

Expressions of Higher Order Thinking
and the Smile and Laughter Response in Two-
Year-Old Children

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Abstract

This thesis explores the eudaemonic topic of Expressions of Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children, aiming to answer to the question; ‘can adults provoke higher order thinking and pleasure simultaneously for positive developmental progress in two-year-old children?’

Studying higher order thinking and pleasure together in two-year-olds bridges the separation of “academic” learning and wellbeing, reflecting evidence that emotion and cognition are integrated. This focus is also timely for policy, aligning with Department for Education (2025) Best Start in Life strategy, which prioritises high-quality early learning, play, and integrated family support to promote children’s development and wellbeing concurrently.

Using an exploratory sequential mixed-methods design and employing mixed method-grounded theory and praxeological principles, the research aligns with the needs and realities of children, families, and the Early Childhood sector. It positions practices relating to expressions of higher order thinking and the smile and laughter response as capable of instigating positive change, even within Early Childhood services that operate under arguably suboptimal circumstances.

The research is organised into two interconnected phases; Exploratory (Study 1: questionnaire; Study 2: multimodal case studies) and Experiential & Legitimacy (Study 3: within-subject experiment; Study 4: co-production), which come together via situational analysis to integrate findings and address the research questions, aims, and objectives.

The thesis redefines smiles and laughter as both pedagogical tools and measurable physiological data, identifying activities and conditions that optimise their co-occurrence with higher order thinking. Emotional expressions are positioned at the centre of early cognition, emphasising the body as the primary site of learning rather than treating expressions as byproducts. These findings inform the recommended and corroborated practical strategies for adults involved in the care and education of two-year-old children. A unique contribution of this thesis is the ‘Expressive Embodiment of Affective Cognition’ discussional theory. While not claiming conclusiveness, the theory is presented as open to further development. Finally, the thesis outlines future avenues for research, career development, and post-doctoral dissemination.

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Abbreviations

AEPS-3 - The Assessment, Evaluation and Programming System for Infants and Children

BECERA - British Early Childhood Education Research Association

BERA - British Education Research Association

BPS - British Psychological Society

CoEL - Characteristics of Effective Learning

EC – Early Childhood

ECS - Early Childhood Settings

ECSDN – Early Childhood Studies Degree Network

EEoAC - Expressive Embodiment of Affective Cognition theory

EPPE - Effective Provision of Pre-School Education

ECQRS-EC - Early Childhood Quality Rating Scale

EF – Executive Functioning

EYFS – Early Years Foundation Stage

HOT – Higher Order Thinking

HOTT – Higher Order Thinking Talk

ITERS - Infant-Toddler Environment Rating Scales

MM-GTM - Mixed Method-Grounded Theory Methods

NSPCC - National Society for the Prevention of Cruelty to Children

OECD - Organisation for Economic Co-operation Development

PVI – Private, Voluntary and Independent

SEFDEY - Sector Endorsed Foundation Degree in Early Years

SEND - Special Educational Needs Disabilities

SSTEWS - Sustained Shared Thinking and Emotional Well-being

TACTYC - Together and Committed to Young Children

TOM – Theory of Mind

TIPTOS - Teaching Pyramid Infant-Toddler Observation Scale

UNICEF - United Nations International Children's Emergency Fund

UNCRC – United Nations Convention Rights of the Child

Chapter 1 - Introduction

Consistent with established guidance for doctoral introductions (Roffey-Barentsen & Reilly, 2025), this chapter introduces the key concepts and context underpinning the overall intention of the PhD research, in this thesis' case, exploring the question 'can adults provoke higher order thinking (HOT) and pleasure simultaneously for positive developmental progress in two-year-old children?'

This introductory chapter establishes the foundations for the thesis by outlining the significance of the research topic, the context from which the inquiry emerged, and the rationale underpinning the study. The chapter begins by considering the importance of two-year-old development and the factors that influence developmental outcomes during this critical period. Attention is then directed towards the key concepts explored throughout the thesis, namely HOT and smiles and laughter, and their potential relevance to children's developmental progress. Following this, the chapter presents the personal and professional motivations that inspired the research and discusses the researcher's positionality, including the importance of adopting a eudaemonic research focus. The chapter then introduces the overall research design, including the research aims, objectives, questions, and four interconnected studies that comprise the inquiry. Finally, the chapter identifies the research gap and broader resonance of the study, before providing an overview of the structure and organisation of the thesis to support reader navigation. Collectively, these sections establish the justification, direction, and purpose of the research presented throughout the remainder of the thesis

This chapter positions the thesis within the broader field of Early Childhood (EC), establishing that HOT and smiles and laughter, should be intentionally supported by all adults who care for and educate two-year-old children, whether in family contexts, EC services or everyday interactions. In doing so, the research responds to growing recognition that promoting children's cognitive development and wellbeing is a shared societal responsibility, as the Royal Foundation Centre for Early Childhood (2024) asserts, everyone has a role to play in prioritising EC which is fundamental to creating a "happier, healthier society". While HOT and related emotional expressions such as smiles and laughter at age two reflect universal integrated developmental processes (Rijavec, Goulb *et al* 2021; Roman, Risoto *et al* 2022; Rahmaniya, Muthmainah *et al* 2025), they have traditionally been examined separately with increasing recognition that thinking and emotion are intertwined processes that shape

children's learning, wellbeing and social participation (Immordino-Yang & Damasio, 2007; Whitebread, 2012; Rijavec, Goulb *et al* 2021; Roman, Risoto *et al* 2022; Rahmaniya, Muthmainah *et al* 2025). Within England, practice with children aged two (covering birth to five) is guided by the Early Years Foundation Stage (EYFS) (DfE, 2024), which emphasises communication, critical thinking, play, relationships and emotional wellbeing. While the EYFS recognises the importance of characteristics of effective learning, including creating, thinking critically and active learning, comparatively little guidance exists regarding how adults involved with the care and education of two-year-old children might intentionally cultivate HOT alongside positive emotional experiences such as smiles and laughter. This thesis therefore examines these processes within the policy and practice context of England, drawing on English-residing participants and contexts, while generating findings that may hold wider international relevance reflective of the universal developmental process of expressions of HOT and the smile and laughter response introduced in this chapter.

1.1 The Importance of Studying Two-Year-Old Development

Early child development is vital because the first years of life lay the foundation for later learning, health and wellbeing (World Health Organisation, 2020; The Royal Foundation Centre for Early Childhood, 2023; Royal College of Psychiatrists, 2023; Parent-Infant Foundation, 2023; Institute of Health Visiting, 2023; Foundations, 2023; Anna Freud Organisation, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024; Department for Education, 2024). In the UK, the Department for Education (2025) published a Plan for Change; ‘Giving Every Child the Best Start to Life’ as inequalities in development start early, with some children already falling behind in key milestones before they reach school at the age of five, largely due to variations in the richness of early interactions and the support available to families. The Department for Education (2025) emphasises that the foundations for lifelong success include communication, emotional regulation, relationship building, and early problem solving, and are laid in the first few years, making this time a pivotal stage for shaping positive developmental trajectories. Furthermore, the Department for Education (2025) emphasise that the Early Years Foundation Stage (EYFS) curriculum should be adopted by EC services as it ensures children “learn and develop well” from birth to five. Ji *et al.* (2025) scoping review indicates that social–emotional development accelerates significantly at age two, with peer interactions in EC environments playing a central role.

Their findings highlight the importance of tailored pedagogical approaches for this sensitive developmental stage, while also noting a continuing lack of evidence on effective pedagogy specifically for two-year-olds (Ji et al., 2025). Impactful research such as the Lancet Series 1000 days and the next 1000 days (Draper et al., 2024; Nores et al., 2024) and UK based 1001 Critical Days movement (1001 Critical Days Foundation, 2025) has demonstrated that the first two years of life represent a uniquely sensitive phase in which children undergo rapid physical, neural, cognitive and social-emotional development. The age of two remains critical, as the brain continues to mature at speed and children rapidly extend abilities such as motor coordination, language, social interaction, self-regulation and early Executive Functioning (EF) (Draper et al., 2024; Nores et al., 2024). However, environmental risks, can hinder development during this stage (1001 Critical Days Foundation, 2025; Draper et al., 2024; Nores et al., 2024) and children's progress across these years is strongly influenced by the quality of nurturing care they receive, with nurturing environments characterised by strong health provision, adequate nutrition, responsive and emotionally attuned caregiving, safe and secure surroundings, and rich early learning opportunities (Draper et al., 2024). The period up to age two is seen as critical, by the UK Office for Standards in Education, Children's Services and Skills (Ofsted) a non-ministerial government department in England responsible for inspecting and regulating education, training, and EC services. Ofsted (2025) Getting it Right from the Start report, which found that the first two years establish the basis for physical, cognitive and language development and that by age two, children are already developing independence, early problem-solving skills and short sentences, thus quality EC services should be cognisant of this. However, the Department for Education (2025) highlights that too many children miss essential developmental steps due to poverty, limited access to childcare, or reduced family support services. By focusing research on two-year-olds, families, professionals in EC service and anyone in contact with two-year-old children, can arguably better understand how to strengthen EC experiences for two-year-olds potentially reducing inequalities and ensuring that every child has an opportunity to thrive.

1.2 Factors Influencing Two-Year-Old Development

International evidence consistently positions EC development as socially and environmentally situated, with outcomes shaped by the quality of provision, the nature of adult-child relationships and access to stimulating, play-based experiences (World Health

Organisation, 2020). The Early Years Coalition is a UK alliance of charities and organisations that advocate for improved EC policy and investment, aiming to promote the wellbeing, development and rights of young children, particularly those facing disadvantage (Early Years Coalition, 2025). The Early Years Coalition developed Birth to Five Matters in 2021 which accompanies the EYFS curriculum and other early years policy, it states that emotional security, physical wellbeing and meaningful relationships provide the foundation for healthy development. A similar US based organisation National Association for the Education of Young Children (NAEYC) (2019; 2020; 2025) state key influences on child development are interactions between biology and environment, with early brain architecture shaped through responsive relationships and “serve and return” interactions. Furthermore, NAEYC (2025) state that consistent relationships support brain development, self-regulation and resilience, and children should be viewed as active learners who construct knowledge through play, exploration and culturally meaningful experiences. High quality EC provision therefore depends on intentional, responsive pedagogy, inclusive environments and sustained adult-child interactions that scaffold learning and extend thinking (World Health Organisation, 2020; Early Years Coalition, 2021; NAEYC, 2019; 2020; 2025).

The World Health Organisation (2020) highlights three priority areas for improving outcomes in EC, these include the provision of responsive caregiving and early learning experiences during the first three years of life, support within nutrition interventions and the incorporation of psychosocial support, for both children and parents’ mental wellbeing. These recommendations recognise that development cannot be separated from the quality of caregiving and the broader systems in which families are situated. This ecological understanding is reflected in Bronfenbrenner’s (1977) Ecological Systems Theory, which conceptualises development as occurring within nested layers of influence. According to Bronfenbrenner (1977) children’s immediate relationships and daily environments, such as family, and EC settings, interact with wider community structures, policy contexts, cultural values and historical conditions. Development is therefore shaped through reciprocal interactions across these systems over time (Bronfenbrenner, 1977; World Health Organisation, 2020)

Findings from the UK based longitudinal research of Effective Provision of Pre-School Education Project (EPPE) demonstrate that high quality EC provision, particularly when combined with a supportive home learning environment, has sustained positive effects on

children's cognitive, personal, social and emotional development into later schooling, evident not only in academic outcomes, but pro-social behaviours (Sylva et al., 2015; 2020). According to the Department for Education (2025) secure attachments, consistent routines and sensitive adult responses foster safety, self-regulation and confidence, while adequate nutrition, movement, rest and stimulation enable children to engage and learn healthily. Development unfolds along individual pathways shaped by temperament, health, family context and wider socio-economic conditions, including poverty and inequality (World Health Organisation, 2020; Early Years Coalition 2021; Department for Education, 2025). Children are not passive in this process, they actively shape their own learning, developing competence and resilience through play, exploration and practice (Early Years Coalition, 2021; Department for Education, 2025). The quality of these interactions is central to children's development as adults can support this process through sensitive interaction, modelling regulation, extending language and providing well-judged guidance and opportunities for play and challenge. (World Health Organisation, 2020; Early Years Coalition, 2021; Ofsted, 2023; Brown et al., 2025; Department for Education, 2025; Ofsted, 2025).

1.3 Higher Order Thinking and Social, Emotional Expression in Two-Year-Olds

HOT refers to the ability to move beyond simple recall of facts and instead question information, connect ideas in new ways, and make thoughtful judgements (Bloom et al., 1956; Anderson & Krathwohl, 2001). HOT encompasses tackling unfamiliar problems, transferring knowledge across contexts, applying learning flexibly, integrating problem-solving, critical and creative thinking, analysis, synthesis, and decision-making, and is associated with innovative reasoning and purposeful creation (Bloom et al., 1956; Anderson & Krathwohl, 2001; Frausel et al., 2020; Munar et al., 2022). At two-years old, these abilities are emerging but already significant as children express early forms of HOT when they attempt to overcome everyday challenges, experiment with solutions, and make choices between alternatives (Frausel et al., 2020; Munar et al., 2022). Therefore, this age represents a formative period whereby the precursors of HOT can be intentionally supported by responsive adults (Walker & Gopnik 2014; Frausel et al., 2020). According to Hurside et al. (2024) whether young children engage in HOT depends greatly on the kinds of tasks they encounter and the quality of adult guidance they receive. Therefore, developing HOT is shaped by intentional pedagogy, and thoughtfully designed interactions that can extend

thinking into deep engagement (Lewis & Smith, 1993; de Boer et al., 2018; Hurside et al., 2024). Despite this, HOT remains under researched in EC practice, often limited by much of the current data collected with older participants, or, by a focus on academic outcomes rather than deeper cognitive development (Seifer, 2018; Frausel et al., 2020; Hurside et al., 2024).

Naturalistic observation research suggests that children begin to demonstrate HOT through spontaneous talk between 23 and 27 months of age, particularly when they compare ideas, draw inferences, recognise abstract relationships and connect different experiences or concepts (Frausel et al., 2020). Children use this form of reasoning talk increasingly with age as language develops, highlighting how early thinking moves beyond simple perceptual narration, toward deeper relational behaviours, inviting others socially and emotionally into their thinking (Frausel et al., 2020). Although explicit research exploring emotions as integrated with HOT in under-three samples is limited (Frausel et al., 2020; Ji et al., 2024) studies of toddlers' emotional communicative behaviour show that positive emotional expressions are associated with greater caregiver verbal responsiveness, suggesting that affective behaviour can shape cognitive and linguistic interaction even before age three (Fields-Olivieri et al., 2020).

Personal, social and emotional development is widely recognised as a foundational domain of early development, underpinning children's cognitive, social and behavioural capacities and providing the platform on which subsequent learning and development are built (Department for Education, 2025; Education Endowment Foundation, 2025; The Royal Foundation Centre for Early Childhood, 2025). Emotional expression is a critical component of development in two-year-old children, forming part of the broader domain of social-emotional learning (Ji et al., 2025). Early emotional expressions reflect children's emerging socio-emotional capacities, while also shaping the responses of adults around them, for example, toddlers positive emotional expressions (such as smiles and laughter) have been shown to encourage parents to engage in extended conversation and responsive interaction with them, reinforcing both the child's cognitive and emotional development and the quality of the caregiving environment (Fields-Olivieri et al., 2021). This is further supported by evidence from physiological studies capturing quantitative arousal data (e.g. pupils, facial expressions) that suggested toddlers exhibit distinct emotional responses, such as smiling or arousal patterns, when observing helping interactions, indicating that emotional expressions are closely tied to early social cognition and cognitively evaluating social experiences (Tan & Hamlin, 2024). According to Smith-Flores and Feigenson (2022) two-year-olds use other people's emotional

responses to reason about the physical world, therefore, emotional expression (of themselves and those around them) and HOT are arguably connected at the age of two and warrant more investigation. This is further supported by evidence that caregiver emotional expressiveness predicts toddlers' developing emotional understanding, highlighting the reciprocal nature of emotional communication and cognitive development within adult-child interactions (Ogren et al., 2021). Although adult-child interactions can act as a vehicle for expressions of HOT and positive emotions e.g. smiles, pro-social talk, in two-year-old children, there is still a need for more targeted research on these developmental areas in this age group.

Direct evidence examining the relationship between HOT and emotional expression in two-year-old children remains arguably uncommon, but is increasingly recognised that cognition and emotion are mutually influential systems, whereby children's emotional experiences shape attention, motivation and opportunities for learning, whilst cognitive processes influence how emotional information is interpreted and used during reasoning (Ji et al., 2024). According to Goddu et al. (2024) between 24 and 30 months children are capable of considerably more sophisticated thinking than previously assumed, children demonstrated the ability to use abstract relational rules to solve novel causal problems, transferring knowledge flexibly across unfamiliar contexts which is a hallmark of HOT. Similarly, toddlers have been shown to integrate multiple emotional signals, including facial expressions and tone of voice, when interpreting others' emotions, indicating that emotional understanding and expression requires the comparison and integration of multiple sources of information rather than simple emotional recognition (Brady et al., 2024). Collectively, these findings suggest that emotional expression may not simply accompany cognitive development but may actively facilitate the emergence of HOT by shaping children's reasoning, social engagement and the quality of interactions through which complex thinking is supported. Nevertheless, research has largely investigated HOT, emotional development and adult-child interaction as separate constructs, with relatively few studies exploring how emotional expression and HOT interact during naturally occurring experiences in two-year-old children (Seifer, 2018; Frausel et al., 2020; Hurside et al., 2024). Consequently, examining emotional expression and demonstrations of HOT during everyday interactions with two-year-old children represents an important contribution to the field of knowledge.

1.4 Personal and Professional Rationale for the Research

EC is critically important, yet the sector faces ongoing challenges such as underfunding and undervaluation. At the same time, high-quality EC is vital for children's development, which underlines the need for continued research and support. In the UK, EC services for children and families are delivered through a mix of settings, including maintained and Private Voluntary and Independent (PVI) nurseries, pre-schools, and childminders; services operated by charities, private organisations offering sessional care or community activities and local authorities programmes and settings, often integrating education, care, health, and family support. As the previous sections showcase, the first years of life are profoundly influential in a child's development, despite this, services within the UK EC sector have persistently faced underfunding, undervaluation, and inadequate compensation for staff (Early Childhood Studies Degree Network [ECSDN], 2020; Anna Freud Organisation, 2023; The Royal Foundation Centre for Early Childhood, 2023; Parent-Infant Foundation, 2023; Foundations, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024). This disparity has fuelled a personal passion for advocating the significance of professional practice within the EC sector and for championing the voices of the staff, children, and families involved. Emphasising and centering the voices of children and professionals is fundamental to advocacy in the EC sector (ECSDN, 2020; Early Years Alliance, 2024; Together and Committed to Young Children [TACTYC], 2024). Advocacy in EC services scopes multiple disciplines as it is related to all those involved in care, education, health (holistic and clinical), community/family services (Mevawalla & Archer, 2022). Arguably, it is everyone's duty to improve or influence the quality of lives for children in society (World Health Organisation, 2020; The United Nations International Children's Emergency Fund [UNICEF], 2022).

EC sector professionals should engage in reflective practice, document their experiences, and share their stories to effect meaningful change and advancement within the sector (Johnston, 2018; Foong et al., 2018; Harris, 2018; Taylor, 2018; Rogers et al., 2020; Dobson, 2021; Purcell & Schmidt, 2023). This PhD thesis is one way to fulfil this call to action and share a story as a practitioner turned researcher trapezing educational and psychological subjects by approaching research with praxeological approaches (Oliveira-Formosinho & Formosinho, 2006; Pascal & Bertram, 2012, 2023). Praxeological research is carried out with EC professionals and service users and emphasises making visible their values, processes, and reflections to transform future practice using carefully chosen data collection materials and methods to portray their ecospheres (Oliveira-Formosinho & Formosinho, 2006; Pascal & Bertram, 2012; 2023).

EC development, mental health and wellbeing is an important subject nationally and internationally (Department for Education, NHS England & National Children's Bureau, 2024; World Bank, 2025; World Health Organisation, 2025; UNICEF, 2025). Reed and Parish (2021) identified that through the pandemic there were 'hidden harms' of lockdown on 0-2s which have been "broad, significant and experienced unevenly depending on family background and circumstance" (Reed & Parish, 2021: p.5). This was coupled with a backdrop of consistently underfunded EC services and limited contemporary research into toddler/two-year-old development, mental health and wellbeing (The Royal College of Psychiatrists, 2023). Reed and Parish (2021) highlight the significance of taking up opportunities to elicit and champion 'human connection' in all EC services, for the benefit of the service users and professionals alike, and to use this as the cornerstone for future practices. Hoosen et al. (2024) systematic review of children's psychological wellbeing from a eudaimonic lens discovered that researching using this perspective can enhance flourishing and increase practices that support children's skills for their future by nurturing their emotional expressions and fulfilment. This means recognising that wellbeing involves not only emotional positivity but is multidimensional, for example the development of cognitive skills that enable children to flourish (Hoosen et al., 2024). EC experiences can set the thermostat for future wellbeing and development (The Royal College of Psychiatrists, 2023) therefore, it is crucial that research not only highlights existing successes in supporting children but also proposes transformative practices to enhance outcomes for children's holistic flourishing (Reed & Parish, 2021; Pascal & Bertram, 2023; Hoosen et al., 2024). Ascertaining means of cultivating wellbeing in society is arguably important as worldwide 10% of children and young adults have experienced a mental health or psychosocial problem (World Health Organisation, 2021;2022;2025). In the UK alone, around one million children currently have active referrals to mental health services, and approximately 10% of those aged 10–17 self-report having low wellbeing, with nearly one-third expressing unhappiness about a specific aspect of their lives (The Children's Society, 2023;2024). In 2023 The Royal College of Psychiatrists stated that early action is vital, as prior to the pandemic over 100,000 (5.5%) of two- to four-year-olds in England experienced anxiety, behavioural or neurodevelopmental disorders, and globally around one in five children aged one to seven are affected by a mental health condition. Findings such as this have underpinned the UK launching a Children's Wellbeing Bill (RH King Charles, 2024) which unites emotional and physical wellbeing and educational agendas. This PhD thesis therefore unites some key priorities in the sector by focusing upon Expressions of HOT and the Smile and Laughter Response in Two-Year-Old

Children. As a society, we must address the challenges faced by the EC sector and parents, while recognising and advocating for their vital role, alongside the broader influence of society in supporting children's development and wellbeing (The Royal Foundation for Early Childhood, 2024). This personal and professional rationale highlights the pressing need to recognise, value and invest in EC as a foundational period of human development, while ensuring that the voices of children, families and professionals remain central to research. The challenges faced by the sector, alongside growing recognition of the importance of early wellbeing, relationships and responsive environments, provide a compelling rationale for research that explores the everyday developmental experiences through which two-year-old children express HOT, smiles and laughter.

1.5 Researcher Positionality and the Importance of a Eudaemonic Research Focus

Despite a challenging backdrop in the EC sector, there is much to be positive and optimistic about due to this being the most important phase of a child's life (The Royal Foundation Centre for Early Childhood, 2023). Choosing to be optimistic does not mean denying the challenges faced by the sector and wider society, but it does involve focusing upon what helps children the most and viewing challenges as solvable, due to the impact evidence of high quality EC experiences (The Children's Society, 2024). Therefore, this research positions practice pertaining to expressions of HOT and the smile and laughter response as capable of instigating positive change. A research project framed as capable of positive change can be beneficial because it draws on a praxeological model of EC quality improvement that is participatory, context sensitive and driven by values and reflection (Pascal & Bertram, 2018). This orientation is further underpinned by a transformative stance informed by Dewey's (1933) conception of inquiry as an experiential and reflective process through which knowledge is generated to improve lived experience and inform future action. From this perspective, research extends beyond understanding existing adult-child interactions and two-year-old EC practice, to producing evidence capable supporting meaningful change. Whilst a transformative stance provides the philosophical commitment to improving practice through knowledge generation, praxeology offers the practical enaction through which this transformation is realised. Praxeological research actively engages practitioners and other participants as contributors of situated and experiential knowledge, ensuring that evidence is grounded in the realities of everyday practice and translated into contextually meaningful improvements (Oliveira-Formosinho & Formosinho, 2006; Pascal &

Bertram, 2018; 2020). Together, these complementary perspectives position the present study as both theory-informed and action-oriented, seeking not only to understand expressions of HOT and the smile and laughter response in two-year-old children, but also to generate evidence capable of informing and enhancing EC practice. Within praxeology, a positive stance can fuel reflection using this emotional energy to sustain engagement and entwine research with application, thus enabling transformative practice (Dewey in Boydston, 1991; Pascal & Bertram, 2018; 2020). This resonates deeply with the researcher's own experience of finding pleasure and purpose in the everyday moments of EC practice, something which Pascal and Bertram (2020) refer to as eudaemonia.

Eudaemonia is a concept originating from Aristotelian philosophy, it emphasises living in accordance with one's true self and achieving a fulfilling, meaningful life (Symans & VanderWeele, 2024). Pascal and Bertram (2020) highlight that there is much research and focus on performance and academic attainment, yet less on creating conditions for children to flourish and for the children and adults around them to live fulfilled lives. Applying eudaemonic ideals to EC research means focusing on the holistic development of children, beyond academic achievement and considers the visceral response of both adult and child involved (Hoosen et al., 2024). Research with a eudaemonic focus, such as exploring and advocating for practices that support HOT and the smile and laughter response in two-year-olds, seeks to understand and promote conditions that could lend themselves to happiness and fulfilment, furthermore, can contribute to the eudaemonic research gap identified by Pascal and Bertram (2020) and Hoosen et al. (2024).

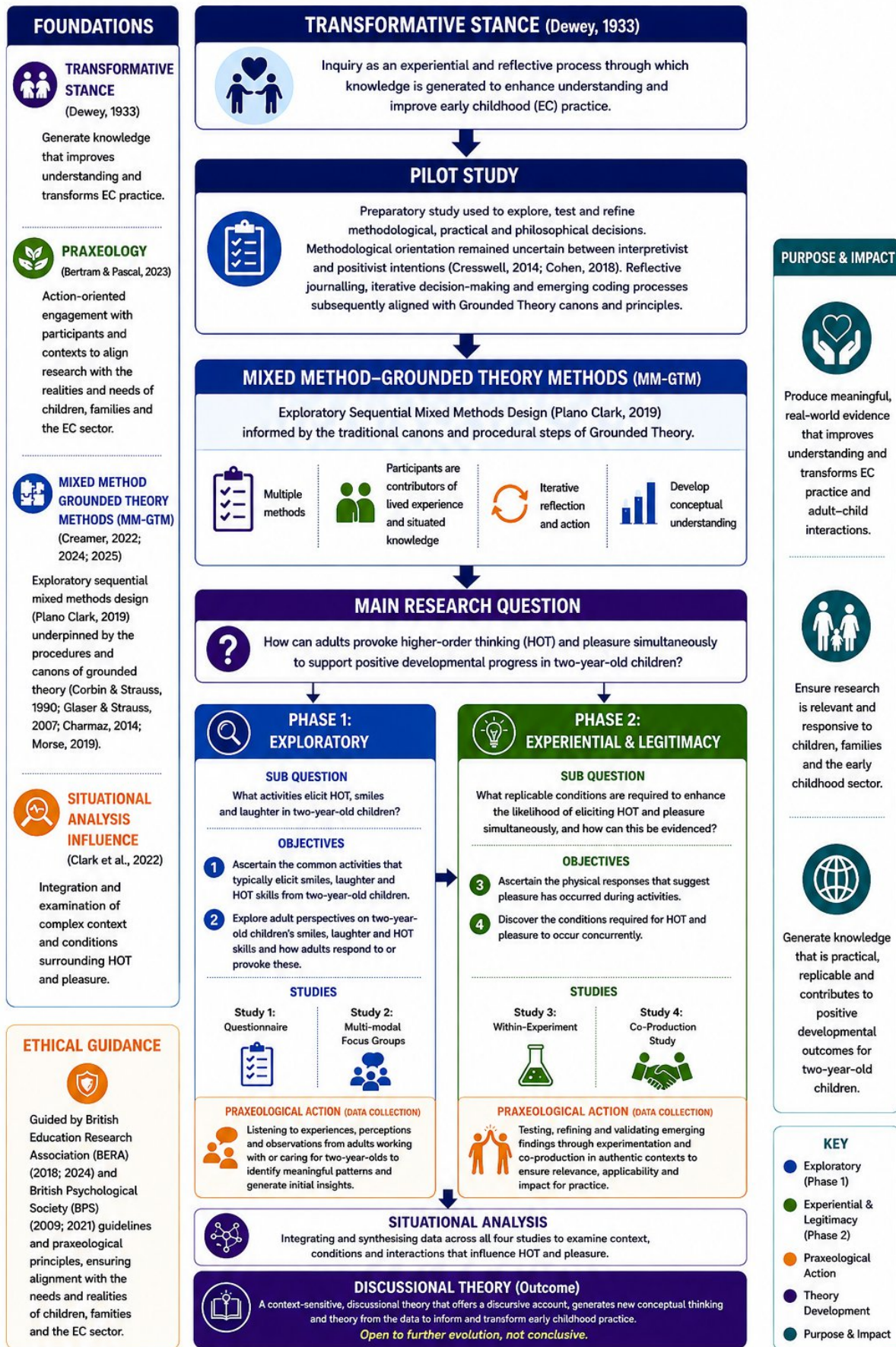
1.6 Research Structure; Aims, Objectives and Studies

The applied psychological and educational topic pertinent to adults who care for and educate two-year-old children, whether in family contexts, EC services or everyday interactions this PhD thesis explores is Expressions of HOT and the Smile and Laughter Response in Two-Year-Old Children.

The research follows an exploratory sequential mixed methods approach (Plano Clark, 2019) via Mixed Method-Grounded Theory Methods (MM-GTM) (Creamer, 2022; 2024; 2025), underpinned by the traditional canons and procedural steps of grounded theory (Corbin & Strauss, 1990; Glaser & Strauss, 2007; Charmaz, 2014; Morse, 2019). The research is

structured across two interconnected phases; ‘Exploratory’ and ‘Experiential and Legitimacy’. This structure is underpinned by a transformative stance, informed by Dewey’s (1933) view of inquiry as an experiential and reflective process through which knowledge is generated to enhance understanding and improve practice. The exploratory and experiential legitimacy dimensions therefore position research as a means of producing meaningful, real-world evidence that can inform and transform EC practice and interactions between adults and two-year-olds (Dewey, 1933; Pugh, 2011). The two interconnected phases each comprise of two studies, sequentially progressing that contribute to a unified inquiry. Ethically, the research is guided by British Education Research Association (BERA) (2018; 2024) and British Psychological Society (BPS) (2009; 2021) guidelines and praxeological principles, ensuring alignment with the needs and realities of children, families, and the EC sector (Bertram & Pascal, 2023). Ultimately, the project aims to generate a discussional theory via the influence of Situational Analysis to unify the inquiry (Glaser & Strauss, 2007; Morse, 2019; Clark et al., 2022) that meaningfully responds to the research question, aims, and objectives, but does not claim to be conclusive, rather, open to further evolution. A discussional theory therefore represents a form of theory development that moves beyond description of findings by providing a discursive account generating new conceptual thinking and theory from the data.

Given the complexity of the methodological and analytical processes underpinning this research, fig. 1 provides a visual overview of the inquiry as a whole. Fig.1 demonstrates how the transformative stance informs the research design, how praxeological principles operate through action-oriented data collection and knowledge generation, and how the exploratory and experiential legitimacy phases are connected through MM-GTM. It further illustrates the relationship between the four studies and the cumulative process through which findings are integrated via the influence of situational analysis to inform the development of the proposed discussional theory. Fig. 1 is intended to orient the reader to the overall structure of the research before the individual components are discussed in greater depth throughout the thesis. Fig 1. is also repeated at junctures in the thesis to help reorientate and remind the reader at key points.



Abbreviations: HOT = Higher-Order Thinking; EC = Early Childhood

Fig. 1 Research Structure and Design Infographic

1.7 Research Gap and Resonance

Currently, there is an evident appetite within the EC sector for research that bridges academic inquiry with practice, policy, and lived experience, especially if there is a ‘feel-good factor’ (Hadley et al., 2023). Individual studies from this research have begun to achieve recognition within the sector, validating its present relevance and indicating strong potential for future impact, for example, early pilot findings and reflections were shared at the ECSDN Conference in 2020 and expanded upon at the Sector Endorsed Foundation Degree in Early Years (SEFDEY) conference in 2021. Study one was presented at British Early Childhood Education Research Association (BECERA) 2023, accompanied by a conference blog aimed at practitioner audiences. This was followed up by an invitation to lead a KinderlyLearn webinar to share insights from all four studies and produce a practice-based blog that suggested explicit implementable ways of using the research. In 2025, a presentation of study two was shared at BECERA 2025 accompanied by a blog, similarly, discoveries from study three have been presented to TACTYC 2025. These sustained engagements demonstrate that the research addresses pressing topics identified as important by practitioners, researchers, and sector professionals. Such engagement is more than visibility, as Hadley et al. (2023) argue, meaningful collaboration between researchers and sector professionals ensures that research questions are aligned with practice and policy priorities, increasing the likelihood that findings are relevant, usable, and adopted in real-world contexts. Being invited to present at leading EC conferences and to contribute to practitioner focused webinars and blogs further indicates that sector professionals perceive the legitimacy and practical value of the work. In addition, requests for dissemination, resources and further collaborative research from charities such as Thrive at Five and Staffordshire County Council, signal that this thesis is not confined to academia but holds potential to shape practice and contribute to society wide impact and is earnestly awaited to be published.

Written Publications

Brown-Cornwall, F. (2025) Exploring the Joyful Path to Development, [Online] Available at [Exploring the Joyful Path to Development — CREC](#)

Brown-Cornwall, F. (2024) Higher Order Thinking and the Smile and Laughter Response, [Online] Available at [Higher-order thinking and the smile and](#)

Conference Outputs

Brown-Cornwall, F. (2025) ‘Emotional Cues and Digital Tools for Higher Order Thinking and the Smile and Laughter Response’ November, TACTYC Conference, Aston Birmingham University

Brown-Cornwall, F. (2025) Joyful Minds: Unveiling Insights into Two-Year-Old Thinking and Laughter, February, BECERA, The Studio Birmingham

laughter response – Kinderly	
Brown-Cornwall, F. (2023) Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children, [Online] Available at Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children — CREC	Brown-Cornwall, F. (2024) Joyful Minds: Unveiling Insights into Expressions of Thinking, Smiles and Laughter, November, Kinderly Learn Online Webinar
	Brown-Cornwall, F. (2023) Higher Order Thinking and the Smile and Laughter Response, February, BECERA, Midlands Arts Centre
	Brown-Cornwall, F. (2021) Smile and Laughter Response in Two-Year-Old Children, SEFDEY Conference, March, Staffordshire University
	Brown-Cornwall, F. (2020) Higher Order Thinking and The Smile and Laughter Response, ECSDN Research Conference, January, Sheffield Hallam

Table 2. Research Resonance

1.8 Signposting and Organisation of the Thesis

This thesis is organised into nine chapters that collectively present the rationale, context, methodology, findings, analysis, and conclusions relating to the exploration of HOT and the smile and laughter response in two-year-old children. The chapters are sequentially structured to guide the reader through the development of the research from its conceptual foundations to the generation of a discussional theory informed by four interconnected studies.

Chapter 1 introduces the research topic and establishes the significance of studying two-year-old children's development. It outlines the personal and professional motivations underpinning the research, presents the research aims, objectives, questions, and overall structure, identifies the research gap, and explains the relevance of the study to contemporary EC practice and adult-child interactions.

Chapter 2 contextualises provision for two-year-old children within the United Kingdom. The chapter examines political, societal, and professional influences affecting EC provision, considering both the expansion of services and the challenges faced by the sector. This chapter provides the wider policy and practice context within which the research is situated.

Chapter 3 presents the literature review. The chapter critically examines existing evidence relating to two-year-old development, HOT, executive functioning (EF), smile and laughter

responses, and the potential relationship between these. The literature review identifies conceptual gaps and establishes the need for the current investigation.

Chapter 4 outlines the methodological approach adopted throughout the thesis. The chapter explains the development of the research design, researcher reflexivity, underlying theoretical perspectives, and the rationale for adopting an exploratory sequential mixed methods design through MM-GTM. Ethical considerations, methodological cohesion, and limitations are also discussed.

Chapter 5 presents the pilot study and demonstrates how the research evolved through reflective inquiry. Drawing upon Dewey's (1933) reflective cycle, the chapter documents the process through which uncertainty, research design development, testing, and refinement informed the final research design and methodological decisions allowing for full transparency.

Chapter 6 presents the Exploratory Phase of the research and contains two interconnected studies. Study 1 reports findings from the questionnaire investigation that sought to identify activities associated with HOT, smiles, and laughter in two-year-old children. Study 2 presents findings from the multi-modal focus groups, exploring adult perspectives regarding the occurrence and provocation of HOT, smiles, and laughter. Together, these studies generate foundational insights that inform the subsequent phase of the research.

Chapter 7 presents the Experiential and Legitimacy Phase and similarly contains two studies. Study 3 reports findings from the within-experiment investigation designed to explore physical indicators of pleasure and the conditions associated with concurrent HOT and pleasure responses. Study 4 presents findings from the co-production study, through which emerging findings are collaboratively refined and legitimised within authentic contexts. Collectively, these studies further develop and validate the concepts emerging from the exploratory phase.

Chapter 8 provides the analytical discussion and represents the point at which findings from all four studies are integrated. Drawing on the influence of Situational Analysis, the chapter explains the analytical process used to unify the inquiry, proposes the discussional theory generated through the research, addresses the research questions, and positions the proposed theory within existing literature and professional practice. The chapter additionally reflects on the analytical journey that connected the studies into a coherent whole.

Chapter 9 concludes the thesis by summarising the principal findings and contributions to knowledge. The chapter identifies theoretical, methodological, and practical implications, revisits limitations, presents recommendations for policy, practice, and future research, and outlines potential next steps arising from the work.

Following the main thesis, the Reference List provides full details of all sources cited throughout the research. The Appendices contain supplementary materials including ethical approval documentation, participant information materials, data collection instruments, and additional resources relevant to the studies.

To assist navigation, readers interested primarily in the overarching methodological design may refer directly to Chapter 4, while readers seeking study specific methods and findings may consult Chapters 6 and 7. The integrated interpretation of findings across all studies is presented within Chapter 8, and the implications and contributions are summarised within Chapter 9.

1.9 Summary

This chapter establishes the significance of researching child development, particularly at age two, a period in which cognitive and emotional processes are rapidly consolidating and shaping future wellbeing. It identifies HOT and emotional expression as underexplored yet conceptually important areas within this age range. The chapter situates development within relational contexts, emphasising the role of sensitive and responsive adults across home and EC services in shaping developmental trajectories. It also introduces a eudaemonic and praxeological framing, foregrounding the value of joy and lived experience in early learning. The research question, sub-questions and objectives are clearly outlined in table 1 and fig. 1, before orientating the reader to the structure of the thesis. In doing so, the chapter sets the foundation for a deeper examination of HOT, smiles and laughter in two-year-old children.

Chapter 2 - Contextualising Early Childhood Provision in England for Two-Year-Old Children

This chapter sets the scene and contextualises the policy framework and influencers for EC services for two-year-olds in England. It traces key policy developments, from legislation to curriculum reform and entitlement expansion, that influence current practice and EC services for two-year-olds. The history demonstrates how successive reforms have positioned EC services, including two-year-olds and their families, as an apparent policy group, highlighting the significance of this developmental stage for later outcomes, parenting practices, and service delivery (Fitzgerald & Kay, 2016; Cameron & Moss, 2020). Since EC was first overtly politicised in 1997, public funding has increased, policy initiatives have proliferated and at each general election political parties compete to surpass one another in the promises they make to families (Cameron & Moss, 2020). Therefore, it is important to explain this context to aid understanding of how policy underpins the environment in which this research is carried out and to acknowledge that research cannot be separated from policy because the latter shapes research agendas, funding, and what is possible in practice in EC contexts (Melhuish, 2016; Harris & Jones, 2018).

2.1 Politicising Early Childhood

Whilst the UK has had education and care provision for two-year-olds pre -1997, it was from this point onwards that the UK moved from a patchwork of local provision for children in their early years towards a more strategic EC policy (Fitzgerald & Kay, 2016; Melhuish, 2016; Bate & Foster, 2017; Harris & Jones, 2018; Cameron & Moss, 2020). Whilst the roots of UK EC policy lie in legislation establishing children's rights and safeguarding from the Children Act 1989, which set out local authority duties to promote children's welfare and provided a legal foundation for child-centred policy and family services, it wasn't until the Labour government in 1997 which placed EC at the centre of its social and education agenda that strategic quality in EC services was considered (Fitzgerald & Kay, 2016; Bate & Foster, 2017; Cameron & Moss, 2020; Nutbrown, 2023). In 1998 Labour set out the first national Early Years Development and Childcare Plans and the National Childcare Strategy for England, which laid down ambitious goals for expanding childcare, creating Sure Start, and

embedding quality standards (Bate & Foster, 2020). The flagship Sure Start programme created area based early intervention services and children's centres aimed at supporting families with children under five, explicitly targeting disadvantage and early learning in the pre-school years (Bate & Foster, 2017; Cameron & Moss, 2020; Nutbrown, 2023). Sure Start established the policy principle that services for very young children should combine health, parenting support and early education in local hubs which is a multi-disciplinary approach still structuring EC co-located, multidisciplinary children's centres integrated in local hubs today (Department for Education, 2025; Institute for Fiscal Studies, 2025).

In 2004 the government published the Ten-Year Childcare Strategy: Choice for Parents, the Best Start for Children, which sought to make high-quality and affordable childcare universally accessible and gave particular recognition to the importance of provision for children under the age of three (Bates & Foster, 2017). Alongside this, investment was directed towards curriculum frameworks such as the Curriculum Guidance for the Foundation Stage and the Birth to Three Matters guidance, the latter being the first publication of its kind to set out principles for supporting babies' and toddlers' learning and emotional development (Sylva et al., 2015; Bates & Foster, 2017; Nutbrown, 2023). This marked a significant policy moment as it placed two-year-olds firmly on the educational map as learners in their own right, rather than children waiting to enter nursery or school (Male & Palaologou, 2016). These curricular developments, together with welfare regulations for childcare settings, which had previously been split between education and care, were brought together in 2008 with the introduction of the statutory guidance for the EYFS (Department for Education and Skills, 2008). The EYFS was particularly important as it unified all early years provision from birth to the age of five across PVI providers, nurseries, playgroups and maintained schools, combining the Foundation Stage, Birth to Three Matters, and the National Standards for Under-Eights Day Care and Childminding into a single curriculum and welfare framework (Department for Education and Skills, 2008; Sylva et al., 2015). For the first time, this meant that two-year-olds in every type of setting were subject to the same statutory learning and care requirements, signalling the consolidation of a coherent national approach to EC education and care (Department for Education and Skills, 2008; Sylva et al., 2015; Male & Palaologou, 2016; Nutbrown, 2023).

The Children Act 2004 was implemented in practice by Every Child Matters outcomes (being healthy, staying safe, enjoying and achieving, making a positive contribution, achieving economic wellbeing) across services for all children aged 0-18 years emphasising the

integrated nature of EC quality and life outcomes. This aimed to strengthen integration between education, health and social care, paving the way for more joined up EC provision focusing especially on safeguarding (Purcell, 2020; Pugh, 2022). The 2003/4 Every Child Matters: Change for Children policy document explicitly set out the five outcomes and mandated the mechanisms for inspections such as Ofsted registered settings, joint area reviews and safeguarding boards (Department for Education and Skills, 2003/4). Whilst this guidance was once central, over time its cross-departmental enforcement weakened, and the emphasis shifted more narrowly to educational outcomes and statutory schooling, rather than the wider welfare, health and parenting supports, thus Every Child Matters seeming slipped quietly away in policy and practice (Brown, 2021).

From 2010 onwards the policy landscape shifted under austerity and successive Coalition and Conservative governments (Arrieta, 2023; Ladreit, 2023), and although universal ambitions continued in terms of improving quality of life for young children via targeted offers, the withdrawal of dedicated funding meant that many Sure Start centres closed and local provision became increasingly uneven (Bate & Foster, 2017; Nutbrown, 2023). At the same time, a significant entitlement reform marked two-year-olds as a distinct, yet discreet, policy group, with the introduction of funded early education places for disadvantaged two-year-olds, an offer that was subsequently expanded to extend eligibility and increase the numbers of children able to access these places, albeit taking much longer than the government had originally planned (Department for Education, 2013).

2.2 Expansion and Challenge

The Children and Families Act 2014 introduced further obligations to professionals in supporting all children equitably in their learning, development and safeguards, followed by the Special Educational Needs Disabilities (SEND) Code of Practice 2015 which supported earlier identification and intervention for young children with suspected or diagnosed SEND, including a clear entitlement for two-year-olds with SEND or from disadvantaged backgrounds, to still access high quality, possibly specialist, provision that fully meet their needs (Department for Education, 2014;2015). The National Children's Bureau is a leading UK charity that seeks to improve the lives of children, especially those in vulnerable circumstances, through policy advocacy, research, and service development, in 2015 they

stated that the age of two is an important period of rapid growth, learning and development, and presents a crucial period whereby the need for intervention services to ensure positive progression can become clear. The All-Party Parliamentary Group for Conception to Age 2 (2015) Building Great Britons report highlighted the societal incentives in prioritising the developmental period of two-years-old and estimated that 23 billion pounds must be spent yearly due to failure in response to this developmental phase. Furthermore, the All-Party Parliamentary Group (2015) acknowledge the advancements in neuroscience which strengthen the evidence of this developmental phase being most influential for life outcomes, particularly in pro-social behaviours and preventing crime, poverty, drug use and early pregnancy, as it sets the groundwork for good citizenship. In 2015 the National Children's Bureau devised the 'Integrated Review' with the Department of Health and Department for Education, combining the previous progress checks for children aged two, this meant that 'The Healthy Child Programme Review at Two' and the 'Early Years Foundation Stage Progress Check at Two' were now a single assessment within the review. The purpose of the 'Integrated Review' is to jointly identify the progress, strengths and needs of children during this significant period, to facilitate appropriate intervention from a collaboration of services, and generate information to contribute to the reduction of inequalities that can cause profound issues for children's later outcomes if not tackled early (Department of Health, Department for Education 2015). The 'Integrated Review' combines the voice of the child, their family, the early years professionals they're involved with, and their health visitor's expertise to develop a picture of the child's health, learning and development within the prime areas of learning; communication and language, personal, social and emotional and physical, whilst exploring cognitive functioning and paediatric health. The need for such an assessment tool at this stage in a child's life evidences the UK governments acknowledgment of the significance of this age range, so much so the Department for Education (2017) stated that the age of two sets the 'thermostat' for future learning and wellbeing. The change for two-year-old integrated reviews was also reiterated in the NHS Long Term Plan and Public Health England (2016) guidance on giving every child the best start in life to bolster key delivery for this age range, identifying that all infant provisions across various disciplines have a role to play in supporting this poignant period of development

Since 2017, policy has prioritised expanding funded hours for three- and four-year-olds, while the two-year-old offer remained targeted toward disadvantage or SEND despite a desire to expand wider (Cameron & Moss, 2020; Nutbrown, 2023). Expansion of the 15-hour

entitlement stalled due to limited funding, local capacity, and workforce shortages. Nevertheless, the Science and Technology Select Committee (2018) emphasised the value of evidence-based, adversity-targeted early intervention, supporting the continued benefit of a focused two-year-old offer. However, the Education Select Committee (2019) Tackling Disadvantage in the Early Years research findings discovered that the UK government had failed to champion the early years workforce despite early years education for children below the age of four having a positive impact on the life chances of disadvantaged children. Furthermore, the Education Select Committee (2019) found disadvantaged children spend significantly less time in pre-school than children from more affluent backgrounds and the funded placement had contributed to further entrenching the divide.

In the years leading up to the Covid-19 pandemic, several policy initiatives focused on early development. Notably, the All-Party Parliamentary Group for Conception to Age Two, established in 2019, and the 1001 Critical Days Movement highlighted the importance of the first 1001 days of life. Their joint work emphasises how early relationships and experiences shape children's long-term development. The 1001 Critical Days Manifesto argues that investment during this stage yields a return of £4–£9 for every £1 spent and stresses the value of supporting positive adult–child interactions, which strongly influence later outcomes, referencing Feinstein (2003) findings that children's development at age two predicts their educational attainment at age twenty-six. Similarly, England's Children's Commissioner (2018) stated that experiences at age two can be equally detrimental should the child experience maternal depression or be surrounded by social deviance, substance misuse and mental illness, as this behaviour is likely to be repeated in later life. The Children's Commissioner (2018) believed there to be at least 8300 babies under one whereby these debilitating factors were evident, so it was becoming apparent that crucial intervention needed to be achieved before the children turned two years old.

The Department for Health and Social Care (DfHSC) (2021) highlighted in the Early Years Healthy Development Review that the time from pregnancy to the age of two sets the foundations for cognitive, emotional and physical development reiterating the initial findings from the First 1001 Days of Life, Health and Social Care Select (2019) agenda. From this the DfHSC (2021) identified action areas for EC which include ensuring families have access to support, information and services seamlessly when they need it, that the leadership of a flexible and skilled workforce is effective in responding to family needs and continual research and evaluation seek to quality assure impact of services. This has been further

echoed by the Babies in Lockdown Report and Babies in Lockdown: Lessons from Local Systems (1001 Days Movement 2021) that highlights personal, social and human connectedness is now more than ever critical for our infants. These findings were not new, as similarly, the Marmot Review (2010) and the Marmot Review 10 Years On (2020) discovered little improvement in the health and outcomes gradient had occurred, despite the recommendations to support children and families in the earliest years being on the policy evaluation agenda for some time. Unfortunately, at the turn of the pandemic, Best Beginnings (2020) discovered that issues faced by families in accessing high quality EC support escalated during the pandemic, consequently, post-pandemic research and innovation in EC practice remain both timely and essential.

2.3 Shared Societal Responsibility

Following the pandemic, EC policy and experiences of two-year-old children took a new lens to understand the resulting impact and necessary action, Oppenheim (2022) Nuffield series of reports into the Changing Faces of Early Childhood in the UK, summarised that changes in family dynamics, increased maternal employment, near-universal EC education, and rising child poverty were key issues facing families. Recommendations for improvements to the UK services included integrated family services, parental leave reforms, enhanced EC education, and tackling childhood poverty (Oppenheim 2022). Phillips (2024) reports that Nuffield are funding a large-scale project investigating how UK local authorities can gather and use information about children and young people involved with their services, so their voices and wider needs are considered alongside the data collected about them to improve EC services. New methods such as sharing their voices through play, emojis and other creative methods are being trialled so even the youngest children can influence service delivery. Whilst the outcomes of the project are yet to be reported upon, it is interesting to see the significance of all the childhood age ranges being recognised, and not just those who are verbal. Also being carefully evaluated is the Family Hubs and Start for Life programme, which is a government promoted programme that provides services to support parents and carers from a child's conception until their second birthday, aiming to transform support for families in 75 local authorities in England, the evaluation of the programme will be available after 2026 (Anna Freud Centre & Barlow, 2021). Currently, the programme aims to enhance and integrate services through transformed family hubs, ensuring timely support for all parents and carers,

while also supporting the development of a national family hub network (Anna Freud Centre & Barlow, 2021). A similar scheme is also running via the Parent-Infant Foundation, who have received government funding to produce The National Parent-Infant Relationship Framework which aims to develop best practice guidance to support parent-infant relationship services for infants aged 0-2years by drawing on UK-wide expertise and research (Parent-Infant Foundation 2025) something which the sector will earnestly look forward to being completed and disseminated.

In 2024 the UK's five leading children's charities: Action for Children, Barnardo's, The Children's Society, the National Children's Bureau and NSPCC, joined together to lobby the government during and post-election to increase children's voices and lived experiences being heard in UK politics with the 'Children at the Table' campaign. An immediate response to this has been the progression of the Children's Wellbeing and Schools Bill (2025) which has seen an agenda geared towards offering more EC services in school locations. This initiative aims to create 100,000 additional childcare places and over 3,000 new nurseries in schools, though whilst the plan aims to improve early years education, it also could impose significant strain on the sector due to a chronic shortage of places, particularly in deprived areas, meaning demand frequently exceeds supply (Sylva et al., 2020). Staff recruitment remains a challenge, as early years professionals are exiting the workforce due to low pay and limited career progression and private nurseries face financial instability, with rising operational costs and underfunding of the government's "free hours" scheme making many settings unsustainable (Bonetti, 2019; Gaunt, 2023). Additionally, gaps in eligibility criteria often exclude disadvantaged families from accessing the intended benefits (Stewart & Reader, 2021) echoing the findings of the Education Select Committee (2019). The All Party Parliamentary Group on Babies (Pregnancy to Age Two) reformed across parliaments in 2024 showed an ongoing commitment to infancy, leading to the government's Best Start in Life campaign which includes a formal inquiry into the early years sector to examine the sustainability of the workforce, families' access to services and the quality of outcomes for young children (House of Commons Education Committee, 2025). Best Start in Life outlines a commitment to strengthening the early years system through close collaboration with the sector, focusing on workforce training and sustained professional development to raise standards with priority areas including; expanding access to evidence-based programmes to improve early literacy and numeracy in Reception, enhancing family services through the continued rollout of Family Hubs and Start for Life programmes, and reinforcing health

visiting and early identification of SEND. These initiatives aim to provide holistic support from pregnancy through EC, ensuring all children are set up for long-term success (Prime Minister's Office, 2025). An ambitious target is for 75% of five-year-olds to achieve a 'good level of development' (GLD) at the end of the EYFS by 2028 (Department for Education, 2025; House of Commons Library, 2025). This strategy is highly significant for provision for two-year-olds, as it responds to the issues of expanding funded entitlements which could encourage greater access to early education from a younger age as evidence consistently shows that high-quality early education can have the greatest impact for disadvantaged two-year-olds, narrowing the attainment gap before school entry (Sylva et al., 2015; Sutton Trust, 2023). However, the policy direction is leaning towards expanding places within school-based settings, with ministers encouraging primary schools to open more nursery provision (Department for Education, 2025). While this may support some families by offering continuity and alignment with later schooling, concerns have been raised that schools are not always the most developmentally appropriate environments for very young children, whose learning is rooted in play, care and secure attachments (Nutbrown, 2021; Pascal et al., 2022).

The PVI sector currently delivers most early years places in England, particularly for two-year-olds, and is recognised as playing a central role in providing flexible, community-based provision that reflects the needs of families (Early Years Alliance, 2025). The Education Committee inquiry will therefore consider whether policies risk undermining the sustainability of this sector by shifting demand and funding towards school-based settings (House of Commons Education Committee, 2025). Pascal et al. (2022) and Early Years Alliance (2025) argue that the PVI sector is uniquely placed to meet the developmental needs of two-year-olds through smaller group sizes, flexible hours, and staff expertise in EC practice, which are not always replicated in school-based provision. This has important implications for inclusion and access as the inquiry has highlighted concerns about 'childcare deserts', where families struggle to find local places, and about the accessibility of provision for children with SEND (House of Commons Education Committee, 2025). Given that the PVI sector often serves disadvantaged communities and offers more flexible entry points, policies that overlook its role could exacerbate inequalities in access for two-year-olds at a critical stage of development (Sutton Trust, 2023; Nesta, 2025).

From 10 November 2025, Ofsted will implement the Early Years Inspection Toolkit, Operating Guide and supporting information, replacing the previous Early Years Inspection Handbook (Ofsted, 2025). The toolkit aligns with the EYFS statutory framework, with

inspectors focusing on leadership, curriculum, inclusion, behaviour, safeguarding, and transitions (Ofsted, 2025b; Ofsted, 2025c) predictably the transition of ‘school readiness’ which is regularly contested as needing reimagining to truly support two-year-old children (Ovington, 2023). Importantly, the latest Ofsted (2025) approach emphasises evidence gathered through observation and professional dialogue rather than additional paperwork, thereby possibly reducing administrative pressures on staff while ensuring that the experiences, development, and wellbeing of young children remain central to inspection outcomes (Ofsted, 2025d), areas especially relevant for two-year-olds as personal, social and emotional aspects are critical for their needs to be met (Department for Education, 2025). Overall, the updated guidance reinforces the expectation that two-year-old provision is integral to quality EC outcomes and therefore assurance processes will continue to be assessed with the same rigour as provision for older children using a scorecard system (Ofsted, 2025).

A more broad and widely publicised investigation into societal application of EC was enlivened in November 2020, with HRH the Duchess of Cambridge and the Royal Foundation publishing the Five Big Questions that made EC development and family experiences a mainstream media and societal topic. The set up between the Royal Foundation and Business Taskforce for Early Childhood has had notable impact in the UK with The Royal Foundation Business Taskforce for Early Childhood being established by the Princess of Wales in March 2023. The group has been collaborating with major corporations such as LEGO, IKEA, Deloitte, Co-op, NatWest, and Iceland Foods, implementing diverse programs that collectively reach over half a million young children and their families. Notable efforts include LEGO's donation of educational sets to foster emotional learning, Co-op's creation of an EC fund supporting over 130 apprenticeships, and Deloitte's funding of leadership qualifications for more than 1,300 early years teachers. Additionally, IKEA has partnered with baby banks to provide essential items to families in need, and NatWest has expanded its lending capacity to support early years settings (Royal Foundation Centre for Early Childhood 2025). These initiatives show that it is not only policy, but society that has a role to play in the quality of life for two-year-old children. The Royal Foundation Centre for Early Childhood (2025) has also published a framework aimed at improving awareness of and knowledge about social and emotional skills to inspire action across society ensuring children in their early years are in a positive environment.

Internationally two-year-old policy is important, The World Health Organisation's Global Strategy for Women's, Children's and Adolescents' Health (2016–2030) states that the period around two years is pivotal, setting developmental trajectories that shape lifelong outcomes (World Health Organisation, 2016), a notion reinforced through the UNICEF (2016) Baby Friendly Initiative which demonstrates how early support including nutrition, stimulation, emotional care can yield measurable cognitive and health benefits by age two. Positively, the UK performs relatively well in outcomes for two-year-olds: in 2023-24, approximately 91.2% of children in England achieved expected levels of personal, social development by age two to two-and-a-half, though this is still slightly below pre-pandemic figures (Department for Education, 2024). However, in international comparison the UK underspends heavily in early years education with Organisation for Economic Co-operation Development (OECD) data showing the UK's expenditure per child aged zero-five is around US\$7,462, which is under the OECD average of US\$12,749, placing the UK among the lowest investing advanced economies (OECD, 2024). Nonetheless, since 1997, UK policy has aimed to balance access, quality, and parental employment, yet enduring challenges in funding, workforce, and capacity still influence how policy is experienced by two-year-olds and their families.

2.4 Summary

Since 1997, UK policy has placed EC firmly on the political and societal agenda, with specific curricula, funding and service agendas for the nations, specifically England covered in this chapter. While there is broad recognition of the significance of the early years, particularly age two, reflected in targeted funding for children facing disadvantage, persistent challenges have remained, especially due to austerity. Concurrently, the evidence base supporting EC services has expanded, highlighting the sector's role in shaping children's life trajectories. Research consistently demonstrates that wellbeing, secure relationships, and high-quality EC environments are critical to long-term outcomes. As EC provision continues to expand and attract political attention, sustained research and policy engagement remain essential, particularly given ongoing structural challenges and the shared societal responsibility to respond.

Chapter 3 - Literature Review

To have a sufficient understanding underpinning an investigation into HOT and the smile and laughter response in two-year-old children, this literature review has used a descriptive and mapping approach (King & He, 2005; Paré et al., 2015; Petersen et al., 2015; Hempel, 2020). The literature review intends to identify a representative number of works on firstly, the significance of two-year-old development, including how the brain develops and the sensitive periods of opportunity for learning around this age. Secondly, expressions of HOT in two-year-old children, acknowledging the synergies and differences between EF, touching on EC practice eliciting HOT and EF. Finally, the smile and laughter response and how this can signal pleasure and/or cognition. The literature concerning HOT, smiles and laughter in two-year-old children is fragmented and conceptually diffuse. Terminology varies considerably across studies, with constructs such as joy, positive affect, humour, and social smiling frequently used interchangeably. Consequently, a narrowly defined systematic review protocol risked excluding relevant studies necessary to understand the subject, therefore, the search strategy has been to offer a demonstrative range of publications within these three areas using descriptive methods of synthesis to present the main themes arising within them (King & He, 2005; Paré et al., 2015; Petersen et al., 2015; Hempel, 2020; Aveyard et al., 2021). Given the exploratory nature of the research questions and objectives, a descriptive synthesis approach enabled the integration of findings from diverse methodological traditions, resultingly, analysis and synthesis of the literature is largely a narrative and descriptive account of mixed method, qualitative and quantitative publications and no formal quality or risk of bias assessment of included literature is required for the purpose of this review (King & He, 2005; Paré et al., 2015; Petersen et al., 2015; Lau & Kuziemy, 2016; Hempel, 2020; Aveyard et al., 2021) . Although scoping reviews are often used to map emerging research areas, the limited number of directly relevant studies and the conceptual overlap between constructs meant that a descriptive synthesis offered greater analytical depth than a mapping exercise alone and allowed for a personal and visceral response to the reading. This literature review intends to ‘set the stage’ and lay the foundations for the following chapters (Hook et al., 2024) rather than attempting exhaustive coverage, the chapter intends to capture key strands of research across applied and developmental psychology, EC, and affective cognition research.

3.1 The Significance of Two-Year-Old Development

As acknowledged in the Introduction chapter, the brain's capacity to undergo structural and functional reorganisation in response to environmental influences within distinct developmental windows is known as a critical period (Dehorter & Del Pino, 2020), with the age of two being a key phase (Knudsen, 2004; Shonkoff, 2017; Department for Health and Social Care, 2021; Rudge et al., 2022). The difference between a critical or sensitive period according to Nelson and Gabard-Durnam (2020), Dehorter and Del Pino (2020) and Knudsen (2004) is that during a critical period, development is irreversible and changes brain configuration, whereas sensitive periods lead to various connectivity patterns which could be compensated somewhat, however both terms (critical and sensitive) are used in literature and indicate a crucial phase of development. Within a critical or sensitive developmental period, such as the age of two, specific stimuli activate heightened neural plasticity, facilitating essential development (Dehorter & Del Pino, 2020, Nelson & Gabard-Durnam, 2020). This critical or sensitive period plays a fundamental role in EC development, shaping developmental trajectory in response to early experiences (Shonkoff, 2017; Department for Health and Social Care, 2021; Rudge et al., 2022). In the first year of life rapid neural connections are formed followed by the second year where a period of equally rapid proliferation and pruning occurs, the brain circuits become more efficient and the highest cognitive functioning happens (Shonkoff, 2017; Boyd, et al., 2019; Department for Health and Social Care, 2021; Rudge et al., 2022).

Brain size increases dramatically, reaching 80-90% of adult volume at two-years-old (Ouyang et al., 2019). According to Conkbayir (2018) neurons are the building blocks of the brain, babies are born with approximately 86 billion neurons, each neuron will form thousands of connections with other target neurons through synaptogenesis. At the age of three, each neuron has approximately 15000 synapses which is twice that of an adult brain (Conkbayir, 2018). The synapses that do not get used go through a process of pruning which strengthens existing structures and makes space for new connections. Synaptogenesis and pruning occur at the greatest rate in EC around the age of zero to three, Tregellas and Legget (2020) commentary on advances in neuroimaging explain that rapid brain growth occurs in the first year, cortical thickness and surface area increases steadily with the age of one to two years seeing the largest increase. Tregellas and Legget (2020) and Gilmore et al. (2020) state that there are individual variations in grey and white matter evident on scans of children

taken sequentially at different ages over one to six years, which they suggest arguably shows promise for early interventions to support cognitive development. If variations in grey or white matter are linked to cognitive challenges or successes, early, personalised interventions could support a child's development while the brain is still highly plastic, making tailored approaches more effective than generic strategies (Tregellas & Legget, 2020; Gilmore et al., 2020). Similarly, Nelson and Gabard-Durnam (2020) identify that there is a lot of evidence on the impact on the brain caused by adversity in early years, thus providing a window of opportunity to learn more about positive interventions and the impact they can have on brain development. As neural connections are strengthened and grow based on experiences, the pathways which form the brain's neuroarcheology happen because of positive or negative repetition of experiences in the infant years, potentially reiterating the importance of discovering more about the impact of positive experiences (Perry, 2001; Shonkoff, 2017; Conkbayir, 2018; Department for Health and Social Care, 2021).

The limbic system is also known as the 'emotional brain' as this is the area concerned with processing, storing and expressing emotional aspects of thinking (Mesulam, 2000; Catani et al., 2013; Connaughton et al., 2024). Twardosz (2012) highlights that babies are born with an experience-dependent limbic system which therefore is reliant upon positive social, emotional and cognitive stimulation from the environment, EC is therefore a sensitive period for the limbic system to develop (McCain et al., 2011).

The limbic system influences how we respond to stimuli, including new opportunities, challenges and is an essential factor in readiness and emotional state to learn. According to McCain et al. (2011) the limbic system influences our arousal, emotion, attention, behaviour and subsequent recovery following an experience (positive or negative). Since babies are primed to be interested in faces and initiate non-verbal communication (typically gaze, cries and smiles) how adults respond creates a serve and return exchange that is poignant in sculpting the neuroarcheology in the limbic system (McEwen, 2008; Centre of the Developing Child, 2010; McEwen et al., 2010; Shanker & Bertrand, 2011; McCain et al., 2011). The neuroarcheology established in early life in the limbic system influences the holistic health, education and behaviour outcomes throughout the rest of the child's life (McCain et al., 2007). The first three years of life are therefore important in supporting healthy development of this area of the brain which helps to manage emotional (visceral reactions, emotive behaviours) and cognitive functioning (memory, narratives, semantics,

spatial orientation, introspective self-directed thought) across the lifespan (Rajmohan & Mohandes, 2007; Catani et al., 2013; Connaughton, 2024).

The prefrontal cortex of the brain provides information to the limbic system which then relays information back to the prefrontal cortex, the brain processes and interprets stimuli using emotions, memories and senses, our intelligence and emotions are based upon these interpretations and complex interactions within the brain lead to the cognitive embodiment or external expression (McCain et al., 2011). Mehsen et al. (2022) highlights that the prefrontal area of the brain is associated with control of superior activity and classifies EF as cold (only cognitive components) or hot (with socio-emotional components) (p1). The hot EF incorporates the cortical limbic system due to the combination of emotional and cognitive brain structures (anterior cingulate cortex, dorsolateral prefrontal cortex, amygdala, hippocampus) being coactivated (Maclean, 1952; Brock et al., 2009; Zelazo, 2020). Therefore, the emotion associated with a memory or learning experience is profound in determining whether or not a child perceives similar stimuli as positive or negative in the future, thus the emotional and cognitive ‘regulator’ for learning is set early in life by the structure and development of the cortical limbic system during this sensitive period (Krugers et al., 2016; Gee, 2020; Stenson et al., 2020). Activities that elicit decision making and self-regulation pertaining to delaying gratification in anticipation of a better reward are advantageous in provoking hot EF that require the corticol limbic system to work (Mehsen et al., 2022). Jarrold et al. (2023) demonstrated that working memory and inhibition can be measured in EC, via Gratification Delay Test, Iowa Gambling Task, Children’s Gambling Task, Sticker Search Task, and the Pre-School Self-Regulation Task as methodological means to assess hot EF, however there are few reported studies into naturalistic accounts of capturing or purposefully eliciting hot EF, equally the accuracy of the methodological assessments are debatable (Hongwanishkul et al., 2005, Mehsen et al., 2022). Holmboe et al. (2021) validated the Early Childhood Inhibitory Touchscreen Task for measuring response inhibition in toddlers which is being used as part of a longitudinal study by the University of Bristol is investigating how EF, particularly inhibitory control and working memory, develop in children aged six months to five years. Using touchscreen games and neuroimaging, researchers are able to assess how toddlers adapt to changing patterns, remember simple tasks to offer insights into foundational cognitive skills essential for learning to clarify when and how these skills emerge (Gill, 2025). The touchscreen format reduces linguistic and

attentional demands associated with earlier EF research tasks, enabling more reliable assessment.

Hoicka et al. (2018) found that two-year-old children learn to think divergently in a social manner, especially when those around them are demonstrating low to high levels of divergent thinking. Hoicka et al. (2018) found that adults who can role model ‘higher order’ adaptations, novel behaviours and innovation with unfamiliar toys and resources influenced the two-year-old children observing them to do the same during their own play. Children who had been exposed to divergent thinking were more likely than those who had not to showcase divergent thinking themselves (Hoicka et al. 2018). Therefore, exposure to HOT, EF or divergent thinking comes from a social experience, and shared experiences between child and caregiver are important at the age of two as strong maternal attachment during this period is closely linked to fewer behavioural difficulties by age three (McKay, 2025). Evidence from the Strengths and Difficulties Questionnaire shows that higher maternal attachment scores consistently correlate with lower behavioural problem scores, even after accounting for socio-economic and demographic variables. Notably, children in the lowest 20% for maternal attachment experience approximately 1.5 more behavioural issues than their peers with moderate attachment levels, highlighting the foundational importance of secure early bonds in shaping later emotional and behavioural expressions and outcomes (McKay, 2025).

Development is influenced by a wide range of interacting factors, with attachment representing only one of many elements that may contribute to HOT and the expression of positive emotions. Increasingly, research has begun to question the extent to which attachment theory should be prioritised in explanations of early development. For example, Meins (2016) argues that attachment theory is somewhat overemphasised, noting methodological limitations and concerns about the transferability of early attachment research across diverse cultural and contextual settings. However, there is caution against dismissing attachment theory entirely (Beckwith et al., 2022; Hammerlund et al., 2022; Foster et al., 2025) instead, they suggest that the field should focus on updating how attachment concepts are understood and applied within EC practice and family support.

The brain is most flexible in EC with rapid growth and learning occurring from birth to five years, and especially from birth to three, when foundational skills in language, social-emotional, and physical development must be acquired (Chugani, 1998; Bruer, 2011; Boyd et al., 2019). While development continues throughout life, infancy is critical for establishing the foundations that shape future growth and outcomes. Although development continues

across the lifespan, infancy and toddlerhood are widely recognised as sensitive periods during which early experiences can have lasting influences on developmental trajectories. This highlights not only the importance of understanding development during this stage, but also the need for further research that translates emerging knowledge about two-year-olds into practical applications for EC, caregiving practices and policy. Greater emphasis on the application of research findings is therefore essential to ensure that insights into early development meaningfully inform practice and support environments in which young children learn and thrive.

3.2 Expressions of HOT and EF in Two-Year-Old Children

HOT has gained increasing attention in educational research, particularly due to its inclusion in the key competencies outlined in United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2020) Education for Sustainable Development framework. This framework emphasises the integration of cognitive, behavioural, social, and emotional learning dimensions to equip learners with the skills necessary to navigate a complex and rapidly changing world (Pollarolo et al., 2023). Within EC education, research by Pollarolo et al. (2023) highlights that EC professionals often frame HOT skills, such as critical thinking, in relation to a child's social and physical development. This approach aligns with UNESCO (2020) broader vision, which emphasises fostering competencies that support transformative learning, essential for achieving sustainability goals. The focus on HOT skills at an early age contributes to the cultivation of critical, reflective individuals capable of driving the societal changes envisioned by UNESCO (2020) sustainable development agenda.

Resnick (1987) in Pollarolo et al. (2023) explains HOT is impossible to faultlessly define, however HOT is immediately intuitively recognisable when encountered. Frausel et al. (2020) summarise many definitions of HOT and explains it involves rearranging, extending and using remembered or new knowledge in novel ways. Frausel et al. (2020) state that there is no firm onset of HOT in development, rather infants begin to generalise, grapple with relational thinking (cause an effect) and develop and sustain relationships pre-linguistics.

Sim and Xu (2017) experiments identified that two-year-old children's self-directed play supports the development of higher order generalisations comparable to adult led or didactic activities, therefore, children and adults play an active role in learning and developing their

HOT. Walker and Gopnik (2013) found that children between 18 to 30 months, can infer a higher-order relational causal principle during play, following just a few observations of a task they can generate expected and novel outcomes (cause an effect and play with what they know to make new meaning). Kimuru and Gopnik (2019) highlight that young infants develop their higher order beliefs very early, for example their beliefs about the sounds certain animals make, they are then able to predict the sounds a new or fictitious animal could make to build on these beliefs. By the age of four children require strong counterevidence that conflicts with their beliefs to change their minds (Kimuru & Gopnik, 2019), therefore HOT arguably develops powerfully in the pre-school years.

HOT becomes more explicit once language is being used, typically at the age of two, as this is when children use their own spontaneous talk and can articulate some of their thinking (Frausel et al., 2020). Frausel et al. (2021) findings indicate that as children aged 15 – 48 months language develops, so too does their Higher Order Thinking Talk. Children during this age range use their increasing ability to express relations, draw comparisons, abstract their thinking, represent and make inferences, though Frausel et al. (2021) and Henry et al. (2012) acknowledge all children do not experience this along the same trajectory due to their unique circumstances, especially those with language or cognitive impairments.

For two-year-old children with special educational needs, disabilities, neurodivergent or ‘non-typical’ development there is increasing evidence that HOT and EFs are impacted upon (Henry et al., 2012), The extent to which HOT and EFs are developed is unique to each child, some cognitive skills can be more advanced than others e.g. a child maybe better at switching attention and behaviour rather than planning (Bishop & Norbury, 2005a; 2005b) and this can be the case for all children. Nevertheless, should a child have a particular development impairment, HOT and EF can be affected.

HOT and EF as phrases are sometimes used interchangeably to describe each other, for example Carlson (2005) and Thibodeau-Nielsen (2018) define EF as “higher order thinking processes that allow individuals to override automatic thoughts for more adaptive of goal directed responses” (p121). Similarly, Henry et al. (2012) describe HOT and reasoning skills as EF. There are synergies between EF and HOT, according to Henry et al. (2011, p.37) EF involves “high-level goal-directed behaviour, strategic planning, flexibility of thought and action (switching), inhibition of inappropriate responses, generation of new responses and concurrent remembering and processing (working memory). In other words, “processes that

control and regulate thought and action” (Friedman et al., 2006, p. 172). EF can exist in the realms of HOT or Lower Cognitive Activity, EF is arguably a set of mental capacities and HOT a set of mental abilities (Brock et al., 2009; Saifer, 2018; Zelazo, 2020; Mehnen et al., 2022), EFs can be defined as a set of skills used to inhibit, regulate and plan behaviours. A child may have the EF capacity to be goal-directed, plan yet remain flexible, inhibit behaviours or thoughts and create new meaning, yet this will differentiate on continuums of complexity and difficulty depending on their lower or HOT abilities. To use the example of animal sounds, when asked to imagine the sound of a fictitious animal, children might offer no response, repeat familiar sounds from similar animals, or creatively invent a new, reasoned sound. As aforementioned Mehnen et al. (2022) classifies EFs into two camps, cold or hot. HOT relates to hot EFs whereby the complexity in which the cortical limbic system coactivating cognitive and emotional aspects can function. Nevertheless, there is a gap in research into HOT hot EFs in children and research into EF typically concentrates on cold EF skills/capacities (Cesari et al., 2019; Mehnen et al., 2022).

Brookhart (2010) categorises HOT into three main areas: knowledge transfer, critical thinking, and problem solving. Lai (2011) further elaborates on critical thinking, identifying it as the sum of two key components: cognitive abilities and dispositions or attitudes. Consequently, a comprehensive exploration of HOT requires examining many aspects in detail as HOT can seemingly manifest in various forms in two-year-old children (Pollaro et al., 2023). One form is play as it is a rich arena for observing two-year-old interaction, thinking and wellbeing with ‘shared smiles’ as a key component of a nonverbal action two-year-olds use to initiate relations, show mutual awareness and convey joint attention (Engdahl, 2021). Yogman et al. (2018) state that play is brain building and vital for children’s cognitive, social, motor and emotional development and expression. Loebach and Cox (2020) identify the well evidenced link between play and healthy holistic development which can be observed and studied for improved practice in EC provision. Hughes (1996;2002) provided the first play taxonomy, later referred to as typologies, for the benefit of playworkers providing a diverse and enjoyable experience for children in their pre-school years, this has since been synthesised and added to, to update play such as digital play (Loebach & Cox, 2020) which can aid EC professionals with their play offering and subsequently support children’s healthy HOT and EF development and emotional expression.

Each play type has the potential to cultivate HOT, EF and smiles and laughter, for example, imaginative play is a particularly important play type as it enables children to showcase their

developing social-cognitive skills and enables researchers to study development of social and cognitive processes (Haight et al., 1993; Harris et al., 1997; Walker-Andrews et al., 1999, Lillard et al., 2013, Jaggy et al., 2023). Using imaginative play is highly opportunistic for adults to elicit HOT and smiles and laughter in two-year-old children due to the thinking process, emotional climate and skills used during this time Thibedeau- et al. (2018). Fantasy play or fantastical components in play increase the development of HOT and EF compared to non-imaginative play types, fantasy is also more beneficial than reality-based imaginative play, as the ability to switch between fantasy and reality is arguably benefiting development of HOT and EF due to the cognitive flexibility and control required (Pierucci et al., 2014; Thibedeau et al., 2016). All objects and situations can be playful creating opportunities for HOT, EF and emotional expression to be observed, Wynberg et al. (2022) explored object orientated play which allowed children to learn about characteristics and cultural applications, discovering that younger toddlers engage in sensorimotor exploration, while older ones demonstrate purposeful sequences and create patterns or categories, effectively imposing their own rules on objects. Koepp et al. (2022) identified that periods of outdoor play that included non-sedentary physical activity helped pre-school children to engage in EF (attention shifting and inhibitory control) upon return to the indoor room, therefore, play, especially when outdoors, can also ‘prime’ children for better EF outcomes and could arguably be used consciously to support HOT development. Similarly, Pollarolo et al. (2023) findings inferred that EC professionals perceive mathematics as an area that can also integrate the social and emotional aspects of HOT via play with problem solving and concrete concepts. Waldman-Levi et al. (2022) examined playfulness in 86 children aged 6 months to two years and found that cognitive skills play an important role in its development. Building on this, studies with children up to age six demonstrate that playfulness tends to increase with age, as children acquire a broader repertoire of play types and advance in their social, emotional and cognitive abilities (Seiler et al., 2024). This is significant because play not only reflects but also enhances EF and HOT, with imaginative, problem-solving and collaborative play offering opportunities to practice skills such as cognitive flexibility, self-regulation and working memory (Schlesinger et al., 2020). Equally, gains in cognitive ability enable richer play experiences, suggesting a dynamic, cyclical process in which play, cognition and emotion continually reinforce one another, creating fertile conditions for learning and development (Seiler et al., 2024) and an opportunity to explore this further with two-year-old children.

Moriguchi (2014) review of research showed that social interaction shapes EF in young children, while EF development in turn supports the cognitive skills needed for social interaction, suggesting a reciprocal relationship between the two. Therefore, it could be argued that socially charged relational practice can cultivate HOT and EF in EC with Cliffe et al. (2022) identifying the power, potential and importance of relational pedagogy, relationships, and connections for the human species' development. According to Basford (2019, p867), relational pedagogy 'originates in genuine, reciprocal encounters that recognise and commit to the contributions of everyone involved in the interaction'. When this commitment is integrated into everyday practice across EC services, relational pedagogy becomes central to supporting many areas of development that can include but not be limited to; EF, HOT and children's overall wellbeing (Cliffe et al., 2022). In terms of relational practices, Siraj et al. (2024) Sustained Shared Thinking and Emotional Well-being Scale is a tool produced to help EC professionals rate and improve intentional relational practices to cultivate high quality social, emotional, cognitive and play experiences which in turn improves children's EF and HOT, including skills such as self-regulation and talk that can narrate thinking. Relational pedagogy, when combined with intentionality in playful and caring contexts, provides a strong foundation for the development of EF and HOT in the early years, and the quality of these interactions, as Siraj et al. (2024) explain, shapes brain architecture and predicts children's learning and wellbeing trajectories, making the earliest years the most critical time to invest in such practice.

One important aspect of relational practice is how attuned EC professionals are, Brandes-Aitken et al. (2020) large longitudinal sample of 1,292 children from predominantly low-income, nonurban communities, found that attuned caregiving in infancy predicted greater joint attention in toddlerhood, which in turn was associated with stronger EF in EC. Attuned caregiving refers to the caregiver's capacity to respond sensitively and contingently to children's cues and emotional signals, supporting regulation, engagement and developmental progress (Brandes-Aitken et al., 2020).

Specifically looking at one component of HOT and EF (memory) Theyer and Wijekumar (2025) discovered that brain activity in both infant and caregivers' left superior temporal gyrus during joint attention was linked to the duration of shared focus and the infants' visual short-term memory, arguably better attunement equates to better HOT and EF expressions in children. Similarly, Markova and Siposova (2019) review of biological markers of attunement found that infants of highly attuned mothers showed more positive social

engagement with their oxytocin reactivity linked to increased gazing at their mothers. This suggests that adult attunement enhances the connection between infants' biological responses and social behaviours, highlighting the important role of highly attuned caregiving in supporting EF and HOT foundations.

The adult role in reflection is also important in expressions of EF and HOT as Muir et al. (2024) found that strengthening EC professionals' skills through ongoing specialised learning offers a practical and sustainable way to support the development of young children's self-regulation, EF and potentially HOT. Mitchell et al. (2025) identified that the role of stand-alone reflective supervision trainings within education settings is a way to promote staff and child wellbeing as reflective practice allows professionals to step back and practice relationally with more intentionality, collaboration and accountability, thus improving children's developmental outcomes. This is further supported by, Madanipour et al.'s (2025) review of 12 qualitative and quantitative studies which identified that reflective practice is a critical component in strategies recommended from the evidence to enhance EF in early years. Mitchell et al. (2025) state that despite reflective practice being commonplace in EC service, there are few studies that unpack this, thus an area of further exploration in terms of pedagogical facilitation of expressions of EF and HOT.

3.3 Smile and Laughter Response in Two-Year-Old Children

Traditional developmental psychology underpins current understanding of smiles and laughter in children, and it is widely accepted that smiles and laughter are a universal indicator of happiness and a positive social and emotional cue. For example, Bowlby's (1969) work on attachment highlights the importance of smiles between child and adult to form secure attachments. Very early work in this area by Bergson (1911) stated that expression of smiles and laughter are influenced significantly by social factors including social norms, values or taboos, and the immediate context surrounding 'comedic' events. The work of McGhee (1979) is prominent in humour development in children and shares two key strands of theory on smiles and laughter; Incongruity Theory proposes children laugh and smile at the perception and resolution of absurd concepts, for example a sheep mooing. Cognitive Mastery Theory (McGhee 1979) proposes children laugh and smile at the resolution of a challenge, gaining mastery over a skill, task or person and will give a larger

smile and laughter response when the challenge is at the peak of their ability i.e. not too hard or too simple. Bainum et al. (1984) built upon all this preceding work and investigated 1847 instances of smiles and laughter in pre-school children and found 95% of occurrences were in a social context with others around. This foundation of research has influenced more recent findings associating smiles and laughter in two-year-old children with cognitive, language and social and emotional development, for example, Addyman et al. (2018) investigated the social facilitation of smiles and laughter in pre-school children and discovered children are eight times more likely to smile and laugh when there is another person/s around, therefore supporting the strength of notion in smiles and laughter being a social tool rather than response to humour. Similarly, two-year-olds also imitate and produce novel jokes and pretend acts when there has been opportunity to socially learn these (Hoicka & Akhtar, 2011; Hoicka et al., 2016). Scott et al. (2022) further argue that social laughter promotes shared understanding and tolerance which are qualities critical for collaborative learning. Complementing this, Paine et al. (2025) demonstrate that humorous peer play in EC encourages the development of social understanding, theory of mind, and emotional flexibility.

The centrality of smiles, laughter, and humour in children's early social and cognitive development has been explored, for example, Mazzocconi and Ginzburg (2022) provide one of the most detailed longitudinal accounts of laughter development in naturalistic contexts. The study of mother and child interactions between 12 and 36 months shows how laughter evolves over time, both in its formal features and in its responsiveness to others, which suggests that laughter is not merely an expression of emotion but an interactional resource that becomes more sophisticated with age and cognition (Mazzocconi & Ginzburg, 2022). Complementing this focus on naturalistic interaction, Hoicka et al. (2022) developed the Early Humour Survey (EHS) which is a parent report measure designed to capture humour development from 1 to 47 months. By offering a reliable tool to track behaviours such as smiling, laughter, and joking across a wide age range, the EHS provides researchers with a practical way to assess humour related developmental milestones that might otherwise be difficult to measure systematically, which is a first of its kind tool (Hoicka et al., 2022).

Other attempts to measure the smile and laughter response have been researched, for example, Yurkovic-Harding et al. (2024) investigated infants at elevated likelihood for autism spectrum disorder, focusing on looking and smiling behaviours at 3 to 4 months of age. While overall smiling levels did not differ from low likelihood infants, the temporal

dynamics of looking behaviours diverged which indicated that early smiling and gaze behaviours may hold diagnostic significance, though they cannot be reduced to simple frequency counts alone (Yurkovic-Harding et al., 2024). Alvari et al. (2021) also discovered in babies (6-12 months) that reduced frequency and activation intensity of social smiles was computed for children with autism via Openface software, this finding conveys that smiling could be a subtle pattern in children's development to detect development progress and SEND needs.

Similarly, Di Stasi et al. (2025) explored the functional role of humour in infant social learning by combining behavioural measures (looking, smiling, laughter) with physiological markers such as heart rate variability, they demonstrated that humour can enhance engagement and learning processes demonstrating how emotionally charged, playful interactions support the development of attention, memory, and social cognition which is experienced in the full body for the child. Similarly, combining cognition and physiological expressions such as smiles, Ger et al. (2024) connected humour and laughter directly to cognitive growth and discovered that young children's recognition of slapstick humour is closely tied to their Theory of Mind development whereby their ability to understand and respond to humour requires an appreciation of others' perspectives and intentions, reinforcing the view that humour is cognitively demanding as well as socially engaging.

However, attempts to quantify humour and laughter risk oversimplifying these complex, socially embedded expressions, especially given that emotion and cognition are deeply intertwined, raising doubts about whether isolated measures of smiling or laughing can fully capture children's learning processes (Immordino-Yang et al., 2019; Damasio, 2021; Hoicka et al., 2022). Similarly, cultural variability must be factored in as Trevarthen et al. (2018) emphasise that early communication is intersubjective and relational, meaning that practitioners must interpret humour and possible expressions of it in the context of specific cultural norms and family practices. These differences are at risk of being medicalised as the findings of Yurkovic-Harding et al. (2024) illustrate that subtle differences in timing of gaze and smiling may be linked to developmental likelihoods such as autism. Yet, Burman (2017) reminds us, developmental psychology can inadvertently frame diversity in expression with a deficit model. Nonetheless, for early years practice, this raises ethical and practical questions about balancing early identification with respect for neurodiverse modes of interaction, with family and cultural situations or other diverse influences.

Ruba et al. (2021) explain that whilst emotions are a complex social phenomenon, children develop the ability to express and understand emotional categories based upon facial configuration early, understanding happy and sad as the first categories in the first year and more complex categories into the second year. Ruba et al. (2021) findings discovered that as children develop language and the EF capacity of working memory, they develop further sub-categories of negative and positive emotional categories both in their perception and expressions in their facial configuration. Regardless of the authenticity, cause or influencer of the smile and laughter expressed, EF and HOT capacities are evident in children's expression and understanding of smiles and laughter. Lillard et al.'s (2021) research found that children aged 18-31 months can simulate emotions and can express and understand others simulated emotions during their play. Lillard et al.'s (2021) data found that happiness was the third most simulated emotion in symbolic and pretend play and the most understood. Therefore, smiles and laughter may be used by two-year-old children in play as a social tool and in response to humour. Nevertheless, there are distinct facial muscle activation patterns that can help distinguish from genuine and false smiles often referred to as The Duchenne. The Duchenne smile is an indicator of a genuine smile as the greater zygomatic muscles contract in the cheek causing the contraction of the orbicularis oculi that results in watery eyes (smile is in the eye). At the age of two children are developing inhibitory control as part of their EF capacity, though amplifying, neutralising, masking, minimising and simulating emotions will be emerging to different degrees of success depending on HOT development. Kromm et al. (2015) note that between the ages of four to seven children are more able (though may still require instruction) to voluntarily simulate and modify emotional expression and understand or differentiate between felt and faked expression and the conceptual reasons for this. Therefore, at the age of two, a smile with genuine Duchenne indicators is a good identifier for cognition and experience that correlates with a feeling of happiness. If the Duchenne indicators are not there, but a smile is visible, this smile can still be considered an observable behaviour that the child has used their HOT capability and EF capacities to use smiles and laughter as a purposeful social cue based on remembered experiences and relational thinking (Frausel et al., 2020). Nelson-Goes et al. (1998) investigation into toddler and mother water play discovered that Duchenne smiles were more prevalent in toddlers during interactions with mothers and inauthentic smiles were prevalent in toddlers with unfamiliar adults. Nelson-Goes et al. (1998) found smiles were used to express emotion, though were also used according to the continuous process model of communication (Fogel, 1993) to mutually create and maintain the interaction. There were differences across the toddler participants in

terms of reasons, timing and duration of smiles (despite being involved in the same task of water play) and differences in their neurophysiology. Young children use faces and eyes from birth to learn from others and express themselves, social stimuli are essential to children learning and children realise they can use their social cues to elicit more response from their environment quickly. Zanolli et al. (1997) research discovered that smiling was more likely to elicit an affectionate response from toddlers than affectionate words or contact, smiles therefore play a key role for socialising and emotions in children's development at two-years-old. Smiles can be a result of happiness and wellbeing, satisfaction of learning and gaining mastery over the environment, or be used to provoke more learning and stimuli, children have a repertoire of cries and smiles as these are the earliest vehicles they have to interact, learn and develop prior to and during language developing. Mora-Ripoll (2011) found that although the human mind is capable of distinguishing between genuine, simulated, and deliberately produced smiles and laughter, the body responds similarly to all forms, triggering physiological and neurological processes associated with positive affect. This means that even simulated or intentional expressions of joy can produce measurable benefits, such as reduced stress, enhanced mood, and potentially improved cognitive and social functioning (Mora-Ripoll 2011). While these findings suggest that both natural and enacted positive expressions may have health promoting and educationally beneficial effects, the mechanisms and practical applications of these effects, particularly in EC, remain unclear. Mireault et al. (2018) research findings suggest that at four months old children laugh in response to social cues, whilst five-month-old children can laugh in response to cognitive features regardless of smiles or neutrality around them. Although these findings suggest early sensitivity to cognitive aspects of the environment, the implications for longer-term social or cognitive development remain underexplored leaving it unclear if by two-years, activities that contain both social uses of smiles and elicit cognitive capacities and capabilities could provoke HOT and pleasure simultaneously for positive developmental progress. Nonetheless, adults need not become overly focused on the medical, social or cultural influencers of a smile, as smiles and laughter are often the earliest established, rehearsed and arguably more readily available cue two-year-olds have to convey and influence their thinking, learning and socialising opportunities. This is arguably an under-utilised tool adults can benefit from in the care and educational practices with two-year-old children.

3.4 The Potential Relationship Between HOT and Smiles and Laughter with Relevance to Two-Year-Old Children

Early experiences and interactions shape children's emotional states and their capacity to learn, with emotional wellbeing playing a crucial role in fostering positive dispositions for development. When conditions are emotionally supportive, learning and pleasure can co-occur, as contented children are more likely to engage and thrive than those experiencing stress or distress (Bowlby, 1969; Conkbayir, 2018; Department for Education 2020).

Research suggests that humans are highly sensitive to the emotional expressions of others, often responding automatically through processes of emotional contagion and interpersonal synchronisation (Hatfield et al., 1994; Niedenthal & Wood, 2019). In EC settings, adults may therefore provide implicit permission for children to engage, explore and express positive emotions through their own smiles, laughter, body language and emotional availability. Such processes are not always conscious; rather, emotional climates emerge through repeated social interactions that communicate safety, belonging and acceptance. Consequently, children's expressions of pleasure and higher-order thinking may be influenced not only by planned pedagogical experiences but also by the affective signals adults inadvertently transmit. Thus, it is difficult to conceive that thinking and emotional expression are isolated, Page (2018) concept of professional love, where educators engage with children with warmth, attunement, and relational care, illustrates how cognitive and affective processes are intertwined in practice. Professional love is not purely emotional; it involves deliberate reflection, decision-making, and responsiveness, meaning that adults thinking shapes the way emotions are recognised, interpreted, and nurtured, while emotional attunement simultaneously informs pedagogical choices (Page 2018).

This emphasis on attuned relationships is also reflected in Clark's (2023) concept of slow pedagogy, which advocates creating time and space for practitioners to observe, listen to and genuinely understand children's perspectives rather than prioritising pace, outcomes or efficiency. Slow pedagogy positions meaningful observation and relational encounters as central to learning and wellbeing, enabling adults to notice subtle expressions of thinking, curiosity and emotion that may otherwise be overlooked. Similarly, Trevarthen's (1999; 2011) concept of communicative musicality highlights how infants and young children communicate through rhythmic, embodied exchanges involving movement, facial expression, vocalisation and timing. Through these synchronised interactions, adults and children become emotionally attuned to one another, creating conditions that support both cognitive and

emotional development. Together, slow pedagogy and communicative musicality reinforce the proposition that HOT and emotional expression develop within reciprocal, relational experiences where adults are sufficiently attentive to children's embodied signals, including smiles, laughter, gesture, rhythm and affective communication. Although smiles and laughter are commonly associated with pleasure, emotional expressions are inherently ambiguous and can fulfil multiple social functions (Niedenthal & Wood, 2019). Smiles may communicate enjoyment, but they may also reflect politeness, affiliation, appeasement, imitation, uncertainty or attempts to regulate social interactions. Consequently, interpreting emotional expression in young children requires contextual and relational understanding rather than reliance on any single behavioural indicator. This reinforces the importance of attuned observation and sustained relationships when attempting to understand children's emotional and cognitive experiences.

Evolutionary theory arguably positions both laughter, smiling and thinking as evolutionarily adaptive mechanisms that continue to shape children's socio-cognitive development (Davila-Ross & Dezechache, 2021; Scott et al., 2022; Paine et al., 2025). Davila-Ross and Dezechache (2021) highlight the evolutionary continuity of these expressions, showing how smiles and laughter in primates and humans evolved to foster social bonding, cooperation, and emotional regulation, improving with intellect, thus, in educational contexts, such behaviours are not merely signs of emotion but function as embodied signals that enhance cognitive engagement.

Actor-Network Theory (ANT) offers a way to connect HOT and smiles and laughter by emphasising how experiences in EC emerge from many interconnected factors, not from single influences alone. Latour (2005) was an important catalyst in this theory, explaining that ANT views social life as networks of relationships that include both people and non-human actors or actants, HOT and smiles and laughter are both outcomes of interactions with human and non-human actants and influences.

One intellectual context smiles and laughter are often associated with is humorous experiences, according to Hoicka et al. (2011, 2021) Two-year-old children's humour reflects their development in social, emotional, language and cognitive domains. Furthermore, Hoicka et al. (2021) established that at two-years-old children can smile, laugh, appreciate and produce humour, thus offering adults around them a social and emotional cue, or window, into their HOT capabilities. Hocika et al. (2021) found that body-based humour e.g.

tickling, funny faces, ‘naughtiness’ e.g. scaring, misrepresentation e.g. acting as something else, incorrect labelling, and playing with social rules and tricks are emerging as the most evident humour types for two-year-olds to enjoy and produce. To smile, laugh, appreciate and produce these kinds of humour children will need to have established or be developing EF capacities and use them with increasing complexity via their HOT capability. Therefore, adults can use humour as a pedagogic tool in early years with children as young as two to facilitate learning with the concurrent pleasure often associated with smiles and laughter. Whilst smiles and laughter do not always denote something pleasurable or humorous, they are a significant feature of social life, and smiles/laughter occurrence in children is underpinned by cognitive development and social and emotional intelligence (Dunn, 2003; Cekaite 2018) thus worth eliciting and working with to establish positive progression in development.

In EC, cognitive and emotional development can be linked to motor activity as young children think, learn, and regulate emotions through movement and sensory engagement with their environment (Pearce & Miller, 2025). Embodied cognition is a theory that encompasses this connection and relates to thinking not being confined to the brain, but as shaped by the body’s actions and interactions with the environment (Shapiro, 2007; Lachman et al., 2015; Shapiro & Stolz, 2019; Pearce & Miller, 2025). Shapiro (2007) referred to in Pearce and Miller (2025) outlines key concepts including conceptualisation, which are ideas that are formed through physical movement, replacement, whereby bodily actions simulate thought, and constitution, whereby cognition emerges from the relationship between body, brain, and surroundings. With this theory, it is reasonable to infer smiles, and laughter can be a means of embodying thinking. Pearce and Miller (2025) states that embodied cognition approaches in EC can offer a fuller understanding of EF development, particularly, working memory and self-control. Adolph and Hoch (2019) review that motor skills are not just physical milestones but foundations of cognitive growth throughout EC. The perception-action perspective emphasises that children’s ability to think and regulate emotions is rooted in how they move through and express themselves within the environment (Thelen & Smith, 1994; Lockman, 2000; Adolph & Hoch, 2019; Pearce & Miller, 2025). EF develops through embodied experiences, where physical/emotional expression and thinking are deeply interconnected, thus showing that the body is central to expressing thinking and emotion in EC (Pearce & Miller, 2025). Fincher-Keifer (2019) states that embodied cognition can help to explain the relationship between the mind, body and emotion as the embodied view of

emotion is that it is a neurophysiological state based upon experiences of movement, senses and perception. Fincher-Keifer (2019) further explains that internal or external triggers of happiness are likely to cause cognitive responses the brain associates with the feeling, leading to an increased heart rate and bodily expressions, for example smiles or laughter. Barrett (2006) explains that multiple elements of the limbic system are involved in expressing, understanding and experiencing an emotional event, including knowledge from sensory, motor and interoceptive experiences, knowledge of expressing appropriate behaviours, involuntary and voluntary facial expressions and bodily posture. Shapiro and Stolz (2019) state the implications for practice involve utilising ‘embodied education’ as a strategy, this involves enhancing learning by intentionally using movement to facilitate understanding and reduce cognitive load, encouraging learners to generate their own movements and observing learners’ expressions and movements to use as diagnostic insight into their thinking.

Similarly, the Theory of Constructed Emotion (Barrett, 2017) proposes that emotions are not innate, fixed responses but are actively constructed by the brain through interpreting bodily sensations in context, drawing on experience, language, and cultural knowledge. Hoemann et al. (2019) suggest that children learn emotion categories by observing how adults consistently use emotion words to label various emotional experiences. Emotional development is a process of concept construction, where a child gradually gains the ability to perceive and experience emotions by building flexible, situation specific emotion concepts (Hoeman et al., 2019). This builds on prior theories associated with a ‘classical’ view on understanding thinking and emotional expressions such as basic emotion theory (emotional reaction are automatic), causal appraisal theory (emotional reactions are triggered by cognitively evaluating a stimuli) and functionalism (adaptive responses serving survival or social functions), these theories arguably perceive emotional expression as a byproduct rather than entwined with thinking (Barret, 2017).

Damasio (1994) somatic marker perspective, argues that emotion and emotional expression is integral to reasoning and thinking as our bodily states provide affective signals that influence decision making (Damasio, 1994). Emotional regulation and cognitive control emerge through maturing connections between limbic regions and prefrontal networks, particularly during EC (Decety et al., 2018). Enactive and affective viewpoints further emphasise that cognition and emotion arise together through dynamic, embodied interactions with the environment (Hipólito & Van Es, (2022). Hipólito and Van Es (2022) propose an enactivist view of social cognition, where understanding is not something that happens solely in the

brain, but is enacted through embodied, real-time interactions. This draws upon dynamic systems theory and active inference, showing how children adaptively align with others in social situations through prediction and synchronisation (Gallagher & Allen, 2018; Hipólito and Van Es, 2022). Children then make sense of the social world through action, movement, and context, constructing meaning from their cultural and embodied standpoints (Hipólito & Van Es, (2022). The work of Hipolito and Van Es (2022) challenges classical theories of emotion and Theory of Mind and alternatively, combine thinking, socialisation and emotional expression as a united areas that develop in relation to each other, not separately.

Polyvagal theory explains the importance of the adult in this relationship between thinking and emotional expression. Warm, responsive co-regulation helps keep children in the social engagement zone, a state of vagal regulation linked to optimal learning and emotional development (Hastings et al., 2008; Porges, 2011; Burgess, 2023). Hastings et al. (2008) found that children's physiological emotion regulation is shaped by caregiver interactions, underpinning Porges (2011) view that vagal tone is a foundation for positive social engagement. Burgess (2023) states that more research is required in EC regarding physiological responses of young children, as it could be helpful in training EC professionals and optimising positive learning opportunities if the subjects of body, emotion and thinking collide.

Kaur and Sharma (2021) highlight that while happiness is recognised as a key contributor to child development, there is currently no universally agreed definition of happiness in EC (Holder, 2012; Anand, 2016; Husted, 2017; Sheldon & Turner-Vorbeck, 2019). Drawing on research with preschool-aged children (3–6 years), happiness is described as comprising positive emotions (such as joy, excitement, and cheerfulness), expressive behaviours (like smiling and laughter), and the absence of negative emotions (such as sadness or anger) (Lewis, 2008; Izzaty, 2018; Kaur & Sharma, 2021). De Haan et al. (1998) in Kaur & Sharma (2021) note that young children communicate and interpret emotions largely through facial expressions. Kaur and Sharma (2021) produced a happiness framework for EC services in India to draw from the significance of happiness and facial expressions of it to promote social and emotional competence among preschool children. This happiness framework for EC services in India is useful for practice because observable expressions such as smiles and laughter provide a practical, real-time measure of children's affective states, which can be directly linked to their engagement, wellbeing, and social interactions (Kaur & Sharma 2021).

According to Lopez and Dukes (2026), the processes through which emotion supports learning are inherently multi-modal. Children and the adults who care for them communicate through a range of embodied interactions, including actions, touch, vocalisations and facial expressions, adapted to the child's developmental stage and learning capabilities. These emotionally embedded forms of communication not only support wellbeing but also influence behaviour and cognitive processes (Dukes et al., 2021). Despite growing recognition that emotional expression and thinking are closely interconnected in EC, the mechanisms through which emotion and cognition intersect remain arguably underexplored (Lopez & Dukes, 2026).

Perhaps HOT and expressions of happiness and joy afford for more attention in research, as Little et al. (2023) surveyed EC professionals and discovered that while the concept of joy was embraced and validated by educators, it was also elusive and hard to define. Little et al. (2023) suggest that validating the place of joy as central in EC education can help to challenge some of the downbeat portrayal of EC services and refocus on positive elements. This is echoed in the work of Pascal and Bertram (2023) who state that eudaimonia emphasises creating daily experiences that enhance children's wellbeing, enabling them to flourish and feel fulfilled. Flourishing involves both feeling good and realising full potential, therefore Pascal and Bertram (2023) invite EC professionals to give greater visibility and status to approaches that recognise the role of context and everyday experiences in the setting which can help us better understand how children's interactions unfold in real time. A eudaemonic perspective allows for more focus on how relational moments, such as expressions of HOT and smiles, contribute to flourishing and fulfilment. It would therefore be remiss not to research thinking and smiling together because emotional expression is not a byproduct of cognition but a co-constitutive part of how children think, learn, and relate (Damasio, 2021; Immordino-Yang et al., 2019; Fredrickson, 2001; Hoicka et al., 2022).

3.5 Summary

This chapter examined literature relating to HOT, smiles and laughter and EC development at two years old. The literature highlights the importance of EC as a period of heightened developmental sensitivity, during which social interactions and emotional experiences play a crucial role in shaping cognitive and social expressions. The chapter conveys that expressions of positive affect, such as smiles and laughter, are closely linked to social and cognitive

engagement and may support learning and exploration in EC contexts. However, the chapter also reveals several areas of consideration, for example, while attachment and caregiver responsiveness are widely recognised as important influences on development, the extent to which attachment theory alone can account for this aspect of practice and developmental influence across diverse contexts is questionable. Furthermore, despite growing interest in emotional expression and early learning, relatively little research has focused specifically on the experiences of two-year-old children, particularly in relation to how smiles and laughter may relate to HOT processes. Finally, the translation of research findings covered in this chapter into practical guidance for EC practice is often not made explicit within the literature, an underexplored area which this thesis aims to contribute towards addressing.

Chapter 4 Methodological Approach

This chapter establishes the overarching methodology underpinning the research project, including its philosophical and theoretical foundations, the evolution and rationale of the research design, ethical considerations, methodological coherence, and the acknowledgement of limitations and practical constraints. As Carter et al. (2020) highlight, a thesis should narrate the storyline of the research and provide a reasoned defence of methodological decisions. Therefore, rather than presenting an idealised or linear account of the research process, this chapter offers a transparent and reflexive account of how the methodology evolved, combining academic rigour with the lived realities of designing research exploring higher-order thinking (HOT) and the smile and laughter response in two-year-old children. The purpose of this chapter is to demonstrate the coherence and robustness of the overall research design, while making visible the reflexive decision-making processes that informed methodological choices and acknowledging the contextual constraints that shape applied psychological and educational research.

This chapter focuses on the methodological architecture that connects the research studies as a coherent whole. It outlines the philosophical positioning, research design, methodological approach, ethical considerations and quality processes that underpin the project. The specific methods employed within each individual study, including data collection instruments, procedural approaches and analytical techniques, are presented within their respective study chapters. The subsequent chapters provide a reflection on the pilot study (Chapter 5), followed by detailed accounts of the four empirical studies (Chapters 6 and 7), where each study's individual contribution to the overall research aims is examined. Sections 4.3 *The Chosen Research Design* and 4.4 *Methodological Cohesion*, alongside Figure 1, provide an overview of how these individual components integrate to form the wider research design.

Overall, this chapter serves as a reflexive methodological narrative (Braun & Clarke, 2018), demonstrating how the research design was iteratively developed in response to theoretical considerations, ethical responsibilities, practical realities and engagement with the research context. It therefore aims to provide transparency regarding not only the final methodological decisions, but also the reasoning processes through which those decisions were reached.

4.1 Changing Positionality from Inception to Research Design

At the outset there was an implicit expectation to potentially adopt an approach that would yield objective, measurable data to identify the conditions under which the variables, in this case smiles, laughter, and HOT, would co-occur in two-year-old children. Much of developmental psychology focuses data collection and analysis on exploring the association between two variables, however, this does not adequately address the practical or contextual importance, nor allow for causal relationships to be established (McCartney et al., 2006; Slater & Bremner, 2017; Miller, 2017). Aware of this challenge, there was still some expectation that this research would produce findings that could be tested, replicated, and potentially generalised into increasingly larger quantifiable studies. Such an approach aligns with traditional positivist experimental paradigms in developmental psychology, which prioritise control, prediction, and quantification (Creswell, 2014; Cohen, 2018). The response to the challenge of misrepresenting the practical or contextual importance (McCartney et al., 2006; Slater & Bremner, 2017; Miller, 2017) was to collect observational data on smiles and laughter and HOT in various EC settings in order to collate the common conditions where the two variables (smiles/laughter and HOT) co-occurred. Experiments could then happen to trial the conditions for the two variables to co-occur to reduce to the most likely conditions and eliciting factors, to then test to see if these conditions and eliciting factors cause the same response in the variables in different contexts two-year-olds find themselves in. Therefore, the initial goal was to reduce rich data acquired through observations to test a hypothesis to see if the conditions can be replicated and generalised. Lerner and Benson (2013) explain that such reductionist methods deliver detailed insights into mechanisms, in this case HOT and smile and laughter processes, which can then be complimented by systems perspectives e.g. testing the hypothesis in different two-year-old relevant settings, which place those mechanisms in context thus showing how aspects of behaviour interact to produce developmental outcomes.

However, this initial methodological orientation shifted significantly due to two key developments. First, the onset of the Covid-19 pandemic made in person data collection in EC settings (such as gathering physiological measures like heart rate, eye-tracking data, and video recordings of facial expressions) impossible under public health restrictions (Department for Education, 2020) during that time. Second, and more importantly, there was a shift in researcher positionality. As prospective participants and interested parties were

engaged with, coupled with reflections on personal experiences as a parent, educator, and EC professional, the importance of capturing the lived experiences of children, families and professionals became amplified. Along with this came an increasing awareness of the inadequacy of a reductionist approach to reflect the emotional and contextual richness of instances of smiles, laughter and HOT (Lerner & Benson, 2013). This growing awareness echoed Mertens (2015) argument that researchers must remain responsive to the ethical, social, and political dimensions of their work, particularly when working with sensitive populations such as children. Consequently, the research design evolved from a data driven model to a more flexible, inclusive, and context sensitive one, which arguably denotes a shift from traditional experimental developmental psychology to mixed methods holism (Kite et al., 2018; Brough, 2019). This adaptation and flexibility were not only responsive to the changing realities of psychological and educational research during a global health crisis, but significant in acknowledging the complexity of HOT, smiles and laughter and the world of two-year-olds. This reflexive ‘awakening’ and the subsequent methodological shift rather than representing a limitation, ended up being a turning point serving as a critical juncture that affirmed the theoretical foundations and rationale of the chosen research design, allowing for a more contextually grounded and subject responsive approach (Brough, 2019).

Ultimately, this research evolved to reflect an interpretivist epistemological position, recognising that understanding HOT, smiles and laughter in two-year-old children requires attention to the meanings, relationships and contexts within which these phenomena occur. Whilst experimental and observational elements can be retained, they are not employed to identify universal causal laws or to reduce children's experiences to measurable variables. Instead, they can contribute complementary forms of evidence that enrich interpretation and deepen understanding of complex developmental processes within authentic EC experiences (Lerner & Benson, 2013; Creswell & Plano Clark, 2018). This position acknowledges that quantitative evidence can illuminate patterns of behaviour, whilst qualitative inquiry provides insight into the lived realities and contextual influences that give those patterns meaning. Consequently, knowledge is understood as being generated through the interpretation of multiple forms of evidence, informed by participants' situated experiences and the researcher's reflexive engagement with the data. Underpinned by Dewey's (1933) transformative conception of inquiry and operationalised through a praxeological approach (Pascal & Bertram, 2018; 2020), this epistemological stance seeks not only to understand

practice but also to generate contextually meaningful knowledge capable of informing and enhancing EC experiences.

4.2 Researcher Reflexivity and Underpinning Theoretical Perspectives

Research is enriched by integrating diverse theoretical perspectives, methodologies and participants, enabling the field of education and psychology to realise its full potential (Shutz & Muis, 2024). Therefore, it is important to embrace multiple perspectives to produce a wholesome view of a subject area (Meyer & Anderman, 2024). Developing a theoretical underpinning to guide the research helps to integrate the researcher's values and provides a structure for choosing the research design, tools, interpretation and analysis of data (Burnell & Roffey-Barentsen, 2020). This also enables the audience for the research to apply the knowledge, experience and skills in the specific encounter with a specific task from a relevant evidence base (Szulevicz & Tanggaard, 2017).

Ontology, epistemology and axiology are foundational philosophical concepts that underpin research design and influence how knowledge is conceptualised and generated. Ontology concerns the nature of reality, including whether there is a single, objective reality, as assumed within realist approaches, or multiple socially constructed realities, as recognised within interpretivist perspectives (Cohen, 2018). Epistemology addresses what constitutes knowledge and how knowledge can be acquired, distinguishing between objective, measurable forms of knowledge associated with positivist paradigms and subjective, contextually situated understandings developed through interpretivist inquiry (Creswell, 2014). Axiology considers the role of values within the research process, ranging from attempts to achieve value neutrality within positivist traditions to the explicit acknowledgement of researcher values, ethics and positionality within critical and participatory approaches (Mertens, 2015). Collectively, these philosophical assumptions shape how researchers approach inquiry within fields such as education and psychology and were particularly influential in shaping the evolution of this research design, from initial methodological expectations to the final approach adopted. For this research, it is recognised that exploring higher-order thinking (HOT), smiles and laughter in two-year-old children can be approached from multiple philosophical perspectives. However, an interpretivist stance has been adopted as the most appropriate position for understanding these phenomena, as it

enables consideration of the contextual, relational and experiential meanings through which children's behaviours are expressed and interpreted (Creswell, 2014; Mertens, 2015; Cohen, 2018).

With over 14 years of professional experience in the PVI and maintained schools-based EC sector, particularly with two-year-olds, there's arguably a rich, practice informed perspective personally brought to the inquiry. This insider position (Costley et al., 2010) not only enhances the authenticity and depth of engagement with the research context but also plays a critical role in shaping the evolving interpretation and construction of new meaning throughout a grounded theory research process (Morse, 2019). This experiential knowledge (Dewey, 1933; Costley et al., 2010; Pugh, 2011) and social-situatedness (Vygotsky, 1962; Costley et al., 2010) enhances the authenticity, ethical practices and contextual sensitivity of the research project (Dewey, 1933; Koro et al., 2022). However, it arguably also introduces potential biases and irregularities as Stough and Lee (2021) discovered 29.5% of 210 [educational research] published studies in highly ranked journals delineated a "grounded theory" interpretivist stance, yet they contained methodological inconsistencies and descriptive cloudiness. To address these criticisms, this study integrates its axiological position with the grounded theory design by drawing upon the canons, or foundational principles, articulated by Corbin and Strauss (1990) and further discussed by Glaser and Strauss (2007), Charmaz (2014) and Morse (2019). These principles include theoretical sensitivity, constant comparison, theoretical sampling, coding and categorisation, and memo (or research journal) writing. Collectively, they provide methodological coherence by ensuring that conceptual development remains grounded in the data whilst acknowledging the researcher's interpretive role. Although adherence to these principles can introduce methodological constraints, which are discussed later in this chapter, they also strengthen the credibility and transparency of the analytical process. By continually interrogating emerging concepts against the data, these canons support the development of theory that is firmly rooted in participants' experiences while reducing inconsistency and researcher bias as far as reasonably possible (Creamer, 2025). Consequently, this approach remains faithful to the original intentions of grounded theory, whilst embracing an interpretivist epistemological stance in which theory is understood to emerge through the researcher's reflexive engagement with participants and the data (Corbin & Strauss, 1990; Charmaz, 2014; Morse, 2019).

Having EC sector experience is recognised as integral to the transformative intent of the research, thus contributing to a more empathetic understanding of the sector (Hoare et al.,

2012; Von Seggern et al., 2023). The EC services workforce operates within a landscape of persistent social and structural inequalities, often marked by undervaluation both financially and socially (Department for Education, 2016; ECSDN, 2020; The Royal Foundation Centre for Early Childhood, 2023; Parent-Infant Foundation, 2023; Foundations, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024; Anna Freud Organisation, 2023). This frequently marginalised sector struggles for professional recognition, despite widespread evidence particularly from neuroscience, psychology, and education, highlighting the vital importance of the early years (Pre-school Learning Alliance, 2018; World Health Organisation, 2020; The Royal Foundation Centre for Early Childhood, 2023; Royal College of Psychiatrists, 2023; Parent-Infant Foundation, 2023; Institute of Health Visiting, 2023; Foundations, 2023; Anna Freud Organisation, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024; Department for Education, 2024). Yet, EC professionals face long hours, low pay, and poor mental health outcomes, forming a stark contrast to the critical significance of their role (ECSDN, 2020; The Royal Foundation Centre for Early Childhood, 2023; Parent-Infant Foundation, 2023; Anna Freud Organisation, 2023; Foundations, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024). This research responds to that incongruity by embracing a transformative approach (Pugh, 2011; Mertens, 2015). The transformative approach looks to be applicable to the context and elicit a change in practice (Dewey, 1933, 1938; Pugh, 2011; Mertens, 2015; Pascal & Bertram, 2020). Change can be both practical and emotional, this research being rooted in a desire for change, and in the belief that small, meaningful experiences, such as shared laughter, can have profound effects. This research positions practice pertaining to expressions of HOT and the smile and laughter response as capable of instigating positive change.

This interpretivist and transformative personal stance are informed by Deweyan pragmatism, particularly in relation to embodied action (Dewey, 1934) and the role of education in expanding rich, meaningful experience (Pugh, 2011). Dewey (1934) argued that the central goal of education is to enrich the quality of life through experience, and this ethos is at the heart of the research. Pugh (2011) interprets Deweyan approaches as embracing transformative learning, evident not only as cognitive change but as something that enhances everyday life, that increases our capacity to find meaning and joy, or eudaemonia, as Pascal and Bertram (2023) believe can flourish with more praxeological research in the sector. In this way, the research intends to ignite a space for transformation for everyone involved. Praxeological research is carried out with EC professionals and service users and emphasises

making visible their values, processes, and reflections to transform future practice using carefully chosen data collection materials and methods to portray their ecospheres (Oliveira-Formosinho & Formosinho, 2006; Pascal & Bertram, 2012; 2023). To adequately respect the researchers' personal views and maximise on showing the 'real worlds' of participants, praxeology compliments an interpretivist and transformative stance enabling the grounded theory canons or principles shaping the research. Grounded theorists, especially those steeped in more interpretivist and transformative traditions, also recognise that the researcher is present emotionally and reflexively as well (Charmaz, 2014; Morse, 2019), researcher reflexivity is integral to grounded research processes as it prioritises reciprocity, participation, and shared meaning making rather than 'clean science'.

Grounded theory following Corbin and Strauss (1990) canons or principles has shaped an intention to generate insights that remain closely tied to the realities and expressions of participants and the EC service sector via two distinct phases of research. Firstly an 'Exploratory Phase' and secondly, an 'Experiential and Legitimacy Phase' (in keeping with Deweyan and transformative cycles and theory). Utilising grounded theory has provided a strong foundation for a mixed-methods design, in which qualitative and quantitative approaches are meaningfully embedded and mutually informing and chosen at the point most relevant to the sequence of research (Tashakkori & Teddlie, 2003; Creamer, 2022). Adopting a mixed methods approach also acknowledges and builds upon the initial methodological considerations of the project's inception; although positivist elements were ultimately set aside, their influence remains recognised and respected. This research values the spirit of genuine inquiry and the theoretical interpretation of human behaviour, making way for an interpretivist, grounded theory via mixed methods to inform and transform practice (Morse et al., 2021; Creamer, 2022).

4.3 The Chosen Research Design

Following grounded theory canons or principles (Corbin & Strauss, 1990, 2007; Charmaz, 2014; Morse, 2019) the research adopts a mixed methods Exploratory Sequential Design (Plano Clark, 2019) with the first two qualitative studies creating an 'Exploratory Phase' via a questionnaire and multi-modal focus groups, which importantly inform the subsequent data collection for the increasingly quantitative study (Plano Clark, 2019; McCrudden, 2019). This

is then followed up by an ‘Experiential and Legitimacy Phase’ via an increasingly quantitative mixed-methods third experimental study of expressions of HOT and smiles and laughter. Which is then concluded by a co-production fourth study intending to ‘close the loop’ of the project to ensure the prior three studies can be applied as intended for praxeological and transformative purposes as authenticated by the sector itself (Dewey, 1933; Pugh, 2011; Bertram & Pascal, 2023).

This interconnected and phased structure reflects a transformative stance informed by Dewey’s (1933) conception of inquiry as an experiential and reflective process through which knowledge is generated, examined and applied to enhance understanding and improve practice. Accordingly, these phases position research as a means of producing meaningful, real-world evidence capable of informing and transforming EC practice and interactions between adults and two-year-old children (Dewey, 1933; Pugh, 2011).

The Exploratory phase represents the initial stage of inquiry and is aligned with the iterative and emergent principles of grounded theory. This phase prioritises understanding the phenomenon within its natural contexts, allowing initial data collection and analysis to identify emerging categories, relationships and conceptual patterns rather than beginning with predetermined assumptions (Charmaz, 2014; Tie et al., 2019). The purpose of this phase is to sensitise the research to the perspectives and experiences of participants, while ensuring that the developing inquiry remains grounded within the realities of early childhood practice (Nunes et al., 2010; Mills & Birks, 2020). Exploratory approaches are particularly valuable within MM-GTM research when investigating under-researched phenomena, as they enable qualitative inquiry to inform subsequent methodological decisions and ensure that later phases are meaningfully connected to lived experience (Fetters et al., 2013; Creswell & Plano Clark, 2018; Creamer, 2025).

Building from these initial insights, the Experiential and Legitimacy phase focuses on extending, refining and examining the relevance of the emerging concepts through complementary forms of evidence and engagement. Within this phase, concepts generated through exploratory inquiry are not viewed as fixed variables requiring detached verification; rather, they are experienced, interpreted and refined through further investigation. The inclusion of a quantitative within-participant design (Study Three) enables emerging concepts to be examined through systematic measurement, whilst maintaining their connection to the contextual understandings generated earlier in the research process. This is followed by a co-

production study (Study Four), where the intended audience contributes to interpreting, refining and evaluating the practical relevance of the emerging theoretical account. Such engagement enhances the experiential legitimacy of the findings by ensuring that the developing theory reflects the realities, needs and perspectives of those who may apply or be affected by it (Costa, 2024).

Together, these phases demonstrate the value of an MM-GTM multi-study approach, enabling a sequential process of generating, operationalising, examining and refining concepts through methodological complementarity and triangulation (Creswell & Plano Clark, 2018; Creamer, 2025). The qualitative studies provide rich, context-sensitive understandings of expressions of HOT and the smile and laughter response, while subsequent studies enable these emerging constructs to be examined, discussed and applied within practice contexts. This iterative movement between exploration, experience and legitimacy supports the development of a discussional theory that is empirically grounded, theoretically informed and experientially credible to the early childhood audience it aims to serve (Christodoulou, 2025).

Mixed methods research in education and applied psychology can help to explore social and contextual learning experiences, compare differences and similarities across individuals/situations and contribute to designing meaningful research or educational tools (McCrudden et al., 2019). According to Creamer (2022) Mixed Methods Grounded Theory Methods (MM-GTM) is a distinct approach to research design, offering opportunity for enhancing grounded theory applicability across disciplines and audiences. This is important as applied psychological and educational subjects require different approaches to investigate complex issues and mixed methods are established as valid, reliable, legitimate and trustworthy approach to such inquiry (Teddle & Tashakkori, 2009; Mertens, 2015; Creswell & Plano Clark, 2018; Durdella, 2019; McCrudden et al., 2019). Nonetheless, there are limitations pertaining to integration and rigor (Teddle & Tashakkori, 2009; Plano Clark, 2019; McCrudden et al., 2019) which are tied to how well research intentionally combines qualitative and quantitative approaches in the design and how the subsequent data collection and analytical quality fulfils high quality standards (Creswell & Plano Clark, 2018; Plano Clark, 2019; McCrudden et al., 2019; Javdani et al., 2023). However, ‘quality’ is often in the eye of the beholder’ in EC service contexts (Mathers et al., 2014; Moss, 2016; Bertram & Pacal, 2023) thus this chapter and the individual study chapters intend to satisfy how integration, rigour and quality of methods has been accounted for, rather than assert

methodological perfection. In keeping with grounded theory, transformation and praxeology, this research asks of itself in the analytical discussion chapter to appraise its own quality i.e. “is the substantive proposed conceptualisation of new meaning from this research project grounded in the data?” This is the main type of question for researchers to consider ensuring that their research is of value and worth (Strauss & Corbin, 2005; Morse et al., 2021).

4.4 Methodological Cohesion

In applied psychology and educational research, multi-phase and multi-study designs are increasingly employed to develop a robust, though not exhaustive, understanding of complex phenomena (Plano Clark, 2019). These designs enable researchers to explore a subject through diverse methodological lenses, however, when a project comprises multiple distinct studies, maintaining methodological cohesion becomes critical to ensure the research evolves as an integrated whole rather than as a fragmented series of inquiries (Mertens, 2015; Plano Clark, 2019). In this context, adherence to the methodological principles and stages outlined in grounded theory, particularly those articulated by Corbin and Strauss (1990) and Glaser and Strauss (2007), can offer a unifying approach to integrating diverse studies within research. Nevertheless, Charmaz (2014) and Mertens (2015) caution against rigidly applying grounded theory procedures, warning that doing so may generate a false sense of certainty or theoretical closure. Even Glaser and Strauss (2007), the original proponents of grounded theory, have revisited and revised their methodological positions over time, highlighting the need for flexibility within the grounded theory tradition. Consequently, while established methodological canons provide a foundation for coherence in multi-study projects, they are not infallible (Charmaz, 2014; Morse et al., 2021). Critical perspectives, alternative approaches and constructive critiques are thus welcomed as part of an evolving research process. Creamer (2019, 2022) emphasises the adaptability of grounded theory in MM-GTM, similarly, Birks and Mills (2015) reinforce the value of methodological cohesion without sacrificing theoretical openness.

The research has two distinct phases that the MM-GTM exploratory sequential mixed-method design follows (Plano Clark, 2019; Creamer, 2022) in accordance with grounded theory canons or principles, the research intends to run as a unified piece to respond to the research question, aims and objectives with a final produced discussional theory (Glaser &

Strauss, 2007; Morse et al., 2021). Glaser and Strauss (2007) highlight generating discussional theories is particularly good for developing theories of process, sequence, change and social interaction, thus resonating with this research subject. Furthermore, Glaser and Strauss (2007) highlight it is especially useful for producing discussional theories which can later be phrased into propositions or hypothesis for future research, or even by the reader contemplating the generated theory itself, providing an evolving contribution to the field of work.

Individual studies also benefit from a shared reflexivity, reflexive thematic analysis (Braun & Clarke, 2019; 2021) was selected in preference to more structured forms of thematic analysis associated with grounded theory traditions. Unlike grounded theory approaches, which aim to generate explanatory theory through systematic coding procedures, reflexive thematic analysis acknowledges the active role of the researcher in interpreting meaning and constructing themes. This was consistent with the praxeological and interpretivist orientation of the study, where the aim was to understand participants' perspectives and experiences rather than develop a formal theory.

Therefore, following the canons of grounded theory, as articulated by Corbin and Strauss (1990) and further developed by Glaser and Strauss (2007), this research adheres to key methodological components of theoretical sensitivity, constant comparison, theoretical sampling, systematic coding and categorisation, and the use of memo writing in a research journal. These practices underpin the classical process of grounded theory and are essential for maintaining methodological rigour and cohesion across a multi-study design (Morse et al., 2021). Applying the classical steps of grounded theory means that for this research, the first stage of theory generation involves comparing the aims, objectives, and findings of each study, using the constant comparative method to identify recurring or divergent categories across data types (Glaser & Strauss, 1967; Charmaz, 2014). The second stage involves integrating emerging themes and concepts across studies, with each phase of data collection and analysis influencing subsequent inquiry (Morse, 2019). The third stage, delimiting the theory, entails refining the theory generation by focusing on core categories that demonstrate explanatory importance. The different studies offer layered perspectives that contribute to a richer theoretical understanding (Bryant & Charmaz, 2007) and these are considered both as individual studies with unique contributions, and as unified inquiry for multi-layer theory generation. Finally, the fourth stage involves constructing a discussional theory which is a grounded, integrative account that moves beyond descriptive summary to provide conceptual

depth and interpretive coherence (Glaser & Strauss, 2007; Charmaz, 2014; Morse et al., 2021). This is developed via the influence of Situational Analysis (Clark et al., 2022) as each written up study was re-read, each of the studies reflective journals were reviewed, and crucially, the raw data of each study was revisited. Situational Analysis informed the theoretical coding and integration, via an analytical process that involved the development of situational, social worlds/arenas, positional, and relational maps, each accompanied by memo writing to deepen understanding (Clarke, 2005; Clarke et al., 2022). Producing the narrative from these ‘messy maps’ results in a situated, dialogic, and evolving discussional theory rather than a fixed endpoint (Charmaz, 2014; Morse et al., 2021). The resulting proposed theory will remain open to further development and critical engagement, consistent with grounded theory’s commitment to ongoing dialogue and theoretical evolution (Creamer, 2025) thus, the final proposed discussional theory resulting from the research is not intended to be a finished product, but a working idea meant to spark further research and discussion.

4.5 Ethical Practices

BERA (2018, 2024) and BPS (2009, 2021) ethical guidelines were followed and institutional ethical approval gained upon inception of the research. The ethical approval for the pilot (inclusive of study one), study two and study three required a full ethical review process to be completed due to child participation, and the fourth study required a proportionate ethical review process to be completed as children nor sensitive subjects were involved. In both cases the aims, objectives, rationale, recruitment, sampling, data collection, analysis, data storage, participant protection and appraisal of risk/harm/benefit was thoroughly scrutinised and reviewed by a panel of academics before the studies were deemed ethically robust and could take place, please see Appendix 1 for evidence of approval. While ethical approval and governance procedures were guided by institutional requirements, BERA and BPS, the European Early Childhood Education Research Association Ethical Code for Early Childhood Researchers additionally was consulted for reflective decisions concerning participant voice, representation, and the dissemination of findings to relevant EC audiences in the latter stages of the research.

Ethical decisions are crucial for rigorous and safe research, especially for subjects relevant to, and involving children (Brown, 2019; Richards & Coombs, 2023; Olsen, 2024).

Praxeologically, it is important to consider methodological decisions in a way to best amplify the voices of those involved, or their context, as it is an issue relevant to their world (Brown, 2019; Pascal & Bertram, 2023). Greenstein and Davis (2019) acknowledge it is a shared ambition of many researchers that directly or indirectly, their work will contribute meaningfully to the individuals at the heart of the subject being investigated. Similarly, Richards and Coombs (2023) state that research with children is often ethically, emotionally and morally charged and yet little explicit acknowledgement of that is often found in academia, however, in the case of this research, the feel good subject of smiles and laughter and wanting to transform practice based upon this is explicit. This demonstrates for this research, ethical decisions and processes not only inform safety and aversion of harm, but also shape the integrity, relevance, and potential contribution of the research to transform practice pertaining to HOT and smiles and laughter. Whilst there was no inducement to participate in the studies, it was appreciated that there was a transformative stance being taken (Dewey, 1933; Pugh, 2011) and there may be indirect incentives e.g. EC professionals participating for continuing professional development purposes. Rather than perceiving this as an ethical tension, this is perceived as positive, as participants own motivations are important when recruitment is driven by voluntary participation and self-election in studies about or involving children (Kyritsi, 2019; Olsen, 2024).

Ensuring that participants are fully informed from the outset about what their involvement entails, including any potential benefits or implications, is essential (Kyritsi, 2019; Olsen, 2024). Therefore, participant information was provided at the beginning of each study in the format of a multi-media sway page suitable for adults and children, plus an infographic, and an optional teams meeting, this responds to National Society for the Prevention of Cruelty to Children (NSPCC) (2023) guidance regarding making sure research with children and families is accessible via inclusive and appropriate formats. Examples of participant information letters, leaflets and recruitment materials can be found in Appendix 2. The sway and infographic were carefully designed to include family-friendly communication, aesthetic, and practical information to ensure accessibility and engagement (NSPCC, 2023) this approach translates ethical child/family rights-based ideals into tangible practice (Angelow & Psouni, 2025). Using clear, understandable language instead of research jargon helps families feel informed, furthermore sharing practical details like transportation options and directions,

or how long involvement might take, makes participation easier and more convenient, especially for those with limited resources or varying schedules (Mueller et al., 2024; Olsen, 2024). Positionality (as a parent and experience working in EC services) ensured the potential power imbalance inherent in research with children and families could be approached with sensitivity and intentionality. While the strategies used were intuitive, they were rooted in relational ethics (Taguchi & Boden, 2025) and to reduce hierarchy and foster trust. For example, during study three informal, non-directive conversations were had with parents, often centred around shared experiences of motherhood, family life, and recommending child friendly spaces or food options on campus, which created space for mutual connection. Participation as a peer in play with children, during and outside of data collection, allowed relationships to form organically and ethically (Taguchi & Boden, 2025). This approach aligns with literature on child-centred, participatory research (Clark, 2005), where ethical practice is embedded in everyday interactions, and power is consciously negotiated through relational presence rather than procedural compliance alone (Taguchi & Boden, 2025).

Increasingly children are becoming active participants, co-creating and collaborating in research conducted and published within EC services (Olsen, 2024; Lundy, 2025; Angelow & Psouni, 2025) this is because in line with the United Nations Convention Rights of the Child (UNCRC) (signed and ratified in the UK 1990-1992) children are not seen as objects, rather as participants with their own rights, opinions and responsibilities. Their rights are to be taken seriously and protected, thus they should be at the very least, given the opportunity to express their thoughts (UNCRC, 1989). This is supported by the Lundy (2007; 2025) model of participation whereby children should have the space to voice their opinions to an audience that will enable their opinions to have influence. A two-year-old child is typically capable at receptive language of both simple and complex sentences, they can express their likes, preferences, interests and dislikes/disinterest, whether this be verbal or non-verbal (Department for Education, 2023; UNICEF, 2025) This indicates that the children are competent and have agency, thus, when they were active participants in the research (studies two and three) via play-based methods, they were interacted with meaningfully and their behavioural/language response respected (Flewitt, 2020; Olsen, 2024; Lundy, 2007; 2025).

Obtaining informed consent and assent is fundamental when conducting research with children, their families, and EC service professionals as it ensures ethical integrity and respects the autonomy and rights of all participants (BERA, 2024; BPS, 2021). Alderson and Morrow (2020), stress the importance of tailoring ethical practices to children's

developmental stages and understanding, for children, assent must be sought in a developmentally appropriate way e.g. observing for positive body, spoken, facial expressions, alongside consent from parents or guardians, recognising children's emerging capacity to understand and participate meaningfully. This combination of seeking both assent and consent arguably helps to respond to the polarising perceptions in research involving children as children being all competent or all vulnerable (Wegerstad, 2023; Angelow & Psouni, 2025) as children's behaviours are observed and responded to and gatekeeper consent aids protection (NSPCC, 2023).

In MM-GTM, ethics is also closely tied to sampling, Glaser and Strauss (1967, 2007) emphasise theoretical sampling, where participants are selected based on their potential to inform emerging theoretical ideas. This approach requires ongoing ethical reflection, as researchers must ensure participants are not treated as instruments. Ethically, theoretical sampling according to grounded theory avoids overburdening participants and maintaining transparency about how and why individuals are selected for the different studies, especially important for EC and children/families feeling comfortable that they're involved in 'meaningful participation' (Dillon et al., 2016; Kennan et al., 2018; Olsen, 2024). According to Glaser and Strauss (2007) theoretical sampling often saturates different categories of people relevant to a subject being explored, or alternatively, the findings present a case for persistence, should the studies be repeated. Glaser and Strauss (2007) also explain that theoretical sampling does not require full coverage of a category, though it is preferable at the beginning of a project. Glaser and Strauss (2007) recommendations throughout sampling for each study have been considered, for example, study one opts for the largest sample size and diversity of adults participating, with data collection ceasing once semantic saturation occurred and no further themes were being identified. Furthermore, each study does not seek statistical power, this is due to the shift from positivist views at inception, to interpretivist once confirming the research design. It was also due to praxeological reasons pertaining to the real-world (Pascal & Bertram, 2023) of the subject being explored: families and professionals in EC / two-year-olds, are busy people, ethically the research needs to fit into their world, not the other way around. Nonetheless, in keeping with mixed-methods exploratory sequential design, the number of participants cannot be discarded as entirely irrelevant (Creswell & Plano Clark, 2019). Skumalski (2018) reflected upon adequate sampling in mixed method research in applied psychology or education fields, especially those exploring cognitive embodiment such as HOT and smiles and laughter, Skumalski

(2018) identified that suitable samples for the qualitative aspect are typically between 6-15 participants, whereas the quantitative element is 40-200, which this research fulfils both as a whole and as individual studies, however, this was not an explicit quota to fulfil.

In terms of storing the rich data generated through each study, all collected data are stored electronically and protected through secure cloud-based Microsoft systems alongside the institution's secure socket layer (SSL) technology, which operates in accordance with UK data protection requirements and exceeds ISO 27001 information security standards.

Participants were informed that all personal data were processed in accordance with the General Data Protection Regulation (GDPR, 2018), with the lawful basis for processing research data being a 'task in the public interest'. Clear information was provided regarding participants' rights in relation to their data, including the right to withdraw participation without providing a reason. Withdrawal procedures were explained individually to participants, with specific withdrawal deadlines provided as part of the consent process.

Participants were informed that they could request removal of their data up until the point at which data had been aggregated, anonymised and incorporated into the wider analysis, after which individual contributions could no longer be identified or separated from the dataset.

For child participants, withdrawal could be exercised through indicators of non-engagement or distress, such as choosing not to participate in an activity, with researchers respecting children's ongoing assent throughout the research process.

In accordance with institutional research governance procedures, collected data will be securely retained for a maximum period of 10 years following completion of the research, allowing sufficient time for audit, verification, publication and potential future academic scrutiny. During this retention period, access to identifiable data will remain restricted to authorised members of the research team and stored securely according to institutional data management procedures. Following the completion of the retention period, all research data will be securely destroyed in accordance with institutional policies and data protection requirements, ensuring that confidential participant information is not retained unnecessarily.

4.6 Methodological Confines

It is essential to acknowledge the limitations and constraints inherent in the selected research design and methods, particularly when employing a mixed method and multi-study approach,

as this often introduces unique challenges (Cresswell & Plano Clark, 2018; Salmons, 2024). While generalisability is often regarded as a strength in applied psychological research (Brough, 2019), it is required differently in terms of generalisation through theoretical development within grounded theory methodology (Glaser & Strauss, 2007; Charmaz, 2014; Morse et al., 2021). Therefore, whilst scientific generalisation involves applying findings from a representative sample to a wider population (Brough, 2019), grounded theory offers an alternative theoretical generalisation which aims to develop concepts or explanations that may be relevant across similar contexts, without claiming universal applicability (Morse et al., 2021). Thus, where this research may not fulfil scientific generalisability, it intends to convey theoretical generalisation.

A key feature of praxeological approaches, is that the 'real-world' of the participants is retained and not universalised (Pascal & Bertram, 2023). Grounded theory prioritises the development of theory grounded in data from specific contexts, rather than producing findings that apply universally (Glaser & Strauss, 2007; Charmaz, 2014; Morse et al., 2021; Creamer et al., 2025). In applied psychology and educational research, especially those adopting interpretivist paradigms, limitations in generalisability are frequently acknowledged and accepted (Durdella, 2019; Braun & Clarke, 2021). Instead of aiming for statistical generalisation, rigour is sought through quality indicators such as transparency and trustworthiness, demonstrated via the plausibility of findings, something which Glaser and Strauss (2007) term "plausible accounts" subject to disconfirmation, not proof. This research also intends to demonstrate dependability via the stability of data over the studies (Lincoln & Guba, 1985; Durdella, 2019). The final study is steeped in confirmability via the degree to which findings are shaped and confirmed by participants themselves (Lincoln & Guba, 1985; Durdella, 2019). Finally, the transferability of the proposed discussional theory (in the analytical discussion chapter) which pertains to the extent to which findings may resonate in similar contexts is aspired to (Glaser & Strauss, 2007; Morse et al., 2021) but arguably can only be confirmed once tested.

Creamer (2022; 2024; 2025) emphasises that quality indicators in MM-GTM extend beyond a reliance on transparency of the beneficial and limiting methodological factors. Howell-Smith et al. (2020) and Creamer (2022; 2024; 2025) identify notable features of quality as iterative reinforcement, whereby early-stage grounded theory informs subsequent quantitative testing and, in turn, quantitative findings refine theoretical development; a process evident in this research design via the two phases and sequential multi-studies. Additionally, Howell-Smith

et al. (2020) and Creamer (2022; 2024; 2025) identify validation strategies as a quality indicator, which involves the application and clear articulation of mixed-method and grounded theory legitimisation procedures; which study four explicitly attends to. However, when attempting to attend to so many factors when combating methodological confines and quality assuring when using MM-GTM, analytical burden is potentially increased, and there is arguably a potential for research to force integration, rather than allowing the theory to generate organically (Creswell & Plano Clark, 2018; Creamer et al., 2025). Glaser and Strauss (2007) strongly recommend respite between studies and between analysis opportunities, similarly Creamer et al. (2025) summarise that mixed methods is a philosophical mindset to spend time ‘thinking with’ responsive to this, the research ensures each study and phase could be completed and analysed sequentially to allow for reflection. Conversely, with studies occurring sequentially, thus at different times, it can possibly challenge comparability of the data. However, rather than comparing individual people across studies, for this research the educational and psychological contextual markers (such as HOT, smiling and laughing) were the critical components in analysing and theorising, Clark (2005) discussed in Charmaz (2014) refers to as ‘grounded theory mapping: situational analysis’ of comparability. Taking the time to reflect and use the canon/principle of a research journal, has allowed for unification of thoughts via writing ‘messy maps’ (Clark, 2005) to subsequently attend to possible issues of comparability, forced integration and show transparency reflexively.

4.7 Summary

To conclude, this chapter has established the methodological foundations underpinning the research project and demonstrated the developmental journey from an initial positivist orientation towards an interpretivist and transformative stance enacted through praxeological principles (Creswell, 2014; Mertens, 2015; Cohen, 2018). As outlined throughout the chapter, this philosophical shift informed the evolution of the research design into an exploratory sequential mixed methods approach (Plano Clark, 2019), operationalised through MM-GTM (Creamer, 2022; 2024; 2025) and guided by the foundational principles and procedures of grounded theory (Corbin & Strauss, 1990; Glaser & Strauss, 2007; Charmaz, 2014; Morse, 2019). The resulting design comprises two interconnected phases, ‘Exploratory’ and

‘Experiential and Legitimacy’ (Dewey, 1933; Pugh, 2011), each consisting of two sequentially related studies that collectively contribute to the overarching inquiry. Figure 1 provides a visual representation of how the research questions, sub-questions, objectives and individual studies connect within this methodological framework.

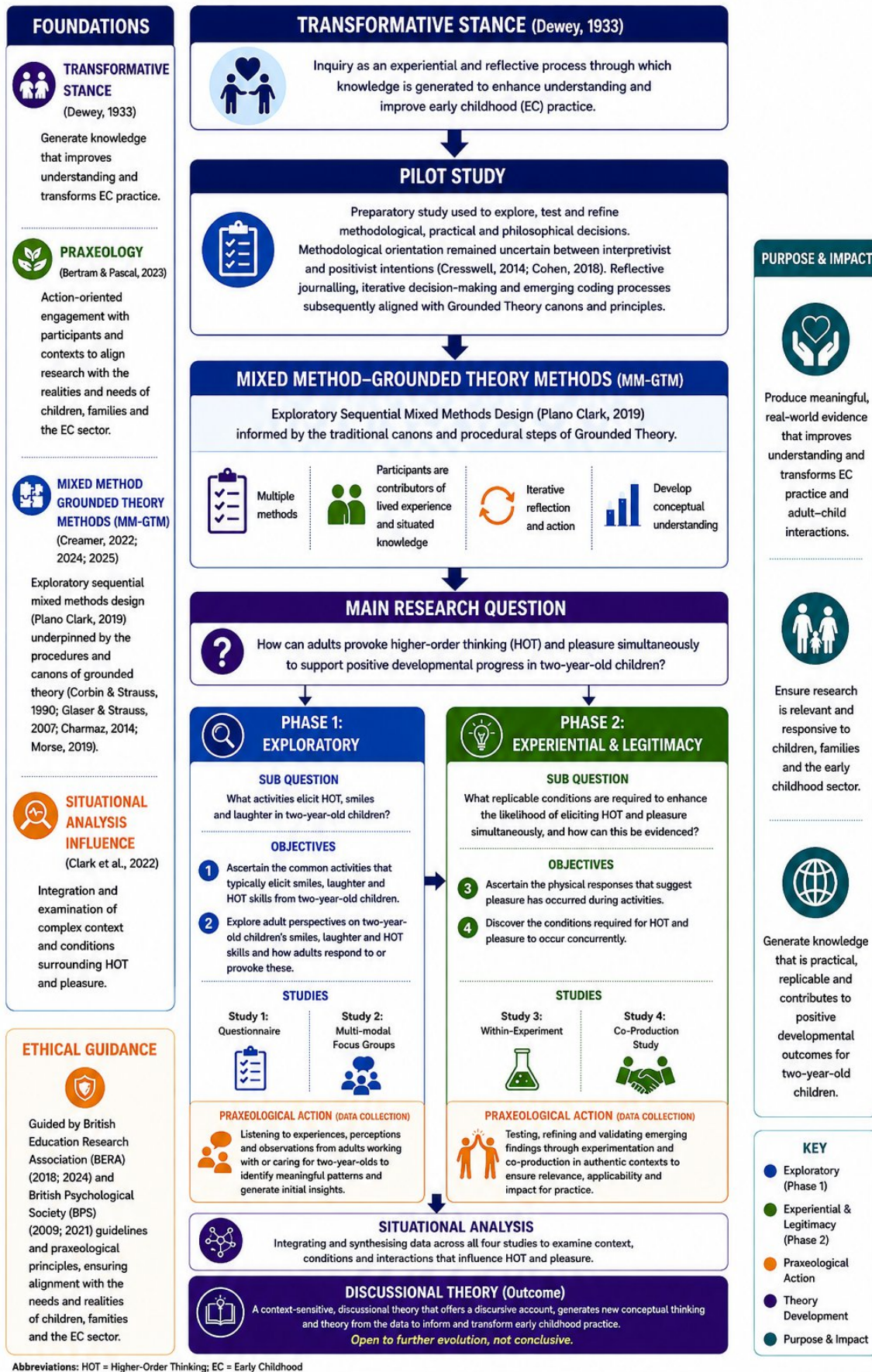


Fig.1 Research Structure and Design Infographic

Ethically, the research has been guided by BERA (2018; 2024) and BPS (2009; 2021) principles, alongside praxeological commitments to ensuring that research remains responsive to the experiences and realities of children, families and the early childhood sector (Pascal & Bertram, 2023). The overall purpose of this methodological design is to generate a discussional theory, informed by grounded theory and Situational Analysis principles, which provides a theoretically meaningful and contextually situated response to the research questions and objectives (Glaser & Strauss, 2007; Morse, 2019; Clarke et al., 2022). Importantly, this contribution is not presented as definitive or conclusive, but as an evolving interpretation that may be refined through further inquiry.

In acknowledging the inherent confines of this design, including considerations relating to generalisability, comparability, analytical complexity and integration across multiple studies (Clarke, 2005; Glaser & Strauss, 2007; Charmaz, 2014; Durdella, 2019), this research seeks to maintain methodological coherence through a balance between adherence to grounded theory principles and the flexibility required within interpretivist inquiry (Morse, 2019; Stough & Lee, 2021). Quality has therefore been considered through multiple indicators, including plausibility, iterative reinforcement, legitimacy and confirmability (Lincoln & Guba, 1985; Glaser & Strauss, 2007; Durdella, 2019; Creamer, 2022).

Having established the overarching methodological framework, the following chapters present the pilot study reflection and the four empirical studies in detail. Each study chapter will describe the specific methods, data collection instruments, procedures and analytical approaches employed, while demonstrating how each contributes to the wider research design established within this chapter.

Chapter 5 Pilot Study

This chapter presents the pilot study that informed the development of the main research design. Conducted during the preparatory phase of the inquiry, the pilot was not intended as a smaller version of the final study, but rather as an opportunity to explore, test, and refine methodological, practical, and philosophical decisions. At the time of conducting the pilot, the methodological orientation remained uncertain and oscillated between interpretivist and positivist intentions (Cresswell, 2014; Cohen, 2018). Although grounded theory had not yet been formally adopted, many of the practices engaged with during this phase, including reflective journalling, iterative decision-making, and emerging coding processes, reflected grounded theory canons and principles, albeit initially unintentionally.

To support transparency, this chapter adopts a reflexive and narrative structure. Drawing upon entries from a research journal maintained throughout the pilot study, it documents how methodological decisions evolved in response to experience, challenges, and emerging insights. This approach aligns with both the iterative nature of grounded theory and Dewey's (1933) conception of reflection as a movement from uncertainty towards informed action. Rather than presenting the final research design as predetermined, the chapter illustrates how methodological understanding progressively developed through engagement with the research context.

For an immediate concise overview of the pilot outcomes, table 2 summarises the original methodological intentions, what occurred during implementation, and the resulting implications for the main study. The remainder of the chapter then provides a more detailed reflexive account of these developments using Dewey's (1933) reflective cycle as an organising framework. Together, the table and accompanying narrative demonstrate how the pilot study contributed to the evolution of the research design and support the transparency and trustworthiness of the inquiry (Lincoln & Guba, 1985; Durdella, 2019).

Planned Method	Intended Purpose	What Actually Happened	Reason for Change / Implications for Main Study
Embedded ethnographic case studies within a nursery setting	The researcher to observe two-year-old children's smiles, laughter and HOT naturally within everyday practice.	Covid-19 restrictions and concerns about researcher presence influencing children's behaviour led to a shift towards remote data collection. Therefore, professionals and families collected the observations.	Remote approaches were found to be more practical and less intrusive. Main study observations would therefore utilise setting-based systems and remote methods where appropriate.
Two-week data collection period	Enable collection of observational and questionnaire data within a manageable timeframe.	Parent consent forms were returned slowly, requiring an extension from two to five weeks.	Recruitment and consent processes required more time than anticipated. The main study would allow five weeks for participation and data collection.
Electronic parent questionnaires	Explore adult perspectives on smiles, laughter, HOT and adult responses to these behaviours.	A small number of responses were obtained despite initial interest from parents.	Questionnaire accessibility needed improvement. Main study questionnaires would be made available in both digital and paper formats.

Professional discussions with staff	Gain rich, reflective practitioner perspectives regarding children's behaviour and development.	Due to pandemic pressures, discussions were replaced by questionnaires completed by staff.	Staff questionnaires generated useful information but lacked depth and dialogue. Professional discussions were reinstated for the main study to enhance data richness.
Baseline developmental assessment against the EYFS	Establish children's developmental starting points.	Baseline information was collected but contributed little to the immediate research aims.	The study was not designed to measure developmental progression. Baseline assessments were therefore removed from the main study.
Neutral-expression photographs of children	Support analysis of facial expressions by providing comparison images.	The photographs had limited value for emotional analysis.	Images were more useful for identifying individual children during observations. The main study retained photographs for identification purposes only.
Photographic and video observations using existing setting equipment	Capture observable instances of HOT, smiles and laughter.	Image quality varied considerably due to equipment quality, positioning of cameras and children often looking down during activities.	Clearer observation guidance and suitable recording equipment would be provided to participating settings to improve data quality.
Use of multiple observational sources	Generate rich embedded case-study data from	The combination of methods produced useful and complementary insights.	Multiple methods would be retained. Reflective journalling and systematic

(video, photographs, field notes, questionnaires)	multiple perspectives.	Reflective journalling additionally emerged as a valuable analytical tool.	coding would be incorporated more explicitly within the research design.
Questionnaire and observations conducted concurrently	Explore activities, conditions and adult perspectives associated with smiles, laughter and HOT.	The methods successfully generated preliminary evidence about activities and conditions linked to HOT and pleasure.	Findings supported continuation of an exploratory phase focused on identifying patterns before moving to subsequent phases of inquiry.

Table 2 Pilot Study Summary

When conducting MM-GTM using an exploratory sequential design (Creamer, 2025; Plano Clark, 2019), it is essential to consider the grounded theory process of preparation, implementation, and dissemination (Mills & Birks, 2020). Before implementation or dissemination can occur, the preparatory phase is crucial and includes clarifying the philosophical stance, exploring methodological options, and planning the study (Mills & Birks, 2020). Accordingly, this research incorporated a pilot study to examine and refine these key foundations. Nunes et al. (2010) highlight the value of pilot studies in the preparatory phase of grounded theory research, they argue that pilot studies help researchers identify contextually relevant information and become familiar with key aspects of the research subject matter. This early engagement supports the emergence of tentative theoretical categories and informs initial decisions about data collection (Nunes et al., 2010; Mills & Birks, 2020). Pilot studies also allow for the testing and refinement of data collection tools in context sensitive ways, thus supporting research design choices that are more attuned to the human, social, and environmental circumstances of the research (Nunes et al., 2010; Mills & Birks, 2020). Plano Clark (2019) suggest pilot studies can be helpful in exploratory phases of mixed-method research design as pilots allow researchers to consider approaches that meaningfully inform specific aspects which will be qualitative and quantitative.

5.1 Grounded Theory Emerging from Pilot Work

Given the recognised methodological complexity of grounded theory, particularly for early career researchers (Suddaby, 2006; Burvill, 2019), it is perhaps unsurprising that it was not explicitly adopted at the outset of the study. However, pilot work offers an important space in which to develop grounded theory competencies, enabling researchers to test, refine, and gradually confirm its appropriateness as a methodological approach (Suddaby, 2006; Burvill, 2019; Nunes et al., 2010). This pilot study was designed to trial and evaluate the methodological approach, allowing for necessary revisions prior to the main research without compromising data integrity (Nunes et al., 2010; Frey, 2018). ‘Perfect’ research was not expected, as it was an opportunity to learn. Jhangiani (2019) highlight the importance of pilot studies in all research for testing the feasibility of research methods, noting that researchers cannot assume their approaches will be effective. Instead, methods must be demonstrated to work in practice, and if they do not, they should be revised or discarded. This principle underpinned the rationale for conducting the pilot study, especially as the research philosophical stance and data collection tools had not been confirmed as the preparatory

phase began (Nunes et al., 2010). Frey (2018) emphasises that unworkable methods should be identified and discarded early, as they are unlikely to be feasible in larger-scale research, pilot studies offer a crucial opportunity for practical methodological refinement. Similarly, Charmaz (2014) highlights the importance of cultivating theoretical sensitivity from the outset which requires an open yet analytically attuned mindset allowing researchers to adjust their theoretical decision making, which is complimentary to practical decision making. In keeping with Frey (2018) perspective and consistent with recommendations for pilot work in MM-GTM designs (Creamer, 2023), the emphasis was placed not on data outcomes, but on critically reflecting on the methods, design, and researcher experience. This approach also challenges the misconception that a pilot study is merely a smaller version of the full research, rather, it served as a tool for assessing methodological viability and coherence (Frey, 2018; Jhangiani, 2019).

At this early stage of the research, the overarching aim was to identify the most appropriate methods for exploring HOT and the smile and laughter response, with the final intention of the main research to develop an evidence-based practice guide. Complimentarily, the goal of grounded theory is to generate plausible, practice-based insights that inform useful concepts, frameworks, or guides for a specific audience (Lambert, 2019). Pilot studies are a critical part of this process, as they allow for early testing, refinement, and alignment of methods with both the research aims and the practical needs of the intended end users of the findings and recommendations (Nunes et al., 2010). Pilot studies and grounded theory allow for a degree of flexibility in planning and designing research as it progresses, design of the research could therefore be an ongoing process, beginning with the pilot study (Lambert, 2019). Thus, the pilot study enables active involvement in the real-world research setting, while still thinking critically and analytically about what was being experienced to confirm decisions for future research, something referred to in grounded theory as ‘proximity’, bridging practice and theory with reflection (Schwandt, 2015; Lambert, 2019). Grounded theory is inherently iterative and emergent, as Corbin and Strauss (2015) emphasise, and the pilot study served as a vehicle for enabling this process to unfold. Similarly, Mills and Birks (2020) stress the importance of the preparatory phase of grounded theory in achieving methodological clarity which was a key function of the pilot study.

5.6 Reflective Practice

Reflective thinking was first described by Dewey (1933) as an “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends” (p. 118) cited in Lombardi (2023). Reflective practice should be embedded within research and professional work in EC services, as it offers a foundation for evidence informed decision making, enhances the quality of practice, and supports ongoing professional and personal learning (Nahmad-Williams & Oates, 2018; Bolton & Delderfield, 2018; Crow et al., 2019; Norman, 2019; Davies, 2021; Third, 2022; Cohen et al., 2023). EC service professionals reflective practice beliefs can promote practices that support the social emotional development of children, therefore, high quality reflective habits harbour benefits for both professionals/researchers and children (Virmani et al., 2020). In the fields of applied psychology and education, such reflection deepens understanding of participant and researcher experiences, strengthens ethical and responsive practice, and encourages critical engagement with theory and methodology (Dahlberg et al., 2002; Denscombe, 2022). Dewey (1933) discussed by Mortari (2015) presents reflection as a process closely tied to action, suggesting that its value lies in transforming impulsive or reactive behaviours into thoughtful, intentional ones. Through reflective thinking, individuals gain greater control over their experiences, enabling more purposeful and informed responses, therefore, reflection provides a structured way of thinking that enhances our practical engagement and supports a more intelligent and systematic approach to practice or research (Dewey, 1933; Mortari, 2015). Within grounded theory, it is crucial to regularly reflect and begin research with an open mind replacing scientific rigidity with reflective practice (Glaser & Strauss, 1967; Charmaz, 2014; Morse et al., 2021; Denscombe, 2022). Therefore, it would not be enough to simply conduct a pilot study, the reflection on the pilot study is arguably the most important part for preparation, clarification and quality of the main research (Nunes et al., 2010).

Keeping research memos or journals (Glaser & Strauss, 1967, 2007; Charmaz, 2014; Morse et al., 2021) are key canons or principles of grounded theory, journals are also commonly encouraged for reflective practice in EC services (Muge, 2019; Dumlao, 2019; Hojeij, 2021) and was the earliest, arguably intuitive, decision made during the preparatory phase of the pilot study, albeit titled ‘field notes’ at the beginning. The reflections were handwritten and, intuitively rather than purposively, included details relevant to axial coding, situational,

relational, and social world particulars and personal learning/meaning making (Clark et al., 2022).

The following section is structured around Dewey's (1933) reflective cycle, providing a systematic framework for making sense of the pilot study and is illustrative of how the journal was kept in handwritten notes. By drawing on entries from the reflective journal and data collected during this phase, it offers a transparent and reflexive account of what occurred. This approach not only supports the development of methodological clarity but also aligns with the iterative, reflective nature of mixed methods grounded theory (Plano Clark, 2019; Creamer, 2025), where early insights shape subsequent design decisions (Nunes et al., 2010). Dewey's (1933) model of reflective thinking remains highly relevant in grounded theory research within applied psychology and in education. This is arguably due to its emphasis on active, iterative engagement with experience and remains the cornerstone of more recent reflective models (Nahmad-Williams & Oates, 2018; Bolton & Delderfield, 2018; Crow et al., 2019; Norman, 2019; Davies, 2021; Third, 2022; Cohen et al., 2023). Dewey's (1933) systematic yet flexible cycle supports theoretical sensitivity (Charmaz, 2014) and aligns with the constant comparison and analytic processes central to grounded theory (Corbin & Strauss 2015). In MM-GTM, Dewey's (1933) emphasis on inquiry and trialling new thinking/behaviours complements the iterative movement between qualitative and quantitative strands (Creamer, 2023) as adjustments can be made to context and data (Dewey, 1933; Miettinen, 2000). Praxeologically, Dewey's (1933) approach resonates and is relevant to reflective professional practice in EC service contexts as it continually features in training, publications and practice which enables professionals to integrate experiential insight (Bolton & Delderfield, 2018; Nahmad-Williams & Oates, 2018). As such, Dewey's (1933) reflective model, albeit traditional, provides a valuable framework for structuring reflexive, evidence informed inquiry in emerging MM-GTM research designs during pilot studies.

5.7 Dewey (1933) Reflective Cycle

Dewey's work (1933; 1934; 1938) spans philosophy, psychology, and educational theory, though his enduring influence on education remains one of the most widely recognised and applied philosophers (Cunningham & Breault, 2023). Dewey's (1933) reflective cycle outlines a process beginning with the recognition of a problem, followed by exploration, the

generation of possible responses, evaluation of these options, and the testing of outcomes. This iterative structure provides a meaningful link between real-world experiences and the development of evidence-informed action, Dewey (1938) refers to this as an experiential continuum through which one experience generates another experience cited in Wing and Yan (2025). Dewey described reflection as a “shift from uncertainty to understanding, where thinking transforms impulse and desire into purposeful activity” (Dewey, 1933, p. 17). To demonstrate the shift in thinking during the pilot study and convey how the experience influenced implications for the research design, the following sections are ordered and titled: Disturbance or Uncertainty, Intellectualisation, Hypothesis, Elaboration of Hypothesis, and Testing the Hypothesis. These titles reflect Dewey’s (1933;1934;1938) own wording for the stages of reflection. It is important to note that Dewey’s (1933; 1934;1938) use of the term *hypothesis* differs from its conventional scientific usage. Here, it refers to a tentative, imaginative idea that arises from experience and guides further inquiry through action, reasoning, or observation (Miettinen, 2000).

5.7.1 Disturbance or Uncertainty

There is little known about HOT (Frausel et al., 2021) and the smile and laughter response in two-year-old children (Addyman et al., 2018) and the pilot study provided an opportunity to explore how observational data on this subject might feasibly be gathered from EC settings, for example, two-year-old rooms in nurseries, to begin to fill this research gap. A manager of a nursery was intrinsically curious about a similar subject (children’s humour) and had volunteered their setting as a base to collect data from, similarly due to personal and professional networks, location and participants for the research were readily available. Therefore, the central initial uncertainty was largely of methodological concern for how children’s natural activity, particularly their facial expressions, could be captured in a way that ethically and unobtrusively preserved authenticity and allowed for clear analysis of the contexts in which smiles, laughter, and HOT occurred. Department for Education (2025) challenge the idea of avoiding research with children and young people as they are vulnerable, and state in many cases it is the most ethical way to investigate their world, however practicalities and ethics must be deeply thought out. Thus, some aspects of this decision making pertained to the practicality of getting a good quality image of the child, for

example the types of cameras that could be used, coupled with the consent and assent enabling this to ethically occur (Department for Education, 2025; NSPCC, 2023). Other aspects of this decision making pertained to remaining open minded of alternative methods and tools of data collection that might emerge because of trialling data collection ideas (Malmqvist et al., 2019). The uncertainty extended beyond observing children as it also involved identifying the most effective and respectful ways to elicit adult perspectives. It felt crucial to gain insight into their views without influencing or disrupting their natural interactions with children. This raised further questions about how to engage with professionals and parents in a way that acknowledged and accommodated their existing responsibilities and priorities which can often be complex, yet parents are willing to partner and information share (Hryniewicz & Luff, 2020). A further complexity involved envisioning how subsequent experimental studies might be later designed to test whether certain conditions reliably prompted the co-occurrence of smiles/laughter and HOT, however the pilot study intended to ignite preparation for this part of the research design, rather than confirm the next steps for such later studies. Underpinning these musings was a deeper tension due to paradigm oscillation. The goal of distilling rich observational data into a testable hypothesis implied a positivist orientation by seeking to generalise replicable conditions in future studies (Cresswell, 2014; Cohen, 2018). Yet the nature of interpreting emotive and expressive data required interpretive work to preserve authenticity of the context and advocacy for the EC sector (Cresswell, 2014). This oscillation between paradigms caused an ongoing reconsideration of the research intentions, responsive preferential design and data collection methods. Thus, the pilot study was not intended as a smaller scale version of the main research, but rather to situate within the uncertainty, gather evidence from within it, and allow that discomfort to inform decisions moving forward in order to contribute to knowledge about HOT and the smile and laughter response in two-year-old children.

5.7.2 Intellectualisation

The first step in responding to the uncertainty was to outline a two-phase approach to the research. The first phase was exploratory and qualitative (Plano Clark, 2019) to discover what types of activities and conditions elicit HOT and the smile and laughter response in two-year-old children, with a follow-up second phase which would quantitatively test whether those discovered activities and conditions reliably prompted the co-occurrence of

smiles/laughter and HOT in controlled and uncontrolled circumstances, though the pilot study did not seek to confirm how to do this at this early stage.

The first phase aimed to:

1. Explore adult perspectives on instances of two-year-old children's smiles, laughter and HOT skills.
2. Ascertain the activity types that elicit smiles, laughter and HOT skills from two-year-old children.
3. Discover the ways adults respond to two-year-old children when they exhibit smiles, laughter and HOT skills.

The expected approach to conducting phase one and fulfilling these aims was to concurrently run two studies, a questionnaire and four 'embedded case studies' that withhold multiple units of potential analysis (Yin, 2009) as follows:

- a. Disseminate an electronic questionnaire via professional networks and social media to seek responses from adults to ascertain their perspectives on what smiles and laughter mean, how HOT can manifest, and how they respond to such instances.
- b. Produce four separate exploratory qualitative ethnographic case studies obtained during a typical working week in the two-year-old room of an Ofsted registered EC provider. Each case study will evidence facial reaction ranges of two-year-old children during activities with instances of HOT and/or smiles and laughter, and the perspectives of the staff and their parents/guardians on such behaviours. Each case study will be formed by a variety of sources including; photographic and video observations of children, field notes, professional discussions with staff and questionnaires from parents/guardians.

The purpose of the case studies was to explore instances of HOT, smiles, and laughter as they naturally occurred within everyday experiences at the pilot setting. Each case study drew upon multiple sources of data, including photographic observations to capture significant moments and activities, video observations to provide greater contextual detail regarding children's behaviours and interactions over time, reflective field notes to document observations and emerging interpretations, professional discussions with practitioners to explore their perspectives and interpretations of children's behaviours, and questionnaires completed by parents or guardians to capture family viewpoints and experiences beyond the

setting. Combining these sources could enable consideration of both children's observable responses and adult perspectives regarding the activities, interactions, and conditions associated with HOT, smiles, and laughter.

The pilot study could therefore play a vital role in testing potential questionnaire items for a larger-scale questionnaire study and explore the reality of using methods for collecting embedded case study data (Yin, 2009) (observing children's smiles, laughter, and HOT through photos and video, alongside professional dialogue and family questionnaires). Critically (unbeknownst at the time) was the opportunity to trial [journaling reflective] field notes.

5.7.3 Hypothesis

Upon trialling the initial research design, a number of sequential developments occurred, as documented in the research journal. The pilot study commenced on 24th February 2020 at a private day nursery rated 'Good' by Ofsted. The following timeline was initially agreed with the setting:

- **24th February – 6th March 2020:** Observations conducted; questionnaires distributed to parents
- **24th February 2020:** Staff shared their initial reflections
- **6th March 2020:** Staff provided final reflections; completion of all observations and questionnaires

Although parents initially expressed interest in participating, delays in returning consent forms meant that the planned two-week pilot had to be extended to five weeks to allow sufficient time for participant recruitment. Simultaneously, the onset of the Covid-19 pandemic necessitated a methodological shift from the originally intended ethnographic approach within the setting to remote data collection. Prior to the pandemic, there had already been some hesitation about introducing an unfamiliar researcher into the environment, due to concerns that this might influence the natural behaviours of the children. The arrival of public health restrictions, however, made remote working essential. Consequently, the use of online submissions for observational data (already included in the ethical approval) was formally confirmed and implemented. Uleanyand Yu (2023) reflected upon data collection during the

pandemic and acknowledged whilst remote data collection offers certain benefits, these are often outweighed by practical challenges researchers had to navigate, especially difficulties in accessing participants and social spaces. These challenges arguably reduced researchers control over the process and demanded increased flexibility, sensitivity to participants, and enhanced research skills (Uleanya & Yu, 2023). Thus, the pilot study not only tested the feasibility of the study, but the abilities of the researcher in shifting the timeline as follows:

- **9th March – 20th March 2020:** Observations resumed; parent questionnaires reissued
- **9th March 2020:** Staff provided updated initial reflections
- **20th March 2020:** Staff submitted final reflections; data collection concluded

By the week commencing 23rd March, the UK entered a national lockdown. Even during the pilot period, the setting was already experiencing disruptions due to the pandemic, including staff and families shielding, a reduced provision, and limited attendance, reflective of the sector more widely (National Day Nurseries Association 2021). These factors significantly impacted the sample size and response rate. Data was successfully collected for eight children, parental responses were received from two families, and three staff members responded at the start of data collection, with one completing a follow-up at the end.

Despite these challenges, all intended data collection tools were trialled, offering valuable insight to inform key methodological decisions ahead of the main research. Working remotely became a central factor in shaping the research process, highlighting the need for adaptable and responsive methods moving forwards (Uleanya & Yu, 2023). The shifting priorities and responsibilities faced by everyone in society, not just participants, showed that the ethical and practical complexities of conducting research in EC settings during a global crisis would be plentiful, with Newman et al. (2021) identifying that online data collection is not inherently riskier than in-person methods but requires careful, reflexive planning to address evolving risks, especially when working ethically with vulnerable populations to support context informed research. Researching EC in what quickly became the ‘new normal’ required not only methodological flexibility, but also a rethink to navigate uncertain, disrupted environments that families and EC professionals were residing in.

Pilot studies in education and applied psychology cannot eliminate uncertainty, particularly when researching complex human behaviours and experiences (Cohen et al., 1992, Flick,

2018). The pandemic had heightened this unpredictability in an impossible to prepare for manner, serving as a large reminder of the volatile nature of lived realities (Newman et al., 2021; Uleanya & Yu, 2023). However, pilot studies continue to play a vital role in increasing the likelihood of success in the main study by identifying design flaws, refining tools, and ensuring feasibility (McGrath et al., 2019; Mertler, 2021). For this research, conducting the pilot during the early stages of the pandemic may be seen as opportune, as it enabled reflection on methods within the emerging 'new normal' of research. It also allowed for early consideration of the practical and ethical implications of working under public health restrictions, which are challenges that were likely to persist in some form for the foreseeable future.

Despite the challenges encountered, all intended data collection tools were successfully trialled, including some context specific adaptive additions. Among these were a baseline assessment of children's development, designed to establish their starting points in relation to the EYFS, and the use of initial photographs capturing neutral facial expressions to support later identification of expressive changes. While the baseline data might prove useful in a longitudinal study where developmental progression of HOT could be tracked over time, it became evident that within the short, case study-based time frame of this pilot, such data offered limited value. The study does not aim to assess children's progress against the EYFS. As such, the baseline assessment tool would be discarded in the main research. Similarly, the inclusion of neutral expression photographs, though not effective for analysing changes in emotional expression, proved useful for participant identification during the observation review should remote working continue. At this stage in the research, there is no intention to analyse smiles for authenticity or apply criteria such as Duchenne markers. Therefore, while the original purpose of this tool will be revised, it will be retained for identification purposes only but could be reconsidered in readiness for phase two.

Using videos for qualitative research is commonplace, but not without issues, researchers must navigate the potential for the "imperial gaze" of the camera (p.1), participant performativity in front of the lens, and tensions arising from conflicting approaches to videography (Gregory, 2020). The observations conducted during the pilot echoed some of these issues, for example, the quality of visual data in photographs and videos was significantly influenced by the technology available and the angle from which images were captured, this was often complicated by the fact that children typically look down while engaged in activities. In response, it was decided that the main research participants would be

provided with cameras and/or clear guidance on optimal photographic protocols to improve the consistency and clarity of image-based data. Additionally, the pilot demonstrated that using the setting's existing online learning journal system was advantageous, both ethically and practically. This approach reduced additional workload for staff and aligned with Covid-19 safety guidance by minimising the presence of external individuals in the setting. Consequently, it would be recommended that participating settings in the main research utilise their own online learning journals where possible, or are provided with a system, to replicate the success of the pilot and maintain alignment with public health protocols and context specific practice when researching children (NSPCC, 2023; Department for Education, 2025).

Adult perspectives during the pilot were captured via online questionnaires completed by both staff and parents. At the request of the setting, given the pressures of the pandemic, the planned professional discussions were replaced with electronic questionnaires at the beginning and end of the data collection period. While these offered some insight, the format lacked the dialogic quality necessary for exploring participants' experiences in depth (Adler et al., 2019). The absence of reciprocal communication limited opportunities to engage meaningfully with staff reflections on smiles, laughter and HOT and the conditions that supported them. This limitation prompted a methodological reconsideration, with the original plan to conduct professional discussion calls being reinstated in the main research, as they are likely to yield richer data (Adler et al., 2019). It is recognised in the research journal that ethical sensitivity guided the decision to adapt the method in response to setting pressures, reflecting a commitment to reciprocity and respect for participants' professional circumstances. However, a clearer awareness that such adaptations must not compromise data quality became more apparent which marked a notable development in reflexivity and growing confidence in balancing ethical responsibility, research stance with methodological rigour (Suddaby, 2006; Burvill, 2019). Finally, to further enhance accessibility and response rates in the main research, questionnaires would also be available in hard copy.

Overall, the pilot confirmed that observations and questionnaires are effective tools for addressing the research objectives and questions of this phase. By refining the tools through improved guidance for data capture and increased accessibility for adult respondents the study was well positioned to build on the pilot's strengths and further develop a robust, ethically sound research design. The intentions to reduce to a testable hypothesis in controlled

and uncontrolled conditions however remained uncertain and more reflection on phase two would be required after the implementation of the main phase one of research.

5.7.4 Elaboration of the Hypothesis

During the pilot study, the methodological orientation was still evolving. At the time, opposing paradigms were oscillated between, including interpretivist and positivist-informed approaches influenced by developmental psychology (Cresswell, 2014; Cohen, 2018). Although grounded theory had not yet been formally adopted, several methodological practices, such as open/axial coding within reflective journalling and iterative analysis were employed in ways that began to reflect grounded theory principles or canons (Glaser & Strauss, 2007; Morse et al., 2021) and made the intentions for phase two of the main research a little more uncertain.

It was through reflective engagement and preliminary axial coding of data, that grounded theory began to emerge as the most appropriate methodological framework to inform the research design. This development aligns with the ethos of transformative mixed methods grounded theory methodology (Creamer, 2025) and complimentary to the mixed methods exploratory sequential design (Plano Clark, 2019) anticipated at the offset. Pilot study data identified that activities and conditions that elicit HOT and the smile and laughter response according to observations included; social interaction with peers, family and pets, sorting games by category e.g. shapes, board games, mark making, water play, scissor skills, helping others and during spontaneous events e.g. birthday song. Pilot study data identified that activities and conditions that elicit HOT and the smile and laughter response according to adults from questionnaires include:

Cause of smiles	Adult response to smiles	Conditions Eliciting smiles	Defining what HOT is	Conditions Eliciting HOT	Relationship between smiles and HOT
Friendships	Cuddles	Seek fun	Accommodated learning	Provide problems to solve	Smile on feeling they're doing well
Health	Encourage more	Peek-a-boo	Conceptual		

Happiness	smiles	Bubble	thought	Questions	Positive
Love	through	play	Ways we think	Follow	emotions cause
Repetitious	imitation	Stories	Knowledge of	child's	learning
play	and	Music and	the world	learning	They're content
Freedom	smiling	movement	Language skills	Role model	in surroundings
Physical	back	Songs	Social and	problem	
Movement		Spontaneity	emotional	solving	
Silliness			development		

Table 3 Pilot Study Themes

As noted by Mills and Birks (2020), methodological uncertainty should not be viewed as a weakness but as a necessary component of designing contextually grounded, interaction sensitive research. In this case, the shifting stance contributed meaningfully to the arguable improvement of the research design confirming a mixed method grounded theory approach (Creamer, 2025). The reflective journalling and axial coding allow the pilot data to be shared as near to raw as possible yet still summarised to retain the authenticity of the participants voice (Glaser & Strauss, 2007; Morse et al., 2021).

The pilot helps to establish the effectiveness of data collection tools, in this case observations and questionnaires, in addressing the aims of the first phase of the research design (Frey, 2018; Jhangiani et al., 2019). This was identified via reflective engagement influenced by Deweyan inquiry (Dewey, 1933), which helped to identify both the strengths and limitations of the tools trialled. One strength was the clarification of which tools were necessary for practical purposes, such as the importance of allocating sufficient time for data collection, aspects which can go missed if pilot studies are neglected (Malmqvist et al., 2019). Other strengths lay in the value of these tools in fulfilling the research aims, particularly the observations of children being ethically collected remotely via a dedicated system and two-way dialogue with professionals enabling richer data (Adler et al., 2019; NSPCC, 2023). Limiting factors became apparent from personal reflection and methodological challenge,

especially grappling with the distinguishment in identity between the perspective of an EC professional and that of a researcher, magnified by the pandemic (Suddaby, 2006; Burvill, 2019; Uleanya & Yu, 2023). This was seemingly important as professional considerations such as prioritising staff workload by opting for questionnaires over in-depth discussion were recognised to potentially compromise research quality. Consequently, the decision was made to reinstate professional conversations (e.g. teams focus groups) for the main research to ensure a more dialogic and reflective account of participants' experiences (Adler et al., 2019).

Van Teijlingen and Hundley (2002) state that identifying key learning points from pilot work contributes to the success of the main research; these insights have informed a series of adjustments. These include providing clearer guidance on observations, utilising technological environments for remote research and enhancing accessibility of the questionnaire through options such as paper-based questionnaires. These developments show how the research design began to take shape not from a predetermined framework, but as a natural and theoretically robust response to the evolving nature of the inquiry and its context during a preparatory phase (Nunes et al., 2010; Mills & Birks, 2020).

5.7.5 Testing of the Hypothesis

Implications for the main study design to test these new ideas pertain to the researcher positioning, research design, philosophical coherence and practical methods. Throughout reflection during the pilot, it became apparent that the researcher positioning is mostly aligned to an interpretivist stance (Cresswell, 2014; Cohen, 2018), resultingly interpretivism underpins the approach to the main research. This change still enabled the initially anticipated design of exploratory sequential mixed methods (Plano Clark, 2019) to be retained, yet now be complimented by a mixed method grounded theory approach (Creamer, 2025). This allowed the beneficial 'accidental' aspects of the experience, for example axial coding and the reflective journalling, initially expected to be field notes, to be maximised upon in a strategic manner i.e. via applying canons or principles of grounded theory (Glaser & Strauss, 2007, Morse et al., 2021) whereby coding and memos are crucial. Consciously adopting a MM-GTM approach in the main research design enhances the philosophical coherence and aligns decision making, thus improving the methodological robustness (Morse et al., 2021; Creamer, 2025).

In terms of practical method decisions, the questionnaire can be made available both physically and digitally to potentially extend participation and expand the ways it can be disseminated. Similarly, practical decisions for the case studies pertain to there being no baseline assessment of children participating and the purpose of any initial photos being for identification purposes in recorded observations. Furthermore, it became evident that observation technology and instructions should be provided for each case study setting to increase the chances of high-quality images being captured and ethical remote exchange of data (Gregory, 2020; NSPCC, 2023). Moreover, dialogic discussions with professionals should occur in the case studies for example via teams or telephone to retain the richness of data (Adler et al., 2019). Finally, the time for participation consent and data collection should be extended from two weeks to five weeks.

In terms of analysing data for the first phase, tentative appreciation for axial coding and/or themes to present a combination of raw data and themes to retain the true voice of participants should be considered, this provides an avenue for further reflection, especially as mixed methods grounded theory is applied consciously moving forwards with the research. Following the implementation of phase one studies it is recommended to have a distinct period of analysis and reflective respite (Glaser & Strauss, 2007) to ensure phase one data collection adequately informs the follow-up studies.

5.8 Summary

The preparatory phase of MM-GTM research includes clarifying the philosophical stance, exploring methodological options, and planning the study (Mills & Birks, 2020; Creamer, 2025). This has been achieved via the pilot study and subsequent reflection because of following Dewey (1933) cycle. The important implications for the research design relevant to researcher stance (interpretivist), research design (exploratory sequential mixed methods grounded theory) and data collection tools (questionnaires and case studies) were clarified, however the second phase of the research remains unclear. Dewey (1933) deems it more important to reflect on experience and make new meaning from it, than simply being actively

involved in something (Dahlberg et al., 2002; Mortari, 2015; Denscombe, 2022) which is beneficial to the EC sector for adults and children alike (Nahmad-Williams & Oates, 2018; Bolton & Delderfield, 2018; Crow et al., 2019; Norman, 2019; Davies, 2021; Third, 2022; Cohen et al., 2023). Similarly, pilot studies are most influential when they move from practical testing, to reflexive practical and theoretical decision making (Charmaz, 2014; Frey, 2018; Jhangiani et al., 2019). Reflecting on the pilot study experience proved important for the research design and the realities in which research can be conducted during and post Covid-19 pandemic (Uleanya & Yu, 2023). Reflective journaling deemed beneficial and as a canon or principle of grounded theory, can be applied consciously and explicitly to the main research to continue to track the proximity bridging practice and theory with reflection (Schwandt, 2015; Lambert, 2019). Reflection will also be planned for after the first two studies to allow for equally deep consideration to adequately inform the second phase of the data collection to fulfil the research aims and retain the intention to contribute a guide to eliciting smiles, laughter and HOT albeit in a different manner to that first anticipated (Lambert, 2019).

Chapter 6 – The Exploratory Phase

Study one (questionnaire) and study two (multi-modal focus group) are included in the exploratory phase and each contribute to specifically investigating:

What activities elicit HOT and smiles and laughter in two-year-old children?

- 1) Ascertain the common activities that typically elicit smiles, laughter and HOT skills from two-year-old children.
- 2) Explore adult perspectives on two-year-old children's smiles, laughter and HOT skills and how adults respond to or provoke these.

6.1 Organisation of the Chapter

Each study is presented as an individual paper in readiness for dissemination post thesis submission. Each have their own brief literature review largely derived from the literature review chapter of this thesis, methods, findings, discussions, conclusions, with the reference lists and appendices available at the end of the thesis. These have been prepared to enable flexibility in the level of detail presented, allowing the paper to be adapted in response to audience focus, journal article aims and scope or reviewer feedback. Structuring studies into individual papers ready for journal submission offers several advantages for doctoral work in education and psychology subjects, as it can enhance dissemination strategies post-doctorally, can build a robust academic profile, and fosters clearer quality control (Mason et al., 2024, Asanov et al., 2024). Paltridge and Starfield (2023) found that thesis via publication or prospective article-based PhDs can help doctoral candidates manage large or complex projects by breaking down work into planned for publishable units, which often supports earlier feedback via peer review and enhances the overall coherence of the final thesis (Paltridge & Starfield, 2023). Similarly, Asanov et al. (2024) state that doctoral thesis which are developed in a way to produce multiple journal articles tend to have the work broadly disseminated, thereby increasing the impact of the work post-doctorally. Complimentary to this, presenting the studies in this way provides for an ease of read without losing sight of the overall picture by breaking the thesis into multiple papers for each study, each study can focus on a distinct component of the MM-GTM process, such segmentation matches the

MM-GTM approach as it provides multiple junctures for the research to influence practice, policy and generate theory (Creamer, 2025; Christodolou, 2025). The papers are purposefully written in a style largely aimed at practitioner-academic journals such as *The Early Education Journal*, *Early Years: An International Research Journal* (official journal of TACTYC) and *Norland Educare Research Journal*, which ensures the findings and analysis are translated into accessible and actionable insights serving the EC sector.

6.2 Role of the Chapter

The first phase of this research prioritises exploration, consistent with the iterative processes of grounded theory, where initial data collection and analysis enable the identification of emergent categories and conceptual patterns (Charmaz, 2014; Tie et al., 2019). This exploratory work serves to sensitise the research to participants' perspectives and to locate the inquiry within the realities of EC practice before progressing to more focused investigation (Nunes et al., 2010; Mills & Birks, 2020). Exploratory phases are particularly valuable in MM-GTM research when phenomena are under-researched, allowing qualitative enquiry to inform subsequent phases and ensuring that the research remains grounded in lived experience (Fetters et al., 2013; Creswell & Plano Clark, 2018; Creamer, 2025).

6. 3 Study 1

Adult Perspectives on Activities that Elicit Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children

Abstract

The study investigates adult perspectives on activities promoting HOT, smiles and laughter in two-year-old children. Understanding how adults can stimulate HOT and positive emotions simultaneously is crucial for early development as the brain is at its most sensitive during learning experiences. Sixty adults, regularly engaging with two-year-olds, completed an online questionnaire exploring expressions of HOT and smiles and laughter. Reflexive Thematic analysis revealed themes including; Providing Playfulness, Deliberately Developing Humour, Harnessing Individuality, Appreciating the Relationship between Mind, Body and Emotion, Sharing in the Benefits. Adults reported that providing a continuum of experiences for children from increasing exposure to smiles and laughter in various guises, adding play and humour to non-play activities and implementing specific play activities where challenge and social context are perceived as advantageous. Recommendations emphasise the value of adult attunement, purposeful challenge, and responsive observation to foster positive affect and HOT in EC.

6.3.1 Introduction

The first two years of life are characterised by rapid neural growth, followed by intensive synaptic proliferation and pruning, making infancy a period of profound change in functional brain networks and thinking (Knudsen, 2004; Fox et al., 2010; Kelsey et al., 2024).

Hoferichter and Raufelder (2025) emphasise the interplay between neural processes and educational experiences, arguing that greater awareness of this relationship can inform practices that shape children's learning trajectories. During the rapid developmental changes of the second year of life, such awareness presents a critical opportunity for adults to provide stimulating and emotionally positive experiences that maximise developmental impact (Gee, 2020). Positive emotional interactions in EC are linked to better cognitive and EF outcomes later in development, for example a longitudinal study by Bruce et al. (2023) found that higher levels of maternal positive affect and responsive caregiving in the first year predict stronger language development and later EF in toddlerhood, suggesting that positive affective exchanges provide a supportive context for cognitive growth. This is not without mutual benefit as the work of Mizugaki et al. (2015) highlighted that when mothers are exposed to their child's smiles and laughter, their stress levels reduce, thus, there is scope for adults and children alike to capitalise on this powerful affective-sensitive period of development. Therefore, this study offers exploratory identification of activities and approaches that are perceived to make the most of this opportunity to elicit smiles, laughter and HOT in two-year-old children.

6.3.2 Literature Review

Expressions of HOT at Two-Years-Old

Frausel et al. (2020) summarise many definitions of HOT and explain that HOT involves rearranging, extending and using remembered or new knowledge in novel ways. Frausel et al. (2020) state that there is no firm onset of HOT in development, rather infants begin to generalise, grapple with relational thinking (cause an effect) and develop and sustain relationships pre-linguistics using potential expressions of their evolving HOT via facial expressions, body language and noises available in their repertoire.

Sim and Xu's (2017) experiments identified that two-year-old children's self-directed play supports the development of higher order generalisations comparable to adult led or didactic activities, therefore, children and adults alike play an active role in learning and developing their HOT. Walker and Gopnik (2013) conclude that between eighteen to thirty months, children develop the ability to infer a higher-order relational causal principle during play, as following just a few observations of a task they can generate expected and novel outcomes (cause an effect and play with what they know to make new meaning). Similarly, Kimuru and Gopnik (2019) found that young children develop their higher order beliefs early, for example they can predict the sounds a new or fictitious animal could make by drawing upon their beliefs and knowledge of animal noises they have learnt. Furthermore, they conclude that by the age of four, children require strong counterevidence that conflicts with their beliefs to change their minds. Therefore, HOT arguably develops powerfully in the pre-school years whereby children exercise cognitive abilities to explore, question, think critically to arrive at new skills and knowledge (Tishman & Andrade, 1996).

Expressions of HOT become more explicit once language is being used, typically at the age of two, as children use their own spontaneous talk and can articulate some of their thinking (Frausel et al., 2020). Frausel et al. (2021) findings indicate that at fifteen- to forty-eight-month-old infants' language develops, so too does their Higher Order Thinking Talk (HOTT). Children use their increasing ability to express relations, draw comparisons, abstract their thinking, represent and make inferences. Yet, Frausel et al. (2021) acknowledge all children do not experience this along the same trajectory due to their unique circumstances, especially those with language or cognitive impairments.

Expressing HOT and Smiles and Laughter

Fincher-Keifer (2019) states that embodied cognition can help to explain the relationship between the mind, body and emotion as the embodied view of emotion is that it is a neurophysiological state based upon experiences of movement, senses and perception. Using these experiences to create new meaning, knowledge and expression is part of HOT. Fincher-Keifer (2019) explains that internal or external triggers of happiness are likely to cause cognitive responses the brain associates with the feeling, leading to an increased heart rate and contraction of the greater zygomatic muscle (indicator of a Duchenne smile). Barrett (2006) suggests that multiple elements of the limbic system are involved in expressing, understanding and experiencing an emotional event including knowledge from sensory, motor and interoceptive experiences, knowledge of expressing appropriate behaviours, involuntary and voluntary facial expressions and bodily posture. These elements are also part of HOT such as working memory and inhibition, the complexity to which a child will experience an emotional event could pertain to their lower or HOT abilities and subsequent use or change in their embodied cognition. Support for this was found in Nelson-Goes et al.'s (1998) investigation into toddler and mother water play as Duchenne smiles were more prevalent in toddlers during interactions with their mothers and inauthentic smiles were prevalent then toddlers interacted with unfamiliar adults. Furthermore, Nelson-Goes et al. (1998) suggest that smiles were used to express emotion, though were also used according to the continuous process model of communication (Fogel, 1993) to mutually create and maintain the interaction. There were differences across the toddler participants in terms of reasons, timing and duration of smiles (despite being involved in the same task of water play) and differences in their neurophysiology and HOT can potentially explain these variations.

In their systematic review, Ilyka et al. (2021) identified evidence that infants' processing of facial expressions is shaped by the quality of caregiver interaction. Studies such as Rayson et al. (2017) showed that infants whose mothers frequently mirrored smiles or mouth

movements demonstrated greater right-hemisphere desynchronisation in the brain when viewing happy expressions at nine months, suggesting more developed action–perception coupling mechanisms. Ilyka et al. (2021) also noted the work of Diego et al. (2002) who indicated that sensitive, responsive caregiving enhances infants’ encoding of positive facial expressions as rewarding stimuli. Therefore, the cognitive significance of smiles as positive affective exchanges do not only reflect emotional expression, but actively contribute to the development of neural systems underpinning social perception and thinking (Diego et al., 2002; Rayson et al., 2017 cited in Ilyka et al. 2021). However, whilst this warrants an important area to continue researching. Ilyka et al. (2021) note that most of the research is based on findings in a research setting, rather than representative of children’s experiences in the typical locations of their daily lives, e.g. home, EC services, therefore, more applied and situated research is needed.

Social stimuli are essential to learning and children realise they can use their social cues to elicit more response from their environment quickly. At four-months-old children laugh in response to social cues, whilst five-month-old children can laugh in response to cognitive features regardless of smiles or neutrality around them (Mireault et al., 2018). By two-years old smiling is more likely to elicit an affectionate response from toddlers than affectionate words or contact (Zanolli et al., 1997). Furthermore, from even before two-years-old activities that contain both social uses of emotions (such as smiles) and cognitive challenge (such as object categories) (Hoeman et al., 2019; 2020) have the potential to provoke expressions of HOT and pleasure simultaneously for positive developmental progress. Smiles therefore potentially play a key role for socialising and emotions in children’s development at two-years-old.

Smiles and Laughter in Two-Year-Old Children

Traditional developmental psychology underpins current understanding of smiles and laughter in children, and it is widely accepted that smiles and laughter are a universal indicator of happiness and a positive cognitive, social and emotional cue. For example, Bowlby's (1969) work on attachment highlights the importance of smiles between child and adult to form secure attachments. The work of McGhee (1979) is prominent in humour development in children and shares two key strands of theory on smiles and laughter. Firstly, Incongruity Theory which proposes children laugh and smile at the perception and resolution of absurd concepts, for example a sheep mooing. Secondly, Cognitive Mastery Theory (McGhee, 1979) which proposes children laugh and smile at the resolution of a challenge, gaining mastery over a skill, task or person and will give a larger smile and laughter response when the challenge is at the peak of their ability i.e. not too hard or too simple. Bainum (1984) built upon this preceding work and investigated 1847 instances of smiles and laughter in pre-school children and found 95% of occurrences were in a social context with others around. This foundation of research has influenced more recent studies and findings associating smiles and laughter in two-year-old children with cognitive, language, social and emotional development.

Addyman et al. (2018) investigated the social facilitation of smiles and laughter in pre-school children and found that children are eight times more likely to smile and laugh when there is another person/s around, therefore supporting the strength of the notion that smiles, and laughter are a social tool rather than response to humour. Furthermore, Lillard et al. (2021) found that children aged eighteen to thirty-one months can simulate emotions and can express and understand others simulated emotions during their play. They found that happiness was the third most simulated emotion in symbolic and pretend play and the most understood. Therefore, smiles and laughter may be used by two-year-old children in play both as a social cognitive tool and in response to genuine humour.

There is caution surrounding smiles and laughter always being a genuine indicator of happiness. Ruba et al. (2021) explain that whilst emotions are a complex social phenomenon, children develop the ability to express and understand emotional categories based upon facial configuration early, understanding happy and sad as the first categories in infancy. Furthermore, Ruba et al. (2021) found that as children develop language and the capacity of working memory, they develop further sub-categories of negative and positive emotional categories both in their perception and expressions in their facial configuration. Regardless of the authenticity of smile and laughter expressed, HOT abilities are evident in children's expression and understanding of smiles and laughter. Nevertheless, there are distinct facial muscle activation patterns that can help distinguish genuine from false smiles (Duchenne de Boulogne & Cuthbertson, 1990). The Duchenne smile is a potential indicator of a genuine smile as the greater zygomatic muscles contract in the cheek causing the contraction of the orbicularis oculi that results in watery eyes (smile is in the eye). Kromm et al. (2015) note that between the ages of four to seven years children are more able (though may still require instruction) to voluntarily simulate and modify emotional expression and understand or differentiate between felt and faked expression and the conceptual reasons for this. Therefore, at the age of two, a smile with genuine Duchenne indicators is a good identifier for cognition and experience that correlates with a feeling of happiness. If the Duchenne indicators are not there, but a smile is visible, this smile can still be considered an observable behaviour that the child has used their HOT ability to use smiles and laughter as a purposeful social cue based on remembered experiences and relational thinking (Frausel et al., 2020).

Smiles and laughter are amongst the earliest established, rehearsed and available cue two-year-olds have to convey and influence their thinking, learning and socialising opportunities (Addyman, 2020). This is perhaps an under researched and thus under-utilised tool adults can resolutely benefit from in the care and educational practices with two-year-old children.

6.3.3 Study Aims and Objectives

This study used data from an online questionnaire to ascertain what activities elicit HOT, smiles and laughter in two-year-old children. The objectives of the study consist of

1. Ascertain the common activities that typically elicit HOT, smiles, and laughter from two-year-old children.
2. Explore adult perspectives on two-year-old children's HOT, smiles, and laughter and how adults respond to or provoke these.

Institutional ethical approval was granted and BERA (2018)¹ and BPS (2009)² ethical guidelines followed. All data was collected anonymously, and participants gave informed consent.

6.3.4 Methods

Design

Katz-Buonincontro (2024) observes that exploratory qualitative approaches like interviews, focus groups or questionnaires rigorously capture and amplify participants' perspectives and experiences, making them particularly suitable for investigating under researched subjects, such as HOT and smiles and laughter in two-year-old children. The qualitative design of this study is significant, as it builds upon the high quality quantitative analyses of research projects such as Frausel et al. (2020), already available in the arguably limited field of HOT and EC development.

An online questionnaire (available in appendix 3) research design was chosen as it is accessible, sustainable and socially situated finding participants where they are (Vehovar and

¹ Data collected prior to 2024 update

² Data collected prior to 2021 update

Manfreda 2017). This online approach facilitates reaching a generalised population of adults who have regular contact with two-year-old children and reduces some of the disadvantages of hard copy questionnaires such as geographical limits, cost and their environmentally unfriendly dissemination (Porter, 2004; Bell, 2014).

The questionnaire seeks to centre perspectives to the lived experiences of two-year-olds and adults around them as they engage in significant interactions which develop expressive displays of HOT and smiles and laughter. Therefore, the research was designed to reach adults with regular contact with two-year-olds, so they could provide lived anecdotes and perspectives to twenty-two open-ended questions. Cohen (2018) notes that data saturation occurs when responses become repetitive and predictable, particularly in qualitative questionnaires exploring no more than five topics, and that even studies with fewer than 100 responses can yield rich, meaningful data. The decision to use open-ended questions was driven by the aim of capturing a wide range of adult opinions, experiences and achieving data saturation pertaining to Cohen (2018) description.

Recruitment, Sampling and Participants

A self-selection sampling approach was used, whereby individuals responded voluntarily to a digital recruitment campaign discussed in the procedures section. Participants who saw the study advertisement and were interested in the topic chose independently to access and complete the online questionnaire.

The online questionnaire received 61 responses, with 60 fully completed and included in analysis.

From the 60 fully completed questionnaires, the adult participants who have regular contact with two-year-old children in varying personal and professional capacities included:

19 nursery professionals from the PVI sector

21 parents

5 family members providing regular childcare

4 schools based nursery professionals

4 early years teachers

1 trainee early years practitioner

1 childminder

1 museum educator

1 university professional within an EC department

4 parents who also worked with two-year-olds professionally

Materials

The questionnaire was delivered exclusively online via a single platform and accessed through one direct link; no paper-based or alternative formats were provided. Microsoft Forms was selected as the hosting platform due to its visual creativity, user-friendly interface, and compatibility across mobile phones, tablets, and desktop devices. It functions via both Wi-Fi and mobile data networks and includes an integrated read-aloud feature to enhance accessibility. The platform complies with Microsoft and University of Staffordshire data protection and security requirements and allows distribution through email and social media channels.

Anonymity settings were enabled. No IP addresses were collected. Participants were given the option to download a copy of their responses at the end of the questionnaire and could voluntarily provide contact details if they wished to be approached for future research.

Vehovar and Manfreda (2017) emphasise that in online questionnaire research, visual presentation, language, and communication design are critical, as the questionnaire interface constitutes the sole point of interaction between researcher and participant. The effectiveness of these design features is often reflected in response rates and levels of completion, given that online surveys are frequently associated with non-response or partial completion (Vehovar & Manfreda 2017; Cohen 2018). As these issues were largely avoided in this study, as indicated by participant engagement and completion, it can be inferred that the design and presentation of the materials were appropriate.

The 22 open-ended questions were designed to explore multiple dimensions of HOT in two-year-old children, including areas identified in the literature such as problem solving, role play, and memory use (Frasuel et al., 2020). Question phrasing was intentionally repeated across items to encourage detailed responses and to enable patterns, similarities, and contrasts to emerge within the dataset (Dillman et al., 2014). This structured repetition was used to prompt deeper reflection and generate rich qualitative data, particularly in relation to observable indicators such as smiles and laughter during potential expressions of HOT. The full questionnaire is provided in Appendix 3. Care was taken to ensure that repetition appeared purposeful rather than accidental, offering participants opportunities for further elaboration rather than mere duplication of earlier responses (Dillman et al., 2014; Salmons, 2017).

Procedure

Institutional ethical approval was granted and BERA (2018) and BPS (2009) ethical guidelines followed. The online questionnaire was disseminated via social media (Twitter and LinkedIn) and professional email groups and distribution lists.

A total of sixty full responses were collected. This sample size was considered sufficient as participant answers demonstrated signs of repetition and thematic convergence, indicating that data saturation had been reached. Cohen (2018) suggests that in educational research, questionnaires with fewer than one hundred responses can still yield analytical power when saturation is evident and the richness of qualitative data is prioritised. Saturation is particularly plausible where responses become predictable or recurrent across participants, especially within qualitative designs that explore a focused number of topics.

The questionnaire was therefore closed on semantic and contextual grounds rather than on a predetermined numerical threshold. The study does not aim to generalise findings but to convey perspectives concerning experiences of responses of smiles and laughter alongside expressions of HOT.

Demographic data was not collected, as the intention was not to produce comparative or divisive analyses, but to preserve the conceptual depth of the topic and avoid reductive interpretation.

As responses demonstrated sufficient repetition and coherence, the dataset was deemed ready for reflexive thematic analysis (Clark & Braun, 2018) and the questionnaire was closed.

Clark and Braun (2018) approach to thematic analysis has been used for the purpose of this study to contribute to challenging assumptions that thematic analysis is only a data reduction or descriptive approach that must be supplemented with other methods. Using thematic analysis (Clark & Braun, 2018) involves a progression from describing the findings, to presenting semantic content, and actively interpreting themes, to identify the significance of the patterns and their broader meanings and implications for practice. Computer aided qualitative data analytic software was discarded in favour of reflexive thematic analysis (Clark & Braun, 2018) as the researchers' reflexivity in actively interpreting the data is important for the human-connected ethos of the study and that the shared anecdotes and responses were felt via the researchers own cognitive embodiment and themes were generated from a visceral response. Initially, familiarisation with the data and noting immediate ideas occurred as this allowed active engagement in the data whereby potential labels begun to generate themselves as the responses were each read. Following this, the data was revisited heeding the initial thoughts to create semantic labels and acknowledge their frequency. The semantic labels were then chosen and linked to the aims of the study to categorise central concepts to aid developing the themes.

6.3.5 Findings

Table 4 shows the semantic labels representing responses used to generate the themes. Table 4 also shows common activities that elicit smiles, laughter and expressions HOT from two-year-old children, how adults provoke and react to such responses, plus the meaning adults make from this.

Perspectives Shared on Common activities that elicit smiles, laughter and HOT skills from two-year-old children.		Perspectives Shared on Adult responses/provocation of smiles, laughter and HOT skills from two-year-old children.		Adult perspectives on smiles, laughter and HOT skills in two-year-old children	
Social Play	Fright/Surprise	Serve and Return	Encourage Independence	Social Context	Adult Wellbeing
Non-Play	Incongruity	Exaggeration	Role Modelling	Social Reactions	Increased Opportunities
Restorative Play	Physical/Slapstick Comedy	Emotional	Challenges	Exerted Effort	Positive Progression
Nature/Outdoors	Jokes/Limericks	Affection	Concrete Concept Play	Intrinsic Motivation	Emotional Dispositions
Expressive Play	Relationships	Repetition	Creativity	Extrinsic Motivation	Skill Ability
Play with Rules	Praise/Reward	Praise/Reward	Sharing Thinking	Activity Level	Effort
Imaginative Play	Nature/Nurture Dispositions	Communication		Quality of Mood/Emotion	Conceptual Thinking
Exploration				Temperament	
Physical Play	Boundary Testing			Emotional Development	Lateral Thinking
	New Experiences			Cognitive/Emotion Cycle	Divergent Thinking
				Child Wellbeing	Sensory-Motor Application

Table 4. Semantic Codes, Eliciting Activities, and Adult Interpretations from Study 1 Analysis

The perspectives gathered in Table 4 were used to generate five themes: Providing Playfulness, Deliberately Developing Humour, Harnessing Individuality, Appreciating the Relationship between Mind, Body and Emotion, and Sharing in the Benefits.

The following discussion includes quotes from individual participants that are representative of answers from the responses collectively relevant to each generated theme.

Providing Playfulness

This theme reflects the variety of play types and differentiation of effort and challenge involved in the play which elicits expressions of HOT and smiles and laughter that participants recall. According to participants in this study social play with others, including onlooker, observer, associative, parallel and collaborative social contexts are important, and this resonates with Sim and Xu's (2017) findings that two-year-old children's self-directed play supports the development of HOT comparable to adult led or didactic activities, and that children will seek out playful experiences in whatever social context they find themselves in.

Participant responses highlighted the varied social contexts in which smiles, laughter, and expressions of HOT were observed. These contexts ranged from interactions within the home, to peer play in early years settings, to adult-led and informal educational environments. Across these settings, participants consistently described smiles and laughter as emerging through relational exchanges rather than in isolation. This supports the view that smiling and laughter function as cognitive and pro-social tools, enabling young children to communicate emotion, demonstrate thinking, and engage meaningfully with their environment (Nelson-Goes, 1998; Addyman et al., 2018).

Reflecting these distinct contexts, a parent emphasised interpersonal interaction within the home:

“I think they [smiles, laughter and HOT] particularly come from interactions with others.”

A nursery professional highlighted both peer and adult engagement within early years provision:

“I find when they are playing in a group or engaged in their own play environment, as well as with adult interaction.”

An early years teacher pointed to responsive exchanges, primarily with adults:

“In response to others (mainly adults) smiling and laughing.”

Meanwhile, a museum educator described socially shared emotional cues across both peer and caregiver relationships:

“Seeing other children laugh, seeing their parent/carer happy.”

In addition to a range of social contexts, participants also referred to a range of categories of play. Outdoor and physical play including rough and tumble, gross motor, physical comedy such as tickling, risky play, and exploration in nature were highlighted as poignant in children’s play experiences eliciting expressions of HOT and smiles and laughter. The problem-solving opportunities and subsequent smiles and laughter that ensued can come from a wide range of activities, for example; “den building and watering the plants” (parent) “forest play” (parent and professional) “putting outdoor clothing on” (nursery professional) “Outside we have large loose parts with tyres, planks, crates to encourage them to think of ways to build effectively” (early years teacher), and relate to opportunities for children to use all of their senses, bodies and emotions in their learning. This supports the notion that the cognitive embodiment outdoor play affords for is an important consideration (Barrett, 2006; Fincher-Keifer, 2019).

Similarly, creativity including various mark making opportunities, expressive and imaginative play, including opportunities to perform are perceived to elicit expressions of HOT an smiles and laughter, for example,

“Role play opportunities, act out stories through props, puppet shows, dressing up, dance, music, junk modelling, loose parts play” (nursery professional)

once again allows for children to embody their learning and express through language, art and/or movement (Barrett, 2006; Fincher-Keifer, 2019).

Play with rules such as simple turn taking games and concrete concept play, playing with mathematical concepts such as shape, size and number, playing with categories such as colour can elicit smiles, laughter and HOT expressions due to the opportunity for satisfaction,

“When they achieve their goal it [smiles and laughter] shows a sign of achievement and passion” (university professional),

“When they accomplish it of course [they smile]” (nursery professional),

“They [smile and laugh] when the child gets praised for the outcome / trying”
(nursery professional).

Though problem solving challenges and activities come with caution as the potential for the challenge to be too difficult can curtail the benefits “both laughter and frustration” (parent) can ensue. The effort and challenge embedded within the play type is an important factor, arguably without some conscious use or appreciation of this, the smiles, laughter and expressions of HOT elicited would be impacted upon.

“They can become frustrated if the task on hand is not going to plan. Although as an adult I do not always like to interrupt their play, but generally I will prompt them with

positive encouragement, which in turn does elicit a smile once they have sense of achievement by themselves” (Nursery professional).

The significance of a ‘playful’ or smiling adult is important during these activities as an affectionate smile according to Zanolli et al. (1997) is more likely to elicit a positive emotional response from a two-year-old than words or contact, especially if from a primary caregiver (Nelson-Goes et al., 1998). Therefore, the power of a smile maybe significant in eliciting smiles, laughter and expressions of HOT for positive development progress in two-year-old children.

Also pertinent is the purpose of play for rest and relaxation purposes or meeting basic needs. Anecdotes from participants of turning routine self-care tasks into experiences which elicit laughter and learning skills e.g. getting dressed, pouring drinks, self-soothing and so forth, were plentiful. However, without the playful element embedded, it is questionable that these activities alone would elicit smiles, laughter or expressions of HOT. This is evidenced by the need for respondents to contextualise and offer details to their stories about rest and relaxation. Respondents did not feel it was enough to state answers such as ‘pour drinks’, ‘go to sleep’ as activities that elicit smiles, laughter and expressions of HOT as they have for other answers such as dancing.

“When it is bedtime we have often pretended that her foot is the telephone, not a mobile phone, I say it’s an old fashioned telephone like nannies at home (meaning mine) I dial grandpa's number, going round and round on her bare foot then I will quickly hold it up to my ear and say 'oh no, there is no answer' So, I have to do it again, by which time my granddaughter is laughing, squealing and laughing some more” (Family member providing regular child care).

The social interaction and social play seem the most poignant of this theme as it determines how other play activities occur. It is important in enabling opportunities for children to share their thinking with others and be adequately challenged – the return from an adult or peer could make the difference between a child being adequately challenged, and subsequently finding pleasure in the experience to them finding a playful experience too difficult or too easy, which resonates with the work of McGhee (1979). This is echoed by a participant in this study:

“Response from peers and adults can provide a sense of success in their play”
(Nursery professional).

Deliberately Developing Humour

This second theme has been generated from the participants accounts of how smiles, laughter and expressions of HOT can be elicited via humour in its age-appropriate guises. For example, ‘peekaboo’ is an adequate fright in comparison to a strategic ‘jump-scare’ and thus children ‘get the joke’ by assessing the level of ‘threat’ and discovering it to be harmless and subsequently laugh or smile at the experience following this thinking process. Similarly, with physical comedy such as tickling or adults/peers role playing ‘accidents’ children assess the level of risk and deem the experience laughable or smile. The smile/laugh is preceded by a cognitive process, again, age/stage appropriacy is important. Children need understanding of concepts or some facts to enjoy incongruity, for example mixing up animal sounds, a child that knows a cow does not say ‘baa’ may laugh at that ‘silliness’ whereas a child that does not know, may not respond the same way. Similarly, where jokes, funny rhymes are shared, this requires a level of understanding for children to go through the thinking process to decipher the ‘joke’. McGhee’s (1984) work on incongruity theory and cognitive mastery theory and

Frausel et al. (2020) Higher Order Thinking Talk can be combined here as to how children are faced with a challenge to use prior knowledge to ‘get’ the ‘punchline’ in a new context and as new language becomes available to them, they can respond to/via receptive and spoken words. Examples of this can be seen in the following extract.

“Pretending to spill my drink and shouting 'spillage!', pretending to run into a dead end and shouting 'oh, dead end!'. She likes it when I 'accidentally' splat bath bubbles into my face or when she is blowing bubbles at me, and I pretend they are attacking me. She loves running after me with a 'sock monster' and I run away pretending to fear it. She thinks it's particularly funny if I pretend I haven't seen it and say, 'at least there isn't a sock monster on me' and then suddenly see it and act shocked and scared. I will often act shocked as that makes her laugh. General silly behaviour. She loves me pulling funny facial expressions and tries to replicate them to make me laugh. Reading one of her favourite books, putting on one of her favourite tv programmes”
(parent).

Therefore, adult attempts at humour are a promising avenue for eliciting smiles, laughter and expressions of HOT through a clear process of reception of the stimuli, assessing the information and concluding with an emotive response. Participants allude to this as ‘exaggeration’ which has been frequently linked to children cognitively assessing the experience as ‘play’ and something to smile and laugh about, rather than elicit a negative reaction. Fincher-Keifer (2019) work on cognitive embodiment can help us understand the relationship between thinking, emotion and the expression of the child as they continue through processing a potentially humorous stimulus. This is described by one of the participants in the following quote.

“As children develop greater awareness of the world and better language there is more which can bring enjoyment and amusement. For example, as language develops a child will be begun to understand jokes, irony, blunders etc. They can also better communicate what they want. As their imagination develops, they can role play the situations they enjoy. They start to build better social relationships, and these can bring happiness. On the other hand, better cognition may be associated with more concern, sympathy, worry and fear. My daughter has recently started to talk about monsters and referring to things as 'spooky' or 'scary'. There is therefore a complex relationship between higher order thinking and smiles/laughter with development associated with more sophisticated humour but also more awareness of negative aspects of life” (parent and nursery professional)

Play and humour are arguably intertwined; play is a broader concept encompassing all areas of development and the main activity two-year-olds engage in. Humour provides opportunities for more spontaneous reactions from children, even if the action to elicit it from the adult might not be. Perhaps adults have a role to play in spotting those humour opportunities. Humour can be incorporated to make activities more entertaining and closer aligned to eliciting an emotional expression than offering playfulness alone.

Harnessing Individuality

To elicit smiles, laughter and expressions of HOT it appears interactions can coerce the interplay between nature and nurture to the perceived child's benefit, specifically when individual preferences, characteristics and interests are harnessed. Participants noted that the level of exertion and effort from a child can lead to a heightened emotional and cognitive

response, which in turn can be exaggerated or suppressed following praise, reward and emotional response of those around them. For example,

“When the child realises they have succeeded in something they can smile but this is not always necessarily spontaneous, but after the success has been noticed and celebrated by an adult or older child” (nursery teacher).

Participants noted the uniqueness of children in their susceptibility to extrinsic factors and their own interests and preferences and any underlying health or special educational need or disability. Thus, it is for adults to decipher how to utilise individuality to elicit smiles, laughter and thinking circumstantially, and to consider what these behaviours mean for the child’s age and stage.

“Some levels of cognitive development delays may show signs of smiles/laughter without verbal cues/physical actions through play, or no smiles/laughter at all. This may be due to early signs of autism, or brain developmental delays/varying levels of disabilities” (nursery teacher).

Frausel et al. (2020) acknowledged that HOT is a unique part of development for each child, therefore unique individuality pertaining to thinking and a smile and laughter response must be considered. Developing a good relationship with the child is a precursor to this with Nelson-Goes et al. (1998) discovering more genuine smiles were evident within mother-child water play as opposed to less familiar adults. Therefore, without insight into a child’s individual character via a good relationship it is difficult to utilise the aspect of nature nurture when eliciting smiles, laughter and expressions of HOT. Adults with intimate knowledge of children and their background seemingly utilise this effectively, for example knowledge of a history of family behaviours can help adults respond to ‘challenging’ behaviour to turn it into an opportunity for smiles, laughter and expressions of HOT, rather than bygone ‘behaviour

management' techniques. The profound absence of smiles and laughter despite efforts can also be an indicator that intervention is needed as aforementioned by participants this can be an indicator of SEND rather than merely individual preference.

Respondents acknowledged the cyclical nature of children having an innate need to interact with the environment and learn from the outcome,

“self-esteem, self-fulfilling prophecy are factors which will impact upon smiles and then lead a child to feel self-worth and create higher order thinking” (Parent and nursery professional)

the notion that the ‘self-fulfilling prophecy’ of learning breeding more learning, and smiles, laughter breeding more of the same relates to the findings of Zanolli et al. (1997) and Nelson-Goes et al. (1998). Some children may be more likely than others to seek these opportunities for themselves, therefore, this is something adults around them need to potentially factor in.

Acknowledging the Relationship between Mind, Body and Emotion

Considering the circumstances which underpin eliciting smiles, laughter and expressions of HOT, and the potential relationship between them, the capacity for emotional, cognitive and physical domains to work collaboratively and in isolation has been identified by participants.

“I would say, because their ability to imagine is at a whole new level at age two, along with their thinking skills, I believe that there is a link between smiles/laughter and Higher Order Thinking skills, yes” (family member providing regular childcare).

Participants also alluded to enjoyment being a positive disposition for development to take place,

“If children enjoy learning things, then they’re more likely to learn them” (nursery professional).

Nevertheless, as knowledge widens respondents also felt that both positive and negative emotions can heighten concurrently

“Smiles come from familiarity and that sense of security that bring more smiles than something new [challenging] that they could be unsure of” (University Lecturer)

“adults place value on certain skills by nurturing them and reacting to their presence, sending the child messages about what is deemed ‘good’ shaping how children respond [emotionally]” (parent).

Interestingly, children experiencing “frustration” was the most referred to limitation adults perceived can be an emotional expression that they inadvertently elicit when offering HOT opportunities which are too difficult or are without adequate praise, encouragement, reward or fun. A knowledge of the child’s individual abilities can potentially reduce the likelihood of this occurring, or where it does occur, use playfulness, humour, share a smile, praise/encouragement to alleviate this.

“a lot is based on the adult responses and encouragement to keep trying when it [frustration] occurs” (family member providing regular childcare).

These perspectives pertain to the work of Fincher-Keifer (2019) whereby thinking and emotion to express or to understand are concurrently or sequentially related,

“Children need to have that memory and emotional response to encourage deeper thinking and recall of skills” (University Lecturer)

Sometimes emotion and cognition are explicitly interlinked, sometimes this is subtle, and sometimes they may be of limited influence on each other. Each child and adult will have

their own developed emotional disposition, which can be changeable, and each of us has a unique temperament, which may make us, more or less, susceptible to outward displays of pleasure in learning. Nevertheless, we will all have an innate involuntary response of genuine pleasure which can be observed and potentially tapped into. For example.

“[during problem solving tasks] there can be frustration as they really want to get the task done themselves. However, once their problem is solved, there are watery smiles all around” (family member providing regular childcare).

Ruba et al. (2021) and Kromm et al. (2015) allude to the differences in facial configuration, categorising emotions and understanding others, this element of emotional intelligence is important regardless of how raucous or genuine pleasure maybe. Every day two-year-old children are navigating their feelings whilst learning and adults supporting them using smiles and laughter as a tool can help create a positive emotional climate, conducive to development (Gee, 2020).

Similarly, thinking manifests itself differently in terms of embodiment depending on the skill ability and task in hand; conceptual, lateral, divergent and sensory-motor application have all been identified as desirable expressions of HOT to elicit, yet will lend themselves to smiles and laughter elicitation with subtleties;

“If higher order thinking skills plateau or are not developed I suspect that the smiles may reduce in activities using specific thinking skills however smiles do not come from higher order thinking skills alone so it would be very hard to measure and determine a causative relationship even if there does initially appear to be a correlation” (School based nursery professional).

The relationship between thinking, emotion and physical embodiment is a changeable and unique component of each child, with individuality considered a smile (or lack thereof) can still be a window into the mind, emotion and development,

“The emotion of smiles/laughter is a good indicator to observe” (nursery professional). This supports Barrett (2006) suggestion that it is the limbic system that is active during processing both emotions and cognition, and that being conscious of this relationship can help adults to comprehend how holistically a child is developing.

Sharing in the Benefits

Participants reported that their response to smiles and laughter includes the quality of their own feelings and emotions improving. This is in line with Mizugaki et al. (2015) findings. Consequently, by being exposed to more smiles and laughter, the relationship between the adult and child is supported, the participants reported increased sense of happiness, love, affection and ‘feel good’ emotional reactions, such as,

“I join in - it makes me as a parent feel really happy to see these emotions” (parent). This in turn may promote the wellness of the child and adult, and the adults feel confident to continue to provide smiles, laughter and learning opportunities, the serve and return of a smile seems mutually beneficial,

“I respond by smiling back to them. I used to run intensive interaction sessions with children with profound and multiple learning disabilities and autism spectrum disorder and this was so important” (university professional).

The body also does not know the difference between genuine or socially utilised smiles and laughter (Mora-Ripoll, 2019) therefore the physiological benefits participants reported can be reaped by exposure to any type or purpose of a smile during activities.

Children that smile and laugh frequently are seemingly happy, and thus more likely to learn from a positive disposition. The potential of an increased quality in play typology and skills associated with expressions of HOT when smiles and laughter are a part of these experiences has been identified, though that is not to say benefits of play and expressions of HOT cannot be enjoyed without smiles and laughter. In the act of consciously trying to elicit smiles, laughter and expressions of HOT concurrently, children are being presented with new experiences, more opportunities to make positive progression, and offers to improve relationships with others and themselves. Similarly, serve and return interactions with children are a means of adults having their efforts validated too, if an adult found that their attempts to offer care, play, facilitate development were not met with any smiles or laughter this would be a reason to alter what they were doing,

“I wouldn’t be doing my job well if the children in my care and weren’t smiling and laughing” (Nursery teacher).

6.3.6 Discussion

The open-ended questions generated rich qualitative data suitable for exploring smiles, laughter and expressions of HOT in two-year-olds. Sixty respondents suggests that the online questionnaire reached adults with regular professional or personal engagement with two-year-old children, enabling informed reflections on activities associated with HOT and positive affect. However, the reliance on social media and email distribution may have shaped the sample toward individuals engaged in professional, academic or interest-based networks and

as demographic data was not collected, the breadth and depth of backgrounds included is unclear. As a result, the data may reflect perspectives that are more reflective, pedagogically informed or positively oriented toward EC practice, potentially limiting representation of broader socio-economic, cultural or less digitally engaged groups. This sampling context may therefore have influenced both the framing of responses and the types of experiences shared in the dataset.

Nonetheless, the data identified a range of social interactions, playful experiences, and humorous encounters that adults perceived as eliciting expressions of HOT and smiles and laughter concurrently. Importantly, however, no single activity emerged as uniquely associated with these responses. This raises a potentially important conceptual consideration: whether the specific activity is less significant than the conditions under which the activity occurs. Existing literature demonstrates that social interaction, play, causal reasoning, relational thinking, and positive affect each contribute independently to children's development (Walker & Gopnik, 2013; Sim & Xu, 2017; Addyman et al., 2018; Frausel et al., 2021). However, the present findings suggest that adults may perceive particular value when cognitive challenge and positive affect occur simultaneously. Participants frequently described adapting their interactions, introducing humour, following children's interests, providing challenge, or responding sensitively to children's cues in ways that appeared to increase the likelihood of both HOT and smiles/laughter occurring together. Therefore, the emerging contribution of this study is not the identification of a definitive activity capable of provoking these responses, but rather the suggestion that intentional adult practices may create conditions in which smiles, laughter and HOT can coexist. This possibility warrants further investigation and provides a rationale for the subsequent studies.

6.3.7 Conclusion and Recommendations

The findings suggest that smiles, laughter, and expressions of HOT are not isolated developmental phenomena but are perceived by adults to frequently occur within shared social and learning experiences. Consistent with literature demonstrating the social and cognitive significance of positive affect (Addyman et al., 2018; Ilyka et al., 2021) and the early emergence of HOT abilities (Frausel et al., 2020; 2021), participants identified a range of contexts in which children appeared to be simultaneously engaged cognitively and experiencing pleasure.

A notable contribution of the study is the identification of a perceived relationship between cognitive challenge, social interaction, and positive affect. Rather than highlighting specific activities as inherently effective, participants consistently described the role of adult intentionality in shaping experiences. Through humour, responsive interaction, sensitive challenge, encouragement, modelling, and adaptation of activities to children's interests, adults reported creating opportunities where HOT and smiles/laughter appeared more likely to emerge together.

The findings therefore extend existing literature by suggesting that the concurrent occurrence of HOT and pleasure may represent a meaningful area of inquiry in its own right. Whilst previous research has explored HOT, humour, affect, attachment, and social interaction independently (McGhee, 1979; Walker & Gopnik, 2013; Frausel et al., 2021; Addyman et al., 2018), less attention has been paid to how adults perceive and potentially facilitate their simultaneous occurrence in the everyday lives of two-year-old children.

The study further suggests that smiles and laughter may offer practitioners and families a readily observable indicator of occasions in which children are not only experiencing positive affect but may also be engaging in complex thinking. Equally, expressions of HOT may occur within emotionally significant interactions and relationships, reinforcing the notion that cognition and emotion should not be considered wholly separate domains of development. Consequently, the findings indicate the importance of relationally rich practice in which adults intentionally combine emotional connection, playful engagement, and appropriate cognitive challenge.

Whilst exploratory and based upon adult perceptions, these findings provide an original foundation for examining whether identifiable conditions exist that increase the likelihood of HOT and pleasure occurring concurrently.

6.4 Study 2

A Multi-Modal Case Study Investigation into Smiles, Laughter and Expressed Higher Order Thinking in Two Year Old Children

Abstract

This study seeks to explore if adults can provoke expressed Higher Order Thinking (HOT) and pleasure simultaneously for positive developmental progress in two-year-old children. The study adopts a praxeological research design with data collection occurring via five multi-modal case studies with data sets including semi-structured focus group interviews, videos and photographs. Informed by discursive psychology analysis, content analysis and reflexive thematic analysis, themes of; The Importance of Attuned Relationships, Embodied and Expressive Forms of Playful Learning, Physiological Expressions of HOT and Pleasure, Smiles and Laughter as an Equitable Pedagogic Tool, Language of Laughter, Humour and Development were generated. Implications for practice pertain to the process of adults achieving high-quality relationships with and between children, plus the conscious prioritisation of sharing in smiles and laughter during activities which can cause states of eudemonia, thus creating positive dispositions for pleasure and development to co-occur in children. The conditions optimal for this relate to adults ‘performing’ during activities to encourage suspense, anticipation, memory recall, repetition and providing opportunities for children to express themselves in diverse ways. Finally, it is proposed that such practice is an equitable and universal sustainable method of impactful support for two-year-old children.

6.4.1 Introduction

Laughter is an evolved signal of harmless intentions and strengthens the bond between infants and caregivers (Nwokah et al., 1994, Provine, 2004, Wood & Niedenthal, 2018). Smiles and laughter have three possible functions, to reward, reinforce and maximise on the behaviour of others, to ease social tension and increase affiliation, or to nonconfrontationally discourage undesirable behaviours (Wood & Niedenthal, 2018). Therefore, an increased exposure to shared smiles and laughter between adults and two-year-olds could have desirable effects on learning and development.

HOT is a set of mental abilities that determine the complexity of EF such as; working towards goals, planning, agility, inhibition, recall and creating new meaning (Brock et al., 2009; Seifer, 2018; Zelazo, 2020; Mehseu et al., 2022). Fincher-Keifer (2019) states that the relationship between the mind, body and emotion can be explained by the embodied view of emotion which is a neurophysiological state based upon experiences of movement, senses and perception. Using these experiences to create new meaning, knowledge and expression is part of how HOT is expressed in two-year-old children. At two-years-old, a child would need to use their Executive Functioning (EF) capacities including (but not limited to); inhibit, regulate and plan behaviours, be goal-directed, adaptable, create new meaning, draw from memories (Carlson, 2005; Friedman et al.; 2006; Thibodeau, 2018) within their HOT ability so they can use or appreciate smiles, laughter and/or humour as an expressed socio-cognitive HOT skill.

Pascal and Bertram (2023) suggest EC educators should now focus their attention on flourishing, fulfilment and wellbeing. This aligns with the widespread play-based model of early years practice, where play can be a natural context for expressed smiles, laughter and HOT to occur. Bertram (2023) identified that EC practices which facilitate eudemonic wellbeing, for example working on meaningful priorities, preferences and activities, can enable flourishing and wellbeing for all involved. Therefore, this study seeks to see the possible practices eliciting HOT and a smile and laughter response simultaneously arguably enlivening eudaimonia, where purpose and pleasure collide.

6.4.2 Literature Review

According to Macrae and Maclure (2021) post-Piagetian research links physical, cognitive, social and perceptual development together in the first three years of life, and this relationship diminishes over time (Libertus & Hauf, 2017; De Jonge-Hoekstra et al., 2021). An opportunity for adults to purposefully elicit smiles, laughter and HOT in playful learning can be in ensuring that physicality, emotions and perceptions are coactivated during the activity allowing children to express their socio-cognitive HOT skills. A practical component of providing this is offering challenging activities and looking out for chances to engage in intergenerational smiles and laughter because smiles and laughter are most likely to occur when the stimuli is calibrated to the level of cognitive ability of the child i.e. not too difficult or too easy (Zigler et al., 1969; McGhee, 1988, 1979; Martin, 2010; Mazzocconi & Ginzburg, 2022). Therefore, this social interaction can be affirming that adults' efforts to facilitate learning and pleasure are adequately aligned, that HOT has been expressed, or that a state of eudaimonia has been established.

According to Hoicka et al. (2011; 2021) two-year-old children's humour reflects their development in social, emotional, language and cognitive domains, thus an expressed form of HOT. Furthermore, Hoicka et al. (2021) established that at two-years-old children can smile, laugh, appreciate and produce humour, offering adults around them a social and emotional window into their HOT capabilities. The types of humour most evident at this age and stage of development were body-based humour, scaring, misrepresentation and playing with social rules and tricks (Hocika et al., 2021). Adults can potentially strategically use humour types as a pedagogic tool in early years to facilitate learning with the concurrent pleasure often associated with smiles and laughter. Whilst smiles and laughter do not always denote pleasure or humour, they are a significant feature of social life, and smiles/laughter occurrence in children is underpinned by cognitive development and social and emotional intelligence (Dunn, 2003; Cekaite, 2018) thus worth eliciting and working with to establish positive progression in development and observing for expressed HOT.

Relationships are an important factor in using humour as a pedagogic tool in early years practice. However, according to Cekaite and Andren (2019) children aged three to five primarily sought and received affiliation with their peer groups with reciprocal laughter, whereas adults shared laughter with other adults. Indicating that at the age and stage just after two in the studied Swedish pre-schools, intergenerational reciprocal laughter was a rare

occurrence. It is possible that purposefully eliciting smiles, laughter and HOT concurrently is an underutilised high quality practice for two-year-old children.

Hoicka and Telli (2022) found that smiles and laughter can be used as markers of social skills in play. According to Mazzocconi and Ginzburg (2022) when language is not fully developed, laughter can be an early means, in its fully available expressiveness, to hold conversation and enable meaningful interaction. Thus, it is an equitable, non-hierarchical communication tool to facilitate learning. Hoicka and Telli (2022) found that humour predicted social cognition, but not the reverse, and this relationship held across a diverse demographic sample, again highlighting the equity of using humour. This also demonstrates that children who can appreciate and produce humour afford themselves an increase in HOT socio-cognitive opportunities (Hoicka & Telli, 2022).

Physiology is important in the processes associated with HOT and smiling and laughing at the age of two. It is the limbic system that is concerned with processing, storing and expressing emotional thinking. Twardosz (2012) highlights babies are born with an experience-dependent limbic system which is reliant upon positive social, emotional and cognitive stimulation from the environment, EC is therefore a sensitive period for the limbic system to develop (McCain et al., 2011). The limbic system influences responses to stimuli, including new opportunities, challenges and is an essential factor in readiness and emotional state to learn. According to McCain et al. (2011) the limbic system underpins arousal, emotion, attention, behaviour and subsequent recovery following an experience (positive or negative). Since babies are primed to be interested in faces and initiate non-verbal communication (typically gaze, cries and smiles) how adults respond creates a serve and return exchange that is poignant in sculpting the limbic system (McEwen, 2008; Centre of the Developing Child, 2009; McEwen et al., 2010; Shanker & Bertrand, 2011; McCain et al., 2011). The limbic system influences the holistic health, education and behaviour outcomes throughout the rest of the child's life (McCain et al., 2007). The first three years of life are therefore important in supporting healthy development of this area of the brain which helps to manage emotional and cognitive functioning across the lifespan, in essence, the expressed HOT in action.

Whilst cultivating the limbic system is important in early years, practical strategies and evidencing when this has occurred is difficult, it is possible that smiles and laughter are a sign of HOT occurring, or the limbic system being positively stimulated. It is possible that using

adult and child relationships to increase exposure to smiles during activities which can elicit HOT can cause a favourable disposition for learning and wellbeing i.e. a eudemonic state in children.

In the UK, two-year-olds access EC provision through a mixed economy of PVI and maintained settings, including sessional, full-day and funded places for eligible families. Policy frameworks have recognised the significance of this developmental phase. For example, The Department of Health and Social Care (2021), in the Early Years Healthy Development Review, emphasised that the period from pregnancy to age two establishes foundations for cognitive, emotional and physical development. The statutory two-year progress check (introduced by the Department for Education and the Department of Health and Social Care in 2012) further reflects the view that this is a critical window for identifying developmental need within the prime areas. However, alongside this recognition sits a complex landscape of sector challenges. The First 1001 Days of Life report (Health and Social Care Select Committee, 2019) highlighted systemic pressures including workforce capacity, leadership, access to family support and the need for ongoing research and quality assurance. Subsequent reports, including Babies in Lockdown (1001 Days Movement, 2021), conveyed the heightened importance of relational connectedness for infants, particularly in the wake of social disruption (Reed & Parish, 2021). Concurrently, national initiatives such as the Royal Foundation's Shaping Us campaign (2022; 2023) and recent regulatory reforms to staff-child ratios and funding expansion (Department for Education, 2023) signal a sector undergoing structural change. Within this context of expansion, reform and acknowledged vulnerability, it is both timely and necessary to examine not only intervention and deficit, but flourishing.

Collectively, the literature suggests that HOT, smiles, laughter, humour, social interaction, and positive affect each play an important role in the development of two-year-old children (McGhee, 1979; Addyman et al., 2018; Frausel et al., 2020; Hoicka et al., 2021). Existing research further indicates that cognitive challenge and positive emotional experiences may be interconnected through children's developing social, emotional, and physiological systems (Fincher-Keifer, 2019; Ilyka et al., 2021). However, these phenomena are typically examined independently and there remains limited understanding of how HOT and pleasure may occur concurrently within the everyday experiences of two-year-old children, or how adults might intentionally facilitate such experiences. Furthermore, much of the existing evidence originates from experimental or laboratory contexts, with calls for more situated and applied

research within the natural environments in which young children live, play, and learn (Ilyka et al., 2021). Therefore, the novel contribution of this study lies in exploring the potential concurrent occurrence of HOT and pleasure, as expressed through smiles and laughter, and in examining how adults may purposefully create conditions that support both simultaneously within authentic EC contexts.

6.4.3 Study Aims and Objectives

Responding to Pascal and Bertram's (2023) call to prioritise children's wellbeing and thriving, this study shifts attention toward eudaimonic dimensions of EC. Specifically, it explores smiles, laughter and HOT as expressions of potential flourishing.

This study explores the following research question.

How can adults provoke HOT and pleasure simultaneously for positive developmental progress in two-year-old children?

This intends to be achieved by ascertaining possible answers to the following sub questions.

- (1) What activities or conditions elicit HOT, smiles and laughter in two-year-old children?
- (2) What can adults do to maximise upon this in practice?

Institutional ethical approval was granted and BERA (2018)³ and BPS (2021) ethical guidelines followed.

6.4.4 Methods

Design

The research adopts a praxeological design (Pascal & Bertram, 2012; Oliveira-Formosinho & Formosinho, 2012) whereby research is carried out with EC educators and has an emphasis

³ Data collected prior to 2024 update

on making visible their values, processes and reflection to transform future practice using carefully chosen data collection materials and methods to portray their ecospheres. Using a praxeological design to tell the stories of participants beyond linguistic formats (Romero & Walker, 2010) and demonstrate how many elements of their practice interconnect to explicitly make visible their perspectives (Pascal & Bertram, 2023). Given that recruitment and data collection occurred in the latter phase of the Covid-19 pandemic, a multi-modal case study design was adopted as the most practical and ethically appropriate method for participant engagement due to its accessibility in an online environment. Thus, five multi-modal case studies were collected (Christensen et al., 2018). A multi-modal case study collects and integrates multiple forms of data rather than relying solely on verbal discussion. In this study, data were generated through semi-structured online focus groups, participant digitally submitted photographs and videos, and observational information captured during the video-conferencing sessions, including tone of voice, facial expressions, non-verbal behaviours, and participant interactions. Therefore, these multi-modal case studies included explicit and implicit data collection tools which provide rich qualitative information. The explicit tools were the semi structured focus groups with adults, plus their submitted videos and photographs of the anecdotes they were referring to in their answers. The process for this is explained further in the procedures section. The implicit tool was the video call itself, which captured the visuals, tonality, expressions and relationships of the participants during the semi-structured focus group interview. Implicit in this circumstance means indirectly or unintentionally captured observational data. Multimodal methods in data collection during case studies provide a “virtual window” (Romero & Walker, 2010, p. 216) into the experiences of the participants that would be missed if limited to the transcript of spoken answers alone. Pascal and Bertram (2023) explain all aspects within a context relate to each other and form a specific ecology in which the practice issue at the centre of the research is situated, thus, the praxeological design enables all explicit and implicit data to be used to emphasise the perceptions of the participants.

Recruitment, Sampling and Participants

A digital recruitment resource was developed using Microsoft Sway to provide prospective participants with a video introducing them to the researcher, written information sheet, embedded sector magazine article the researcher had published on laughter in early years (Cornwall, 2018), and an embedded expression-of-interest form. Recruitment through digital

and multimedia platforms has gained traction in recent methodological literature, with integrative reviews highlighting social media’s expanding role in engaging diverse participant groups (Darko et al., 2022), and reflective work showing that multi-media, especially including video, recruitment tools can positively influence participant engagement and understanding (Culshaw, 2023). Creatively designed digital information may improve comprehension of research aims (Knapp et al., 2021) and broaden outreach when combined with broader online strategies (Uy et al., 2025). The platforms used to share this were email, social media (predominantly Twitter (X) and LinkedIn), and professional interest Microsoft Teams spaces.

A self-selection sampling strategy was employed, allowing participants to volunteer for the study. In keeping with grounded theory principles, sample size was not established a priori; instead, data collection proceeded until theoretical saturation was reached and no new conceptual insights emerged (Tight 2024).

The five multi-modal case studies include participants based at four school-based nurseries and one sessional care service. The participants were twelve adults who are in active professional practice with two-year-old children; professional roles included one sessional care leader, one residential care leader, nine teachers and one nursery assistant with varying parental statuses. The multi-modal case study participants were divided according to the setting they were affiliated with:

CASE STUDY SETTING	NUMBER OF PARTICIPANTS	ROLES OF PARTICIPANTS	PARENT STATUS	SETTING DESCRIPTION
SESSIONAL CARE CS	2	One sessional care leader; one parent who was also a residential care leader	Only this parent currently has a two-year-old child	Weekly, term-time provision, three-hour sessions
SCHOOL NURSERY CS1	3	Two teachers; one nursery assistant working in the two-to-three room	Two parents of older children	Primary school with integrated foundation phase within multi-

		and pre-school		academy trust
SCHOOL NURSERY CS2	3	Three teachers working in two-to-three room and pre-school	Parents of older children	Primary school with integrated foundation phase within multi-academy trust
SCHOOL NURSERY CS3	2	Two teachers working in two-to-three room and pre-school	Parents of older children	Primary school with integrated foundation phase within multi-academy trust
SCHOOL NURSERY CS4	2	Two teachers working in two-to-three room and pre-school	Parents of older children	Primary school with integrated foundation phase within multi-academy trust

Table 5 Study 2 Multi-Modal Case Study Participant Breakdown

Materials

Data collection for the multi-modal case studies utilised Microsoft Teams to conduct a focus group. Virtual focus groups conducted via synchronous videoconferencing platforms have become an established method in qualitative research, providing flexibility, accessibility and opportunities for naturalistic interaction while preserving data quality (Iacono et al., 2016; Archibald et al., 2019). Platforms such as Microsoft Teams supports interactive discussion, multimedia use, and participant engagement (Reid et al., 2021). The online platform enabled synchronous discussion and audio-visual recording of participant contributions and is an increasingly used tool researchers are growing in confidence using to bring together people who couldn't otherwise connect for a focus group (Frey & Bloch, 2023). A semi-structured focus group question pool was prepared in advance, comprising open-ended questions designed to elicit detailed reflections on children's expressions of HOT smiles and laughter within practice contexts. The questions were based upon findings from study one (questionnaire) in keeping with Plano Clark (2019) exploratory sequential design whereby

findings from initial phases guide and inform data collection tools in following studies. The questions included:

- What types of activities make children laugh?
- What types of activities provoke complex thinking skills?
- Are there any activities that make children laugh whilst also provoking complex thinking skills?
- How do you think humour develops?
- How do you think nature/nurture influence smiling/laughing and thinking?
- Do you think there is a relationship between emotions, thinking skills and how we express this?
- Is it possible emotions, thinking and our outward behaviours are isolated?
- Any value to adults in purposefully eliciting smiles, laughter during learning?
- Any value to children in having smiles, laughter purposefully elicited during learning?

In qualitative focus group research, open-ended questions are widely recommended because they enable participants to articulate their experiences and perspectives in their own terms, discussion that includes richer data than closed formats allow. This remains true for virtual focus groups conducted via digital platforms, where open prompts facilitate interaction and in-depth sharing across participants (Olawade et al., 2025)

To facilitate the collection of multimodal data, participants were provided with a secure Microsoft OneDrive “request files” link through which they could upload photographs and short video clips. Practitioners were invited to capture naturally occurring instances of children engaged in activities where expressions of HOT, smiles, and laughter were observed. The upload portal was private, password-protected, and accessible only to the researcher to ensure confidentiality and data security. The submission window was opened two weeks prior to the focus group and remained open for two weeks following the focus group, allowing participants flexibility to contribute materials asynchronously and at times convenient to their practice context. This choice of materials is supported by Kim and Choi (2025), who argue that participant-generated video data of children’s everyday experiences can augment practitioner accounts by providing contextualised, replayable records of events.

Unlike real-time observation, video enables repeated viewing and closer analytic attention, while also transporting the viewer into the situated moment without requiring physical or synchronous presence (Kim & Choi, 2025).

Procedures

Initial contact was made with individuals who had consented to be approached for future research following their participation in Study 1 (questionnaire). Subsequent recruitment extended beyond this group through the dissemination of a purpose designed Microsoft Sway recruitment resource. This digital recruitment resource provided an accessible overview of the study, including an introductory video outlining the researcher's background and aims, embedded relevant prior publications (Cornwall, 2018), a detailed participant information sheet, and an embedded Microsoft Forms expression-of-interest form for settings wishing to participate as case study participants. The recruitment Sway was circulated via professional social media platforms, including LinkedIn and Twitter (X), and shared within multi-professional networks such as the Microsoft Innovative Educator Expert national team. This strategy was intended to reach practitioners and settings engaged in EC education across diverse professional communities.

Prior to data collection, preparatory engagement with key gatekeepers and participants was undertaken to support clarity, trust, and feasibility. An initial in-person meeting was held with the sessional care setting (CS1), followed by an online meeting with the Head of Early Years for the hosting Multi-Academy Trust schools (CS1–CS4). These meetings enabled collaborative identification of suitable dates and times for the focus groups, clarification of the research aims and procedures, and demonstration of how to submit photographs and video clips via personalised Microsoft OneDrive “request files” links.

Providing clear procedural guidance aligns with recommendations in qualitative educational and applied psychological research that emphasise reducing participant burden, particularly when working with busy educators, while recognising that meaningful engagement in research can enhance professional learning and pedagogical practice (Kowalczyk-Wałędziak & Ion, 2024). Participants were also informed that a follow-up letter summarising key findings and practical recommendations would be shared after analysis as an expression of gratitude and to contribute to continuing professional development. Such reciprocal gestures

Step 1	Read and view the data to become familiar with each case study. According to Wiggins (2017) this is obvious but important to do so that themes are not rushed or forced.
Step 2	A descriptive narrative of the semi structured focus group interview was produced as a necessary part of analysing and relaying focus group data that

acknowledge participants' contributions and enhance the perceived value of involvement (Trainor & Bouchard, 2013).

Once dates and times had been confirmed, personalised OneDrive file request links, online meeting links, and calendar invitations were distributed to ensure participants could access their relevant platforms.

At the start of each focus group, the researcher reiterated the aims and purpose of the study, confirmed successful access to the photograph and video upload portal, and reminded participants that the submission link would remain open for two weeks following the session. Participants were also informed that a follow-up letter outlining headline findings and practice recommendations would be shared within ten working days.

Following these procedural clarifications, the researcher facilitated the discussion using open-ended questions. Participants were not time restricted; subsequent question prompts were introduced only after natural pauses in discussion. Although sessions did not exceed two hours, duration was determined by the flow of dialogue rather than a predetermined time limit. At the end of focus group questions, participants were asked if there was anything else they'd like to share, before the recording ceased which allowed for off record natural conversation and an organic close to the meeting.

The findings of each semi structured focus group were individually transcribed and summarised via a descriptive narrative and shared back to the participants. Participants confirmed receipt of their letters and unanimously (yet unrequested to) replied with gratitude and an expression that simply talking about the topic was continuing professional development in itself, the experience and topic was refreshing compared to their usual professional talks and they'd be implementing the suggested recommendations for practice. No changes to their data were requested, therefore, analysis continued.

Informed by Wiggins (2017) discursive psychology analysis, the analytical process displayed in table X was implemented to generate themes from explicit data sets of participants answers and video/photograph submissions, whilst capturing the implicit data set of discursive devices (ways of talking) visible throughout the video call.

	explores human topics (Stewart, Shamdasani, 2014) Each individual multi modal case study received their own descriptive narrative.
Step 3	Thematic analysis following the Braun and Clarke (2018) process identified patterns within the semi structured focus group interview data, drawing from experiences of personal early years professional practice to generate themes, rather than focusing solely on the frequency of responses. This enabled the responses to be analysed with explicit relevance to the early childhood professional sector.
Step 4	Content analysis of the submitted videos, images and recorded call using an abductive approach (Bell, 2001; Graneheim et al., 2017; Blackstone, 2018) whereby the multi-media is analysed alongside the thematic analysis of verbal answers, thus, a more complete understanding can be accrued from combined data. This enabled the explicit and implicit data sets to be delved in and out of collectively and individually which can't be strictly achieved using deductive or inductive means (Graneheim et al., 2017)
Step 5	The data was then looked through once again with a focus on the generated themes to produce discussion points.

Table 6 Study 2 Discursive Devices Analysis Procedure

Using multiple analytical approaches for the data sets (content analysis for submitted videos and photographs, thematic analysis for semi-structured focus group responses), enabled the multi-modal case studies to be analysed individually and collectively. According to Flick (2018) this approach prevents one analytical approach dominating the analysis process, especially when multiple data types are available.

6.4.5 Findings

Findings are presented according to the stages of analysis undertaken. Initial descriptive narrative summaries were produced for each case study (available in appendix 4), followed by thematic analysis of the focus group data, content analysis of submitted photographs and videos, and discursive device analysis of the recorded video call discussions. These analytical strands were subsequently integrated to generate six overarching themes: The Importance of Attuned Relationships, Embodied and Expressive Forms of Playful Learning, Physiological

Expressions of HOT and Pleasure, Smiles and Laughter as an Equitable Pedagogic Tool, Language of Laughter, and Humour and Development.

Descriptive narratives of data or analysis can aid studying the language used about learning in the natural context of which it's from, free from any manipulation or alteration (Nassaji, 2015). This description of the perceptions of the participants enables the praxeological design (Pascal & Bertram, 2023) to be maintained as participant views are made explicitly visible, each case's ecosphere is retained, yet can still be further analysed individually and collectively to generate themes.

The development of themes are presented in table 7;

Data Source	Categories	Final Theme
Focus groups; discursive device analysis	Relationships, Preferences, Emotional Intelligence, Responsibility of Adults	The Importance of Attuned Relationships
Focus groups; videos and photographs	Sensory Opportunities, Narratives, Literacy, Performance (Adult), Performance (Child), Role Play, Small World Play, Water Play, Messy Play	Embodied and Expressive Forms of Playful Learning
Focus groups; videos and photographs	Physiology, Biology of Pleasure, Facial Composition, Expressions	Physiological Expressions of HOT and Pleasure
Focus groups; discursive device analysis	Availability, Social Climate, Emotional Climate, Responsibility of Adults, Infectious	Smiles and Laughter as an Equitable Pedagogic Tool
Focus groups; videos and photographs	Expressions, Anticipation, Suspense, Group Glee, Exaggeration (Adult), Types of Humour	Language of Laughter
Focus groups	Humour Development, Prime Areas of Development, Thinking About Thinking, Memory, Literacy, Narratives	Humour and Development

Table 7 Development of Categories into Final Themes from Data Sources

As shown in Table 6, categories generated across the different data sources demonstrated considerable conceptual overlap. Through reflexive interpretation these were consolidated

into six interrelated themes which capture how participants understood the relationship between HOT, pleasure, smiles and laughter in two-year-old children's development.

The label Equity was generated due to the inference from participants that all children have physiological capacity to embody their learning and showcase their personalities, preferences and sense of humour via smiles, laughter and observable signs. Thus, adults have this area of practice available to them to maximise upon independent of context or social demographic. The language of laughter was arrived at due to the varying expressions children and adults both use during occasions of smiles and laughter. The social, emotional and infectious climate this communication can cause results in germane expressions associated particularly with smiles and laughter. Humour and development were arrived at as participants referred explicitly to these collectively and separately as examples of smiles and laughter been observed and HOT in action. Physiology resulted from responses pertaining to the physiological nature of happiness chemicals, facial configuration and embodiment of pleasure in learning. Finally, playful learning was arrived at due to the series of activities, play types and example sessions/lessons shared as examples from participants.

Bell (2004), Blackstone (2012) and Graneheim et al. (2017), identify that values (categories) and variables (data outside of the visual dimension) need to be acknowledged to adopt content analysis for visual data. These content units can be referred to as physical units (Krippendorf, 2004) as they were physically evident in the submitted videos and images for example, photographs of children playing in water or sensory trays. In the videos it was evident that suspense was built up by adults using repetition so children can use their memory and anticipate what might happen next, suspense also came from the type of communication used e.g. slow, lower tones followed by loud and fast expression, this type of content unit can be referred to as categorical units (Krippendorf, 2004) as they are expressions of the physical units. Another categorical unit was the element of performance which was evident in storytelling, narratives with props and literacy-based tasks, children also replicated such behaviours when in a social scenario. The influence of Wiggins (2017) aided capture of poignant features in the video call. Initially, notes were made during the video to identify 'discursive devices' (ways of talking) during the discussions and these discursive devices were most prominent when participants were discussing the concept of relationships. Discursive devices such as head nodding in agreement, using reminders to refer back to previous discussion on interpersonal topics or anecdotes, plus the use of more personal markers were evident when relationships were the subject.

The following subheadings are the themes generated from the analysis presented reflexively in keeping with Pascal and Bertram (2023) praxeological design, making visible the ecology, values, processes and reflections of the participants with implications for the EC sector.

The Importance of Attuned Relationships

Within the descriptive narrative of the multi-modal case studies, participants share that to provide adequate challenge eliciting HOT skills, adults must build up their knowledge of the child.

‘I think from our education point of view, it's us tuning into what is making them laugh. We're not trying to make them laugh for any sake, we're trying to provide a fun and engaging activity. In the video I sent you it was the letting go of the parachute these children enjoyed. Whereas with another group of children it might be in the stretching. So, you tune into that because you know, that means that they'll focus for longer, and they'll remember it better because they've got that emotional engagement to the learning.’ (CS1)

Bertram (2023) identifies that activities which combine a child's priorities, preferences and fulfil their needs causes a state of eudaimonia which is optimal for positive development and wellbeing. Adults can achieve this only when an authentic understanding of the child has been achieved. This was reiterated by the discursive devices (Wiggins 2017) or ways of talking, that participants were using during discussions about relationships. Participants would head nod in agreement, use reminders to refer back to previous discussion on relational topics, use more personal markers such as eye contact, saying “yes, hmm” in agreement.

To appreciate what circumstances may make a child smile or laugh, the adults need to understand a child's personality, and homelife.

‘I felt one child had a very mature sense of humour, quite ‘dry’ at times, and then I met their dad, and this made sense to me, I could use this in my relationship with the child.’ (CS4)

Adults can maximise upon their relationships and knowledge of the child's temperament and circumstances to then navigate the best approach to eliciting smiles, laughter and HOT. Once

relationships are established, adults are more equipped to use teaching tools such as humour types alongside activities to concurrently elicit smiles, laughter and HOT. According to Zigler et al. (1969), McGhee (1988, 1979), Martin (2010) and Mazzocconi and Ginzburg (2022), smiles and laughter are most likely to occur when the stimuli is calibrated to the individual's cognitive ability, thus a sound knowledge of the child's development and personality is required to be successful. Practice evident in the submitted videos of parachute games and stories with props were adults scanning the room observing engagement, responding accordingly and maintaining the involvement of all children.

The understanding of a child's subtle facial reactions was important to participants as they mentioned observing the 'smile in the eye' to determine suppressing, masking or neutralising their amusement. This is poignant when there's been a potential developmental break through.

'We perhaps do this naturally or automatically, but we're looking for those subtle cues in a child's face to see things such as, yes they understand what I'm saying, yes they understand this joke etc and we're looking for their eyes a lot of the time. Especially those with other needs. For example, a now older child who eventually got diagnosed with dyslexia has only become more smiley with the mouth since we've been altering what we do, initially we were watching those eyes for cues' (CS3)

Dunn (2003) and Cekaite (2018) convey that smiles and laughter can denote social and emotional intelligence and are worth looking for, even subtly, to establish if positive progression has occurred. This poses an area of potential needed guidance on the significance of smiling as part of child HOT development and how adults can elicit or respond accordingly using their relationship.

Relationships allow adults to know when an absence of smiles and laughter might mean intervention is needed,

'At two adults can make anything and everything funny for them, in how we read a story, what we do with toys but if those responses aren't coming from the child and you've used everything you've got to elicit that, then that can be a sign something is going on.' (CS4)

‘Smiles and laughter don’t always mean happiness, we can denote enjoyment and wellbeing from other means. Still, an absence of them or no subtle cues in eyes or similar would mean I’d want to explore this further’ (Sessional Care CS)

According to McCain et al. (2011) healthy performance of our neurological limbic system influences how we respond to social, emotional and cognitive stimuli. Relationships and efforts towards eliciting smiles and laughter help to determine if children are showing an outward sign of a healthy limbic system, neurodivergence or a complex need, particularly important around the two-year-check assessment in the UK (Department for Education, Department for Health and Social Care 2012) which can expose more investigation is required.

Participants also felt the mutuality of relationships as smiles and laughter are a method enabling children to get to know them e.g. understand their sense of humour, thinking and types of communication, when there are serious boundaries and where there are playful opportunities. Participants noted when children are particularly adept, they can use smiles or laughter to neutralise a threatening situation e.g., avoiding being told off.

‘We [myself and the child] both looked at each other, shared a smile, both knowing what he was doing was wrong, it was time to stop, but it was funny.’ (CS4)

This relates to the functions of smiles and laughter, in particular neutralising nonconfrontationally undesirable behaviours (Wood & Niedenthal 2018) whilst the participant and child acknowledged the humour, their relationship/emotional intelligence constructed a shared understanding that the behaviour needed to stop.

Relationships and developing the skills to create and sustain relationships are opportune when considering smiles, laughter and HOT, the sessional care case study noted that smiles and laughter can be useful when helping a child to navigate HOT skills required to manage ‘big feelings’ perceiving when a child or adult could do with a “dopamine/serotonin/happy chemical hit” and using smiles, laughter accordingly to provide a child the HOT skills to self-soothe or regulate. Adults can contribute to helping children use the functions of smiles and laughter for their own benefit, adults can role model using smiles and laughter to reward, reinforce and maximise positive social experiences, ease any tensions and neutralise undesirable feelings (Wood & Niedenthal 2018).

Embodied and Expressive Forms of Playful Learning

Participants listed and submitted a series of potential activities to elicit expressions of HOT and smiles and laughter concurrently, playful learning in varying forms was apparent. This seemed to be particularly powerful in performance, literacy activities and sensory play as the majority of submitted videos and photographs included children engage in those activities. Macrae and Maclure (2021) convey that at the age of two activities which combine physicality, senses and cognition provide optimal conditions for learning and this relationship between co-activating brain, body and emotions is not as profound after those critical early years. Unsurprising that the data produced categories listed in the supplementary material pertaining to these areas. This is potentially due to the need for children to use their HOT capabilities pertaining to memory and recall, to retrieve experiences or abstract concepts to engage in the activities, the following example was explicitly viewable in a video;

‘If it’s a story they know well we can use this recall by building up expectations of what happens next, we use props such as Mr. Bunny who is hidden under a lettuce and children have to behave a certain way to let him sleep or come out during the story and this is always met with laughter.’ (CS2)

These concurrent plots and active behaviours associated to this example link to the humour types and appreciation identified by Hoicka et al. (2021). To smile, laugh and appreciate this activity children will need to have established the HOT capabilities associated with it.

Sensory play affords for perceptual immersion and in the submitted videos and images these were less likely to be led by adults than literacy activities, rather children could sensory seek for themselves and would smile and laugh at their own accord and between each other, thus relating to the findings of Cekaite and Andren (2019) whereby three-year-olds smiled and laughed with each other more than adults. Sensory activities are possibly the preferred self-elected activities children opt for that produce a state of eudaimonia (Bertram, 2023) providing these is a poignant part of practice eliciting smiles, laughter and HOT.

Physiological Expressions of HOT and Pleasure

Participants acknowledged that advancements in neuroscience and improved understanding of mental health provide an opportunity to “biohack” into feel good chemicals and implement activities that are most likely to produce feel good hormones. Focussing research and practice

on this can potentially create positive dispositions and increase the likelihood of HOT occurring in a state of wellbeing (Pascal & Bertram, 2023). Twardosz (2012) highlights children have experience-dependent limbic system, reliant upon positive social, emotional and cognitive stimulation, “biohacking” is potentially important for adults to capitalise on to prevent issues discovered in recent UK based reports on two-year-old wellbeing (Reed & Parish, 2021, Royal Foundation for Early Childhood, 2022).

The functioning of the limbic system is possibly observable when smiles, laughter and HOT are conveyed by children;

‘There’s definitely a relationship between smiles, laughter and higher order thinking, children who are happy or in a positive state are more likely to take on their learning, develop and be responsive to us’ (CS1)

Practices that intentionally elicit smiles, laughter, and expressions of HOT may be more conducive to fostering a eudaimonic state in children than approaches centred primarily on baseline assessments or curriculum-led measurement. From a holistic perspective, attention to children’s physiological and affective responses offers an important lens through which to understand development and wellbeing, complementing more formalised evaluative tools (Pascal & Bertram, 2023). Participants acknowledged, however, that competing priorities within the daily routine can result in planned activities or assessment tasks taking precedence over spontaneous, joy-filled interactions. Although often viewed as peripheral to curricular goals, these organic moments were perceived as developmentally significant. Participants suggested that such experiences, which visibly engage children’s affective and embodied responses, may contribute in ways that structured assessment activities do not fully capture.

Participants commented that they often look for validation of the quality of their provision by the children’s facial expressions and behavioural responses, being aware that ‘the smile in the eye’ is helpful as some children may have facial disfigurements, needs or personalities that neutralise laughter. The videos show participants scanning the entire group of children looking for such observable physical expression and validation. The smile in the eye is evident, creating a “faces lighting up” (CS1) response, thus adults can determine if their practice is being well received by the physiological response of children. Reed and Parish (2021) convey the significance of human connection for all adults and children, thus, we all can benefit from practice pertaining to cultivating smiles, laughter and thinking when we’re cognisant to the child’s observable physiological expressions of their affective state.

Smiles and Laughter as an Equitable Pedagogic Tool

Participants noted that amidst a backdrop of underfunded children's services, smiles and laughter are not affected, it is one of the few parts of provision that can be used as a vehicle for successful development regardless of socio-economic status or levels of need. Participants identified that whilst life circumstances, personalities and needs are diverse, smiles and laughter maintain a window into how well a child is doing cognitively and emotionally, if smiles and laughter are absent entirely, then the two-year-check should provide an opportunity to highlight a need for intervention under the professionals comments for personal, social and emotional development.

‘When children are in a professional setting or service, it is an opportunity to create equitable situations for children that at home may indeed be unequal.’(CS4)

Therefore, adults need to put effort into attempting to elicit, smiles and laughter as this could be the only opportunity some children have. This is increasingly important in the UK due to the cost of living crisis something which the Royal Foundation (2022) has highlighted as a threat to the quality of life for children in their early years. Having pedagogy at our disposal that costs nothing but can have benefits for the child and adults could be a significant aspect to focus more attention on. The discursive devices (Wiggins, 2017) identified facial and body language agreement when a participant would state the following (or similar) “it’s what we’re here for, we’re here for all children, happy children who are learning, that’s what it’s about” (CS2) a notion unanimous across the case studies.

Language of Laughter

The content analysis of the multi-media submissions demonstrated that suspense and anticipation were parts of the expressions used alongside language ahead of bursts of smiles and laughter in activities. Participants in the sessional care case study, described it as;

‘This sort of anticipation and then something happening, us (adults) leaving that gap to build excitement for the children leading to smiles and laughter.’

Opportunities for children to express with their senses and bodies were also part of the whole-body language expressed during instances of smiles and laughter. Participants noted

that language can be powerful in eliciting smiles, laughter and HOT as adults use different types of language, tones, expressions (particularly useful during non-play learning) to generate responses from children as they're working the context out, using their thinking skills in their receptive language to decode what the adult is doing before returning with their own response.

‘A smile is a visual cue of a positive environment, at two you want fun, you want to know you're safe away from your parents who you want to be with, so smiles are a language for all of that. If we show our personalities in that way, they're more likely to show theirs’ (CS4)

Smiles and laughter are part of the language that conveys to children the environment, activity or circumstance is a safe and pleasurable one. This relates to the functions of smiles and laughter (Nierdenthal & Wood 2018) and that smiles and laughter are the earliest form of communication and expression of HOT that a child has at their disposal that they're likely to understand (Nwokah, 1994; Provine, 2004). There are performance elements such as suspense and anticipation which can help to form a prerequisite for smiles and laughter to occur during learning, though smiles and laughter in themselves are also a powerful language and window into a child's cognitive and emotional state.

‘Children express themselves with their body before they even start to use words so we have to communicate like that, through exaggeration and things’ (CS2)

Adults can share in their expression and communicate with them alternatively to speech and in a way more aligned to the child's understanding and HOT capability.

Humour and Development

The prime areas of learning are focussed upon in the UK for the first two years in settings and were identified as the cornerstones of humour development and HOT by participants. Thus, humour is an early generation of HOT development explained by participants as emerging early, differing across children and providing insight into their personalities and holistic development.

‘Speaking personally, my daughter has a cracking sense of humour that comes naturally to her. She finds anticipation, slapstick and unexpected things happening

humorous whereas my son was the opposite. Similarly, to the children I've worked with, they all show different preferences of humour. I think communication and language development are important here, it's how that humour is expressed' (Sessional Care CS)

Humour is none-subject specific therefore can be used to support learning and development at any time. Humour appreciation and use is an outward sign of HOT, if children are not responding or using smiles, laughter then this would highlight a cause for investigation, therefore, humour is an evaluative tool for activities;

'We can use it to see, did they get me?' (CS1)

'Cognition evolving when children understand some facts, or how things can be done and then laughing when things are incorrect or changed' (Sessional Care CS)

Adults own sense of humour and mindset influence a child's expression and learning, therefore, adults need to be mindful of this by producing examples of emotional expression and humour that children can model.

'Benefiting from their developing sense of humour at two means we can use smiles to smile at them, engage with them, show an activity or something is a happy thing to do so they engage with you and learn'(CS1)

Children are sensitive to the emotional climate which adults have control over and therefore need to make a deliberate effort to ensure smiles and laughter are part of a positive environment.

'Once children know us, we can make a joke and they will understand it but wouldn't necessarily do or understand the context if we didn't make an effort to expose them to our sense of humour or have humour in the environment' (CS3)

The emotional climate smiles and laughter contribute to are reliant on HOT skills to accurately appreciate and reciprocally use them as a socio-cognitive tool. By adults concentrating on visible elements of flourishing such as smiles, laughter alongside HOT adults can provide greater fulfilment and wellbeing.

6.4.6 Discussion

This study has sought to explore how adults can provoke HOT and pleasure simultaneously for positive developmental progress in two-year-old children. By exploring the following questions; what activities or conditions elicit HOT, smiles and laughter in two-year-old children? And, what can adults do to maximise upon this in practice? The findings convey how The Importance of Attuned Relationships, Embodied and Expressive Forms of Playful Learning, Physiological Expressions of HOT and Pleasure, Smiles and Laughter as an Equitable Pedagogic Tool, Language of Laughter, Humour and Development are crucial factors that influence the circumstances for adults to provoke smiles, laughter and HOT simultaneously.

The findings emphasise that establishing robust adult-child relationships is fundamental to increasing instances of smiles, laughter, and HOT-triggering events. These high-quality relationships, coupled with a conscious emphasis on integrating smile/laugh expressions into activities, can promote states of eudemonic wellbeing in children, potentially facilitating concurrent pleasure and developmental advancement.

The conditions optimal to maximise upon in practice relate to adults ‘performing’ during activities to encourage suspense, anticipation, memory recall, repetition and methods for children to express themselves in diverse ways. Additionally, creating opportunities for sensory exploration, respecting individual preferences, acknowledging diverse backgrounds, and supporting children's self-expression are also influential.

It is proposed that this study provides praxeological evidence for adults to focus on identifying, evaluating and responding to practice pertaining to eudaimonic flourishing. While these principles align with EC services, their explicit focus on eliciting happiness and development simultaneously (eudaimonic flourishing) arguably differs from conventional practices, which primarily prioritises basic needs and academic progress.

Amidst challenges like underfunded services and a cost-of-living crisis in the UK, purposefully eliciting smiles, laughter, and HOT emerges as an equitable approach within the EC professional sector requiring no expensive resources to benefit from.

Participants appreciated their involvement, recognising the significance of discussing smiles, laughter, and HOT, evoking their own eudaimonic responses. Simply prioritising HOT, smiles, and laughter in interactions with two-year-olds can potentially foster concurrent

development and pleasure, promoting a state of eudaimonia in EC service users, guiding practice and research towards holistic flourishing (Pascal & Betram, 2023).

The findings should be interpreted with appropriate caution given the relatively small sample size. Although the study did not seek statistical generalisation, issues of representation remain relevant when considering the transferability of insights to other contexts (Cohen et al., 2018). Social and demographic data were not collected from participants or their respective settings. While this decision was made to minimise administrative burden (Kowalczuk-Wałędziak & Ion, 2024), the inclusion of contextual characteristics may have strengthened interpretive depth and supported clearer consideration of representativeness and transferability (Cohen, 2018).

The reliance on participant-submitted photographic and video observations also means that not all instances of HOT, smiles, and laughter were captured. As with much qualitative research, the dataset reflects what participants noticed, prioritised, and chose to document (Kim & Choi, 2025). However, requiring comprehensive capture of such moments would have been neither practical nor ethically appropriate, particularly when working with busy EC professionals. Minimising additional workload is consistent with ethical guidance in educational research, which emphasises proportionality and avoidance of participant burden (BERA, 2018; Kowalczuk-Wałędziak & Ion, 2024).

The analytical strategy drew on multiple qualitative approaches, contributing a distinctive process of sequential analysis across data types. Whilst using multiple analytical techniques is widely recognised as a means of enhancing credibility and robustness (Cohen, 2018), the analysis for this study was complex and at times challenging to articulate succinctly. A more streamlined approach, for example, applying predefined deductive codes derived from study one (Graneheim et al., 2017) may have simplified the analytic process. However, such an approach risked constraining the data and potentially obscuring the lived experiences of the case study participants, which praxeology seeks to avoid (Pascal & Bertram, 2023).

6.4.7 Conclusion and Recommendations

The findings suggest that high quality adult-child relationships are a powerful driver of joy, engagement, and developmental growth. When adults are intentional, for example using

expressive “performance,” suspense, anticipation, repetition, and memory recall, they can create HOT triggering moments that deepen emotional connection and learning simultaneously. Smiles and laughter are seemingly not incidental; they are indicators of pleasure, attunement, and cognitive activation. It is recommended that practice should integrate physiological awareness and bio-informed strategies that cause adults to note behavioural or facial expressions of HOT and pleasure coexisting, not just task outcomes, or developmental milestones. Furthermore, it is recommended that the awareness of the power of a smile is prioritised and leveraged more, as it is an equitable tool all adults have at their disposal and there is an appetite to shift priorities of practice to generating smiles and happiness in learning from other routine or curricula driven aspects of the day.

The findings suggest that smiles and laughter are recognised as important indicators of children’s engagement and wellbeing, yet they are not consistently observed, recorded or used to inform practice. Future work could therefore build a clearer picture of the kinds of experiences that elicit HOT and pleasure in observable terms, enabling all adults to recognise these moments more reliably. This may involve studies that track children’s engagement in HOT alongside their emotional expressions, such as smiles and laughter, by examining frequency, duration and the circumstances in which these behaviours occur together. Such data would allow for deeper analysis of the conditions, activities and adult behaviours that help generate these responses. Without systematic attempts to capture this information, there will remain a gap between professionals’ aspirations to prioritise these experiences and their ability to embed them meaningfully in practice.

Embedding this work will also require adults to develop greater self-awareness through reflection and ongoing evaluation of their interactions, particularly when using smiles or laughter intentionally as part of their pedagogic approach. Children themselves play an active role in shaping these moments, as they produce humour, use smiles for different social purposes, and initiate playful sequences. This highlights opportunities for adults to invite children to lead more of these interactions. Further research would also benefit from gathering data across a wider range of contexts, including families, communities and settings outside professional environments, since the patterns observed in this study may be context specific. Finally, while intentionally fostering HOT alongside positive emotional expression can be beneficial, adults should be cautious of over-structuring joyful moments. It is important to leave space for spontaneous, authentic enjoyment to emerge naturally throughout the day to truly enable flourishing to generate.

6.5 The Exploratory Phase Summary

This chapter presented findings from study 1 and 2, the questionnaire enabled the identification of key thematic patterns, which subsequently informed the design of the multi-modal focus groups conducted in this phase. The pilot study also facilitated practical engagement with all components of the Exploratory Phase, including the refinement and testing of questionnaire items, as well as the secure and remote submission of video and photographic observational data. The subsequent multi-modal case study preserved the conversational, in-depth probing approach recommended by the pilot study, particularly in response to study 1 questionnaire items that indicated the need for further clarification and exploration. This methodological continuity across studies contributes to the development of a comprehensive and robust evidence base.

The Exploratory Phase highlighted that establishing robust adult-child relationships is fundamental to increasing instances of smiles, laughter and HOT triggering events, and that when these relationships are coupled with a conscious emphasis on integrating expressions of joy into activities they can facilitate both immediate pleasure and developmental advancement. During the focus groups the findings corroborated and strengthened earlier conclusions that robust adult-child relationships are fundamental to increasing the frequency of smiles, laughter, and HOT triggering events. High quality relational interactions emerged as the foundation upon which pleasure and developmental advancement occur simultaneously. When adults intentionally embed opportunities for smiling and laughter within everyday activities, children experience not only joy but also meaningful cognitive, social, and emotional growth.

Participants described how conditions most conducive to eliciting smiles, laughter and HOT involved adults performing during activities to encourage suspense, anticipation, memory recall and repetition, while also providing children with diverse opportunities to express themselves. Creating spaces for sensory exploration, respecting individual preferences, acknowledging diverse backgrounds and supporting children's self-expression were also identified as influential to practice. Participants emphasised the significance of HOT and the smile and laughter response in two-year-old children, noting that "it's what we're here for, we're here for all children, happy children who are learning, that's what it's about," and reflecting that when they had the chance to think about this more deeply they recognised how

successful practices were inherently equitable. Participants pointed to the importance of the physiological response, with some referring to it as biohacking, observing that “advancements in neuroscience and mental health provide us with an opportunity to do anything which taps into feel good chemicals.” Expanding upon study 1, study 2 introduced more explicit consideration of equity, the pedagogical value of smiles, and the physiological dimensions of affective response. Smiles and laughter were positioned not as passive by-products of interaction, but as pedagogical tools and embodied responses with developmental significance. This provided a natural segue into the next phase, ‘Experiential and Legitimacy,’ where the role of the physiological response could be investigated in greater detail, the direction for study 3 means further investigation of the physiological mechanisms underpinning HOT, smiles, and laughter, and seek to identify the most salient provocateurs of these responses in two-year-old children that should be cascaded to adults.

Collectively, this phase has established that smiles, laughter, and HOT are relationally constructed, pedagogically meaningful, and developmentally powerful. It has identified practical, equitable strategies that can be implemented within everyday interactions to enhance the quality of adult-child engagement. In doing so, it advances the argument that these seemingly simple affective exchanges are not incidental, but central sites of learning, connection, and development which can be probed further by systematic exploration of physiological responses and expressive behaviours.

Chapter 7 The Experiential and Legitimacy Phase

The Experiential and Legitimacy phase affords the opportunity to apply and evaluate the iterative concepts being generated for the discussional theory from the Exploratory phase, especially practice focused aspects, for example, observing parents using the ‘language of laughter’ through building suspense, provoking recall and anticipation, or sharing in a myriad of playful interactions. Importantly, this phase allows for the quantitative observation of physiological changes and gives greater priority to discovering possible differences in increasing exposure of conditions that seemingly (according to the Exploratory phase) could provoke smiles, laughter and HOT.

Therefore, this phase aims to explore:

What replicable conditions are required to enhance the likelihood of eliciting HOT and pleasure simultaneously and how can this be evidenced?

- 1) Ascertain the physical responses that suggest pleasure has occurred during activities.
- 2) Discover the conditions required for HOT and pleasure to occur concurrently.

With an additional objective added to capture the co-production process and its contribution to shaping the final outputs, which is:

- 3) To determine, using multimodal co-production dialogue, the elements of the findings regarded as most significant by EC services and service users, and to ensure that subsequent dissemination reflects their values, priorities and lived experiences.

7.1 Organisation of the Chapter

Having multiple intended subject audiences demonstrates researcher reflexivity, as reflexivity involves an ongoing process of critical self-awareness in which researchers examine their own orientations and positionalities in relation to their study (Schwandt, 2015). Reflexivity requires an introspective dialogue that enables researchers to confront and unpack aspects of their practice that may otherwise remain unacknowledged or uncomfortable (Valandra, 2012; Woodley & Smith, 2020). In this instance, the style of writing and choice of data collection tools moving from the Exploratory Phase, shows a personal journey that began in the pilot study, whereby it became apparent from personal reflection and methodological challenge

that I was grappling with the distinguishment in identity between the perspective of an EC professional and that of a researcher (Suddaby, 2006; Burvill, 2019; Uleanya & Yu, 2023). It is possible that the broadening intention of audience and style of writing shows some evolution in identity and comfort in becoming a researcher. Thus, the organisation of this chapter arguably demonstrates conscious adaptation of framing, methodological discussion and interpretation according to situatedness, purpose and readership (Lee-Johnson, 2023).

The presentation of study four is adapted from a research report that was a requirement of the Connected Communities grant that supported study four implementation. This was subsequently disseminated to the local community, including councils, charities, and other community organisations and in a publicly appealing magazine seen in fig.2 Showing this format in the thesis provides high fidelity as the report is largely kept in its original form, so readers see the findings and context exactly as participants preferred in keeping with grounded theory principles (Charmaz, 2014; Morse et al., 2021).



Fig. 2 Study 4 2023-24 Connected Communities Impact Magazine

7.2 Role of the Chapter

Using MM-GTM is arguably advantageous when a later study includes a quantitative within-participant design (study three), and a follow up co-production study with the intended audience (study four), because it allows exploratory, iteratively generated concepts to be experienced, checked and refined in sequential and complementary ways (Cresswell & Plano Clarke, 2018; Creamer, 2025; Christodoulou, 2025). Integrating these studies strengthens inference through methodological complementarity and triangulation (Cresswell & Plano Clark, 2018) as the qualitative work in early phases uncovers rich, context sensitive information, while the subsequent experimental and workshop work enables the measurement, trialling and disseminating of those emergent constructs in practice (Cresswell & Plano Clarke, 2018), providing evidence about their effects and impact on conditions eliciting smiles, laughter and HOT. Embedding a co-production phase with the research's intended audience further enhances the practical validity and legitimacy of the emerging theory by inviting the intended audience to qualitatively interpret, refine and endorse findings, which both deepens theoretical understanding and increases the likelihood of uptake in real world settings (Costa, 2024). MM-GTM multi-study approach allows for a logical sequence of generating, operationalising, trialing and validating the emerging concepts (Cresswell & Plano Clarke, 2018; Creamer, 2025) so that the resulting discussional theory proposed is grounded in the data and experientially credible to the audience it aims to serve (Christodoulou, 2025).

7.3 Study 3

Optimal Conditions to Increase Chances of Co-Eliciting Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children

Abstract

This within-participant experimental study investigates the conditions required to elicit HOT and pleasure concurrently in two-year-old children. The study addresses two objectives: 1) Measure the physical responses (heart rate and facial expression) that suggest pleasure has occurred during activities. 2) Compare an overt 'joyful' and neutral condition and their impact on HOT and pleasure occurring simultaneously. To meet these objectives twenty-three two-year-old children played concrete concept tablet-based games in two conditions: a neutral condition and an overt 'joyful' condition, whereby an explicit attempt to increase smiles/laughter was made comparative to a more natural or relaxed environment. It was hypothesised that a greater effort from present adults to enhance social interactions with the two-year-old children during the joyful condition would lead to a change in observable expressions of HOT and increased smiling and elevated heart rate. Adopting a praxeological stance, children's actions, behaviours and responses were captured and analysed in a practical, humanistic context, rather than isolating physiological responses from rich qualitative backgrounds. Therefore, a mixed-method within-participant experimental design was used, which allows for flexibility in experimental control. The study collected both quantified data (heart rate and frequency/intensity of facial expressions) and qualitative data, including video recordings and field notes from parents. Although no significant difference in heart rate was found between the two conditions, this could be due to individual differences; 42% reduced, 5% remained the same, 53% elevated. However, there was significantly more smile/laughter time and intensity recorded in the overt (joyful) condition. Furthermore, a new facial expression outside of typically used smile and laughter descriptors, labelled in this study as a 'lightness in the face' was identified in all participants in both conditions, providing additional insight into children's physiological responses during HOT activities. The study discusses how HOT and pleasure can co-occur and details practical approaches that can be implemented to elicit smiles, laughter and observable expressions of HOT.

1.3.1 Introduction

It is important to create environments that facilitate learning and development as United Nations Educational, Scientific, and Cultural Organisation's sustainable development goals pinpoint education as being key in transforming the way children learn, view the world and perceive themselves (Chapman & O'Gorman, 2022; Calero et al., 2025). Education for the future should disrupt what has gone before and strive to be 'held and felt' (Jickling, 2017) therefore, practice pertaining to optimising and transforming the learning environment in EC relates to a full visceral experience, with adults cognisant of contemporary educational environmental needs (Jickling, 2017; Chapman & O'Gorman, 2022; Calero et al., 2025). Rethinking the learning environment in EC is not only important for future sustainability of education but to align to children's perceptions, as these can be different to the adults designing the space. Perry et al. (2023) found that a cohort of 96 five-year-old children were able to clearly express, explain, and rationalise their preferences for different aspects of their learning environments through the Photograph Interview with Children method. Their findings revealed that children particularly favoured home-themed role-play areas and construction zones, viewing classroom design as supporting social interaction more than fostering wellbeing or knowledge. At the same time, children showed noticeably less interest in features such as display boards and science areas. Taken together, these insights suggest a need for adults to reconsider learning spaces from the child's perspective in order to promote greater engagement, deeper learning, and enhanced enjoyment (Perry et al. 2023).

Specifically for two-year-olds, O'Sullivan and Hannan (2025) identifies that high quality practice requires professionals to lead a sustainable service, with two-year-old specific pedagogy, learning spaces and connectedness with families, community and introspectively, yet their research discovered some professionals are unconfident with this. Arguably, adults in EC environments have a large portion of the control determining how children interact with the space and how they feel whilst they're there, and it is important that professionals feel confident and equipped to provide for this (O'Sullivan and Hannan, 2025).

Csikszentmihalyi and Csikszentmihalyi (1988) found that when their research participants were highly challenged and felt highly skilled for an activity, they were in a state of optimal enjoyment, thus children and professionals would both benefit from an optimal environment underpinned by confident and equipped adults. Similarly, Custodero (2005) research with two-year-olds identified that when their music experience was investigated, challenge

seeking, challenge monitoring and social contexts can be carefully curated to optimise pleasure and learning, with Custodero (2005) noting at the age of two, children could self-assign activities and experiences to naturally find a state of flow, or learning coupled with enjoyment, and adults could learn from their perspective. Specifically with EC practice in mind Csikszentmihalyi and Csikszentmihalyi (1988) flow theory has influenced perspectives on play cycles, with Sturrock and Else (2006), and later King and Newstead (2020) and King (2023) theorising that children cycle through a state of flow in their play which is both pleasurable and a learning experience in a six-stage process:

1. **Pre-cue:** The internal, often unconscious, impulse to play
2. **Play cue:** The observable signal that invites play
3. **Play return:** The response to the play cue
4. **Play frame:** The physical or imaginary boundary of the play
5. **Flow:** The state of deep engagement in play
6. **Annihilation:** The end of the play cycle

There is arguably an opportunity for adults to optimise the likelihood of children experiencing pleasure and learning simultaneously if careful consideration is given to the optimising conditions for this to co-occur.

Currently in EC practices, adults may observe children, plan and prepare activities and resources in response to what they learn from resulting evaluations (Department for Education, 2024). Nevertheless, there is a limited amount of research into what adults can do towards optimising conditions to co-elicit HOT and the smiles and laughter response simultaneously. Control Value Theory (Pekrun, 2006) and Broaden and Build Theory (Fredrickson, 2004) have previously helped to explain how positive emotions can affect positive developmental/academic yield and this has been authenticated by advances in neuroscience which has shown that positive emotions trigger the release of dopamine, which enhances brain functions related to memory, motivation, and attention (Ashby et al., 1999; Conkbayir, 2018, Ullah et al., 2024). This is especially important at the age of two, as this age presents the most brain activity and influence, though two-year-olds are not cognitively mature, the most important steps are still taken in the first two years of life towards positive development due to this brain sensitivity (Zhang et al., 2020; Batcheler, 2023). Therefore,

there is an opportunity to identify what specific features of practice adults can implement to maximise upon the likelihood of co-eliciting HOT and smiles and laughter in two-year-old children which this paper seeks to respond to.

1.3.2 Literature Review

Optimising conditions could also be defined as enabling environments (a popular term in UK Early Childhood Settings [ECS]). Optimal conditions, or enabling environments, in early years are those that actively cultivate and facilitate high quality care, education and wellbeing. Enabling environments include adults carefully considering that children are unique and holistic learners, thriving within environments that support their individual and diverse motivations, interests and needs (Birth to Five Matters 2022). The key points professionals are advised to consider when optimising the environment include security, individuality, diversity, inclusion, physicality, action, creativity, outdoors, open-ended opportunities, independence and collaboration - “within an enabling environment, knowledgeable practitioners optimise the development and learning potential of every child.” (Birth to Five Matters, 2022 p.34)

The anticipated outcome is that children are more likely to be in a state of a positive learning disposition, akin to eliciting pleasure and HOT. A learning disposition is an individual's habitual approach or attitude toward learning, shaped by personal traits like curiosity, perseverance, and openness to challenge (Dunckley et al., 2021; Chilvers, 2022). It influences how they engage with new experiences, solve problems, and adapt to learning opportunities, fostering long-term intellectual and emotional growth. In early years this can be observed by demonstrable Characteristics of Effective Learning (CoEL) (Birth to Five Matters 2022) which include *playing and exploring*, playing with what they know and being willing to have a go. CoEL *active learning* includes motivation, whereby children being involved and concentrating, keeping trying and enjoying achieving what they set out to do are noted. Finally, CoEL *creative and critical thinking* pertains to children's thinking being observed for having their own ideas, making links and working with ideas. These were introduced to the EYFS curriculum in the UK to move the emphasis from ‘what’ children are learning to ‘how’ they are learning and developing. Adopting the CoEL can help professionals to focus on providing high quality environments optimal for thinking (Bryce-Clegg, 2015). The CoEL have been adopted successfully in the sector and were the bases of

the Makerspaces Learning Assessment Framework (Kay et al., 2024) that had been developed to support teachers in assessing children's skills, knowledge and understanding when participating in makerspaces in a child-centred and holistic ways. Kay et al. (2024) explained that the CoEL are perceived as being facilitative of assessing their learning disposition with CoELs sharing many synergies with definitions of HOT skills, arguably, CoELs are used in EY as a replacement phrase for HOT to be more meaningful for the context in the UK.

Nonetheless, more broadly used in ECS in the UK and Europe, another gauge of a child's HOT and emotional disposition in the early years is the Leuven Scale of Wellbeing and Involvement. McCrae and Jones (2019) acknowledge that this tool stretches as far back as the 80s and continues to grow in popularity as a tool to evaluate quality. The Leuven Scale for emotional wellbeing consists of five points, ranging from extremely low to extremely high wellbeing. At level 1, a child is in clear distress, exhibiting behaviours such as crying, anger, or fatigue. Level 2 reflects low wellbeing, where the child appears uncomfortable, shy, or unwilling to engage. Level 3 is a neutral state, where the child is neither happy nor sad, engaging with tasks in a passive, uninspired way. At level 4, children show high wellbeing, with clear signs of happiness, such as smiling and curiosity. Finally, level 5 represents optimal emotional wellbeing, where the child is fully engaged, comfortable, and may even talk to themselves during tasks (Laevens, 2005). Professionals observe the child, make a professional judgment and rate them accordingly to influence their responding practice. Similar rating scales specific to the environment rather than the child, are the Early Childhood Environment Rating Scales (ECERS) (Harms et al., 2005 & 2015), Infant-Toddler Environment Rating Scales (ITERS) (Harms et al. 2005) and Early Childhood Quality Rating Scale (ECQRS-EC) (Harms et al., 2005). Initially these were used to audit structures e.g. staff: child ratio or resources but have now evolved to help professionals audit the quality of relationships and climates to optimise learning. This demonstrates advancement in what the sector has learnt about factors influencing learning potential and offers a rating method for professionals to adopt to respond accordingly. Similarly, Siraj et al. (2024) created the Sustained Shared Thinking and Emotional Well-being (SSTEW) Scale which is a tool produced to help EC professionals rate and improve their relational and intentional practices to cultivate high quality social, emotional, cognitive and play experiences, this being the closest aligned to aiding professionals to understand the optimal social and physical conditions for HOT and smiles and laughter.

Naturally such rating methods are reliant upon the quality and competence of the professional making the judgment which is likely to be varied across the sector. Helpfully the Effective Provision of Pre-School Education (EPPE) project (Sylva et al., 2004) identified that professional skills and pedagogy that can improve judgments and prolong benefits to children include sustained shared thinking, where adults and children work together non-hierarchically to solve problems, clarify concepts, or extend narratives; high quality adult-child interactions with good verbal interactions, including open-ended questioning and formative feedback; curriculum knowledge for fostering thinking skills and combining teaching and instructive play and partnerships with parents. Nutbrown (2012) and later Education Policy Institute (2020) and Teacher Development Trust (2024) reviewed that such features of practice and judgments are most advantageous when completed by a highly qualified and trained early years workforce. The Assessment, Evaluation and Programming System for Infants and Children (AEPS-3) (Bricker 2022) and Teaching Pyramid Infant-Toddler Observation Scale (TIPTOS) (Bigelow et al., 2017) both serve to assess various aspects of EC development but focus on different areas: AEPS-3 is more comprehensive, looking at developmental progress across various domains, while TIPTOS focuses specifically on social-emotional development and positive behavioural support strategies, whereby social and emotional interactions are critical. Nonetheless, arguably professionals must be highly skilled to use these tools accurately, as they require expertise in child development, observation, assessment interpretation, and intervention planning to ensure effective, individualised support for young children's growth and learning is optimised.

Dispositional attributions are the internal factors that adults and children can influence to alter learning dispositions, however these internal workings are arguably more complex than situational/environmental. Theory of Mind (ToM) refers to the cognitive capacity to attribute internal states such as beliefs, desires, thoughts, intentions, and emotions to oneself and others, and to recognise that these internal states both vary between people and guide behaviour (Erceg., et al 2025). Emerging 'socio-perceptual' ToM and later, more explicit and representational ToM (Tager-Flusberg, 2001; Frith 2003; Shahaeian et al., 2023) refer to explanations for a child's behaviour or performance that are attributed to internal factors, such as personality traits, abilities, or inherent characteristics and understanding of/interactions with others. In ECS, dispositional attributions are often used to explain a child's success, for example through the CoEL or Leuven Scales (Laevers, 2005; Birth to Five Matters, 2022). However, relying too heavily on dispositional assumptions without sufficient reflection

arguably risks overlooking the ToM processes involved for both professionals and children. For example, when professionals interpret children's engagement, curiosity, frustration, or wellbeing, they are drawing upon their own ToM to infer the mental states that may be underpinning children's outward behaviours. At the same time, children themselves demonstrate emerging ToM skills, which can be observed in how they express emotions, show awareness of others' feelings, respond to peers, or justify their choices. Children's ToM develops through social interactions and continues to refine across childhood and beyond, influenced by the cognitive and social opportunities available to them (Erceg., et al 2025). Thus, a child's behaviours are not simply expressions of temperament or disposition; they are behavioural markers of ToM in action. Llu et al. (1992) found that adults tend to presume positive emotions more readily than negative ones unless additional evidence is available, highlighting how ToM-based inferences can become biased. This matters because emotions consist of subjective experience, physiological responses (such as heart rate), and behavioural expressions like facial cues (Hepach et al., 2025), meaning observable behaviour alone does not always accurately represent a child's internal state. Recognising this complexity creates an opportunity for professionals to move beyond intuitive or "best guess" dispositions and instead adopt a more systematic, evidence informed approach to interpreting both children's ToM expressions and their own ToM based judgements.

The Duchenne smile is typically associated with genuine happiness which is characterised by the involuntary contraction of the greater zygomatic muscle causing the cheek to contract, mouth to open and upturn and eyes to water/crinkle (Darwin, 1872; Ekman, 1990; Sheldon, 2021). The Duchenne smile functions as a reliable display of positive mood (Ekman, 1990; Sheldon, et al., 2021) however, Krumhuber and Kappas (2022) and Hoemann et al. (2019) comment that the Duchenne smile is functional, that biologically the smile is associated with happiness, the Duchenne smile should not be solely used to determine expressed emotion. Rather, the Duchenne smile can function as an adaptive social cue, influencing the social environment favourably for diverse purposes "in different contexts, Duchenne smiles might correlate with happiness (affective state), with being kind (social motive), with perceiving something intrinsically pleasant (cognitive appraisal), or with engaging in an approach behaviour (action tendency)" (Krumhuber & Kappas 2022, p.7). Nonetheless, the social or cognitive function of a smile can be connected to a child using their HOT skills (Addyman et al., 2018). The act of smiling engages intricate neural mechanisms that are closely linked to cognitive processes and stimulate areas of the brain rich in dopamine which can be crucial for

learning and motivation (Strathearn et al., 2008; Mizugaki et al., 2015). The age at which infants begin smiling is associated with their developmental progress; delays in smiling have been linked to later developmental challenges, suggesting that early smiling behaviours are intertwined with cognitive and social development, and are a crucial component of cognitive functions (Van Dokkum et al., 2021).

Physiological markers such as encephalography, photoplethysmography, respiration, skin conductance, skin temperature, and electrocardiography are commonly used to assess emotional states (Shi et al., 2017). Yet findings remain inconsistent, for example Ekman et al. (1983) reported elevated heart rate during happiness, whereas Britton et al. (2007) observed decreases, and Shi et al. (2017) showed that happiness, while lower than sadness, was still elevated from baseline. Nonetheless, playful emotions such as surprise and anticipation consistently elevate heart rate (Ekman et al., 1983; Lansink et al., 2000; Jang et al., 2015; Shi et al., 2017). Interestingly, Soussignan (2002) study found the Duchenne Smiling Group of participants globally had an elevated heart rate when watching positive stimulus, suggesting a connection between this smile type and heart rate response. Importantly, young children naturally have higher resting heart rates than adults (Fleming et al., 2011) yet currently most research has participants over or younger than the age of two. This arguably suggests that emotional arousal and its physiological signatures may present differently in two-year-olds, or change as children develop, pointing to a possible gap in the literature. This aligns with de Barbaro et al.'s (2017) argument that the situational and embodied nature of children's cognition requires closer examination. Evidence from infants demonstrates innate physiological responsiveness to environmental emotion cues, for example, Nagy et al. (2022) showed that happy music reduces arousal and decelerates heart rate, whereas sad music induces stillness and delayed motor responses, highlighting early emerging differentiation in physiological emotional processing. Similarly, Weiss et al. (2024) found that infants with higher resting heart rates showed stronger emotional reactivity to stressors, while those with lower resting rates reacted less, indicating that resting heart rate variability supports readiness for positive engagement, learning and/or emotional reactivity. Research by Lansink et al. (2000) also found heart rate deceleration during focused attention and heart rate elevations during anticipation in babies under one. However, findings remain mixed for two-year-olds, Bazhydai et al. (2022) reported no heart rate differences between synchronous and asynchronous movement during word learning and no relation to retention, suggesting heart rate may not always capture cognitive or social processes at this age. Clark et al. (2024)

further demonstrated that high frequency heart rate variability relates to self-regulation in a task dependent manner in three- to five-year-olds. Taken together, although children's joy can also be expressed through posture, movement, laughter, and arousal shifts (Hepach et al., 2023), heart rate measures remain an important tool for understanding young children's emotional and cognitive engagement, especially given the need for age specific research in two-year-olds.

In terms of what brings children joy, especially two-year-olds, play is a critical component, play, social interaction, toys, receiving awards, days out, favourite foods, cosiness, praise and accomplishment after trying hard with a task are all reported as causing pleasure in learning for children (Aknin et al., 2013; Yonghe et al., 2015; Kyongboon et al., 2017; Hill et al., 2023). Similarly, two-year-old preferred humour includes physical comedy and absurdity (Holmbom Strid, 2023; Hoicka, 2024, Kamiloglu et al., 2024;). Therefore, specifically with two-year-olds in mind, there is an opportunity to further explore how adults can effectively use these features of childhood joy to enhance learning experiences.

HOT observed in play, such as problem-solving skills and memory, are often emphasised as revealing cognitive processes that help children navigate challenges, retain information, and interact with their surroundings. Outward signs such as language, help professionals acknowledge when children are using their HOT skills and what their disposition is (Shahaeian et al., 2023). Physiological responses like changes in blood pressure, skin temperature, brain wave patterns, and heart rate can indicate moments of stimulation, whether from a challenge or pleasurable engagement and these subtle responses suggest deeper cognitive and emotional investment that might not be visible through behaviour alone (Huber & Barnett, 2022). Pekrun and Stephens (2012) and later Huber and Barnett (2022) identify that positive emotions can be both activating e.g. joy and deactivating e.g. contentment during academic activity, and these can be evidenced by corroborating physiological data e.g. a heart rate. Nonetheless, whilst measuring these indicators provides an opportunity in ECS, it can also be challenging in ECS environments to ethically capture this information. As an alternative, other observable markers, such as expressions of subjective feelings and motor expressions, serve as practical and accessible substitutes for physiological engagement observables, particularly for two-year-old children. Children's self-reports and emotional expressions offer valuable feedback on their internal states, supporting professionals in understanding their emotional and cognitive engagement. Encouraging higher order thinking talk, where adults provide cues for productive, on-task dialogue, fosters increased

engagement and enjoyment (Yang et al., 2021; Wu & Gweon, 2021). Furthermore, motor expressions, such as smiling and laughter, reflect neuropsychological engagement and emotional responses to stimuli, thus, distinctions like the Duchenne smile, are helpful for interpretation of the thinking processes causing such an expression (Krumhuber et al., 2022). Professionals should focus on observable responses, including subjective feelings and distinct motor facial expressions, plus physiological data (e.g. heart rate) if available, as this enhances precision in assessments (Pekrun & Stephens, 2012; Huber & Barnett 2022). Therefore, this study seeks to benefit from capturing physiological and observable responses to explore the optimal conditions to increase the chances of co-eliciting HOT and smiles and laughter in two-year-old children.

1.3.3 Study Aims and Objectives

Findings from an exploratory phase of data collection (questionnaires and multi-modal case studies reported on in separate papers) indicated that two-year-olds frequently expressed HOT alongside smiles and laughter when adults are attentive to physiology and use socially rich, humorous, playful and individualised approaches. These insights suggested that specific conditions may reliably elicit simultaneous expressions of HOT and a smile/laughter response. To build on this, the present study employed a within-participants experimental design to compare children's responses during tablet-based concrete concept problem-solving games across two conditions: a neutral interaction condition, in which adults responded naturally without intentionally increasing social stimulation, and an overt (joyful) interaction condition, in which adults purposefully amplified socially engaging behaviours identified in the exploratory phase (e.g., playful incongruity, expressive praise, physical comedy). Across both conditions, the following were captured (a) behavioural indicators including time and intensity of smiling and laughter, (b) observable HOT behaviours, and (c) physiological responses via children's heart rate during gameplay. This design addressed two aims: (1) to ascertain the behavioural and physiological markers that signal the occurrence of pleasure during HOT, and (2) to discover the conditions required for HOT and pleasure to co-occur. It was hypothesised that a greater effort from present adults to enhance social interactions with the two-year-old children during the joyful condition would lead to a change in observable expressions of HOT, increased smiling and elevated heart rate.

1.3.4 Methods

Design

The study adopts a praxeological (Pascal & Bertram, 2023) stance by focusing on understanding children's actions, behaviours and responses in a practical, humanistic context, rather than isolating physiological responses from these rich backgrounds. The study therefore uses a mixed method within-participant experimental design which reduces the need for strict experimental control which would be too challenging, limiting and unnaturalistic for this studies topic and participants. This study employed a within-participant experimental design to compare differences in the dependent variables (heart rate and facial expressions) across two conditions. In the neutral condition, two-year-old children played three tablet-based concrete concept problem solving games in a naturalistic setting. Concepts are the basis of the human cognitive system, concrete concepts are frequently used in our daily life and refer to tangible, factual, and/or categorical qualities (Shen et al., 2022; Henningsen-Schomers & Pulvermüller, 2022). In the overt (joyful) condition, efforts were made to increase smiles and laughter in the environment during the same games. The quantitative measures have been enriched by qualitative data, including observations from the video recordings of the child and game screen, and field notes provided by the parents immediately after their child took part. Thus, offering a comprehensive view of the children's responses in both conditions. This can help reveal the unique ways to elicit HOT and pleasure in two-year-olds, enabling a detailed comparison to identify specific features for future practical application across contexts rather than prioritising the measurable impact or influence of the variables (Dancey & Reidy, 2017; Cramer & Alexitch, 2018).

The study adopts a mixed-methods analytical approach in which inferential statistics are used to compare children's responses across conditions, with specific statistical tests selected after data collection based on the distributional characteristics of the data. Qualitative analysis was conducted through content analysis of observed behaviour, complemented by parent field notes, situating the study firmly within a praxeological stance (Pascal & Bertram, 2023). This perspective prioritises interpreting children's actions and responses within naturalistic, relational and humanistic contexts, deliberately resisting de-contextualised forms of measurement. As Gough et al. (2013) argues, attempts to impose natural-science models on human experience can be ethically and conceptually limiting, as quantitative approaches may

inadvertently reduce complex behaviours to mechanistic, stimulus-response patterns. To avoid such reductionism, this study draws substantively on the qualitative richness of the data, using it to contextualise and interpret the quantitative findings.

Recruitment, Sampling and Participants

Ethical approval for the study was obtained in accordance with BERA (2024) and BPS (2021) guidelines prior to data collection. A voluntary self-selection sampling approach was adopted. Participants were recruited through an open advertising campaign comprising of digital information shared and discussed in the procedures section. Individuals who were interested in participating responded via an expression of interest form and subsequently received further information about the study before deciding whether to take part.

Twenty-three two-year-old children took part in the study (10 girls, 13 boys). Providing demographic information was optional and not required for analysis, although many families chose to share contextual details. Nineteen children had no known health or developmental diagnoses, while three had documented conditions. The sample reflected a range of socio-educational backgrounds: four families reported receiving two-year-old funding, and household qualifications varied from trade certificates to A-levels, undergraduate degrees and Masters degrees. Employment status also varied, including full-time and part-time employment, full-time study and self-employment. Reported household income spanned from £0–£37,000 to £38,000–£150,000. Nineteen participating families identified as White British with two children identified as mixed-race and two as Indian.

Materials

Apparatus for the Tablet Based Concrete Concept Games

Tablet-based concrete concept games were selected as the primary task platform for several methodological and developmental reasons. According to Courage et al., (2021) two-year-olds can operate tablet interfaces purposefully, using simple goal-directed gestures to engage with learning tasks. The concrete-concept games used in this study, include things such as shapes, colours, sizes, and simple categorisation aligning with developmental outcomes in the UK Early Years Foundation Stage curriculum (DfE 2023). Concrete concept games provide immediate, observable opportunities for children to sort, classify, plan, correct errors, and

narrate their thinking (Antonucci & Alt, 2011) behaviours that lend themselves to coding and content analysis of expressions of HOT as inferred during the exploratory phase. ‘Baby Games’ is a mobile application available on Android devices that was selected for this study as the app features a series of interactive games designed to challenge and develop early cognitive skills, including colour recognition, shape categorisation, size differentiation, and pattern identification. These games provide an engaging yet structured environment for children to practice fundamental classification and sorting tasks with multiple levels using familiar contexts e.g. food or animals. Tablets can foster early problem solving and conceptual reasoning, particularly when tasks mirror real world categorisation demands, as they do in concrete concept games (Herodotou, 2017). According to Herodotou (2017) tablet applications can support early problem-solving, conceptual understanding, and attentional engagement in young children, therefore arguably providing an accessible and developmentally appropriate medium for two-year-olds. From a methodological standpoint, tablets offer practical advantages for collecting high-quality physiological and behavioural data. Tablets provide for intuitive, touch-based interfaces promoting sustained attention and reduce unnecessary motor activity compared with physical manipulation tasks (Courage et al., 2021; Herodotou, 2017). Heart-rate measurement required children to remain relatively still so that changes in heart rate reflected emotional or cognitive engagement rather than physical exertion. Touch-screen tasks encourage seated, focused engagement, thereby reducing movement-related noise in heart-rate recordings. Tablets also facilitate precise and synchronised video capture, as the camera can be positioned directly on or behind the device, allowing children’s facial expressions to be recorded unobtrusively and without interrupting the natural flow of play. This aligns closely with Samuelsson’s (2025) research with two-year-olds engaged in digital reading, which demonstrated that video is a practical, accessible and highly mobile tool for mixed-methods analyses of embodied interaction. Mirroring these findings, the video-based approach in this present study enables the detailed capture of subtle facial expressions, moment-to-moment social cues and task-related behaviours during tablet-based problem-solving. The richness of visual data is particularly important when integrated with the physiological measures, reflecting Samuelsson’s (2025) belief that video-based mixed-methods designs offer unique strengths for analysing complex embodied interactional processes such as learning.

The tablet’s built-in screen recording, combined with the concurrent facial expression video capture, enabled precise and reliable measurement of children’s play durations. Play length

was consistent across conditions, with all children completing the three selected games within 8–15 minutes ($M \approx 12$ minutes) in both the neutral and overt sessions. Although elements of the ‘Baby Games’ app (e.g., brief algorithmic prompts) may have contributed to the pacing of gameplay, the structure of the task was also shaped by the clear verbal framing provided to the children. At the outset, children were informed that they would be playing three games, and following each selection, adults explicitly counted down how many games remained. Upon completion of the third game, the researcher clearly signalled the end of the task (e.g., “that’s it”), removed the tablet, and reintroduced tabletop toys to support a smooth transition to post-task conversation. The researcher also verbalised the cessation of data collection for the benefit of both the parent and the video record (“data collection has ceased there”). This consistent procedural structure ensured that play durations remained comparable across visits while maintaining a predictable and child sensitive routine using the tablet. The Huawei MediaPad T3 (8-inch) was selected because its size and weight were comfortable for two-year-olds to use independently and was compatible with the Baby Games app, screen recording and attached video camera. Furthermore, the device was protected by a screen guard and bumper case, ensuring it was sufficiently durable for repeated handling. The Microsoft LifeCam HD-3000 Web camera was used affixed to the tablet to capture the video recordings of facial expressions. This ran concurrently with the heart rate data, and the child and parent could see this on the laptop screen.

Apparatus for Heart Rates

Given that physiological markers such as electrocardiography are widely used to assess emotional states (Shi et al., 2017), examining heart-rate responses in two-year-olds during tablet-based concept games can potentially deepen understanding of their cognitive and emotional engagement. Although prior findings on happiness and heart-rate direction are mixed (Ekman et al., 1983; Britton et al., 2007; Shi et al., 2017), playful emotions such as surprise and anticipation reliably elevate heart rate (Ekman et al., 1983; Lansink et al., 2000; Jang et al., 2015), and Duchenne-type smiling has been associated with heightened autonomic arousal (Soussignan, 2002). Similarly, young children naturally begin from a higher resting heart rate than adults (Fleming et al., 2011) and those with higher resting heart rates are more likely to be emotionally reactive and elevated (Nagy et al., 2022; Weiss et al., 2024). Although findings for two-year-olds remain mixed (Bazhydai et al., 2022; Clark et al.,

2024) it's possible that heart measures can still illuminate moments of HOT and pleasurable engagement. Therefore, capturing heart-rate changes alongside smiles, laughter, and behavioural cues offers a developmentally appropriate and physiologically grounded method of assessing young children's cognitive and emotional responses during interactive learning activities (Hepach et al., 2023).

Biopac MP150 was used in conjunction with the Bionomadix RESPEC-Tx transmitter to record and monitor ECG data from the participants. The transmitter was a small chargeable device which is worn by the participant around the waist. The transmitter is attached using an adjustable Velcro strap which fits around the participant. Attached to the transmitter are three thin electrode cables (each 50cm length), the cables run to each electrode site and attach to the electrodes via a small pinch clip. The electrodes used were EL512 with GEL100 adhesive. During ECG data acquisition the three electrodes were attached to the participants chest cavity, the RESPEC-Tx transmitter is switched on and it sends signals to the MP150 RESPEC-R, the raw ECG data signals are displayed in real-time on the acquisition PC/Laptop. The Biopac MP unit met the standards set by domestic and international regulatory agencies.

Room set-up

The room was kept minimalist yet playful with a child sized round table and chairs in the centre. On the table along with the tablet, were two inset puzzles, a selection of animals and cars. These same resources were in the room for each visit. The laptop and BIOPAC device were on the window ledge with the wire to the webcam taped to the ground and all information on the screen visible to researcher, child and parent.

Procedures

Data Collection

Participants were recruited initially with an aesthetically pleasing illustrated information sheet distributed to local nurseries, around the University campus and to the researchers social media profiles (LinkedIn, Twitter/X, Instagram). This information sheet contained an expression of interest form accessed via a QR code or link. Participants could volunteer their

contact details to learn more about the project. An informal information meeting would be arranged either in-person or MS Teams to talk the parent through the procedure, practicalities such as parking and location and to provide an opportunity to ask questions. Once the parent was satisfied that they wished to take part, two mutually beneficial dates and times were decided upon for the two visits no further than three weeks apart. The order in which neutral or overt (joyful) experiences would occur was chosen by the parent. All children completed two sessions, electing to experience the neutral condition first and the overt (joyful) condition second, ensuring a consistent order of exposure across participants. Children and their parents attended both visits within a three-week period, and assent was continually monitored throughout the procedures. Since all participants completed the neutral condition before the overt condition in a fixed order, this sequence was retained for ethical reasons, allowing children to acclimate to the task and minimizing potential discomfort. The two conditions were administered across separate visits with an inter-visit interval of 7–20 days. In experimental research, it is typically advantageous to counterbalance condition order to minimise potential order, practice or fatigue effects. Having some children experience the overt condition first could, in principle, help to establish whether differences between conditions are attributable to the condition itself rather than the sequence in which it was experienced. However, in this study the consistent ordering of the neutral condition followed by the overt condition was appropriate and ethically sound within a praxeological, child-centred approach (Bertram & Pascal 2023) as determined by the participants. Beginning with the neutral session ensured that children encountered the task and research environment without the heightened stimulation of the overt condition, which may otherwise have created contrast effects or unrealistic expectations for subsequent visits. Treating the neutral condition as the baseline therefore supported a more stable and developmentally sensitive comparison across visits. Moreover, the within-participant design mitigates individual variability, and the analyses focus on relative differences between conditions rather than absolute performance. For these reasons, the fixed order does not invalidate the findings, although it is acknowledged as a limitation to be considered in interpreting the results which is discussed in a later section. Attached to the visit calendar invite was a consent form to sign and this was followed up by an ‘on arrival’ consent form each visit, therefore, details could be shared multiple times, questions asked and ethics thoroughly adhered to for the wellbeing of all involved. Initially children and their parent were greeted outside of the building and walked through to the room providing the opportunity for some

light-hearted chat, often off research topic, to build rapport. Once the research room had been reached, the children were welcomed into the room and encouraged to chat, play with the table-top toys and settle in, before the BIOPAC was offered and decided upon by the child. The transmitter, cables and electrodes were playfully connected to the child with tickles and physical comedy by the researcher, and Parents took the lead sticking on the electrodes coached by the researcher so playfulness and physical comedy prevailed throughout the set-up experience for the child. so that their 'superpowers' could be seen on the laptop screen. The electrodes wires were covered by the child's clothes and signals to the transmitter were sent wirelessly so the child could move normally. The researcher would then check the equipment and show the parent and child the 'superpowers' being captured before inviting the child to choose some games on the tablet, as data collection formally began, the researcher stated, "we will now commence data collection". The child would progress through choosing and playing three games one after the other. In the neutral condition the parent and researcher simply behaved naturally, responding to the child authentically but withstanding from purposefully enhancing social interactions this type of adult behaviour refers to engaging with the child in a natural and genuine way without actively trying to exaggerate or enhance the social interaction. It means responding sincerely to the child's cues (such as smiles or vocalisations) rather than deliberately increasing stimulation or making extra efforts to elicit a reaction. The goal is to allow the child to lead the interaction while maintaining an authentic and responsive presence, rather than artificially amplifying engagement. Once three games had been played, the child would be invited to play with the items on the table whilst we took off the 'superpower' belt and the researcher would say clearly, "we will cease data collection there". In the overt (joyful) condition, the same arrival process would happen, with a reminder to the parent about this occasion being 'overt' and they are welcome to behave in a way that is comfortable to them but still enhances the environmental and social efforts to elicit smiles, laughter and thinking concurrently. Parents could ask questions and confirm their ideas quietly with the researcher whilst the child settled with the tabletop toys for example, one parent caveated their impending performance with "this might include a lot of poop jokes I'm afraid" - though this opportunity to candidly discuss the experience was necessary for comfort and enjoyment for all involved. Once the BIOPAC had been put on following the aforementioned approach, the researcher stated, "we will now commence data collection" and the child was invited to play games on the tablet, three in succession. On this occasion the parents and researcher would purposefully enhance the environment for a two-year-old using age-appropriate comedy, engage in lively,

exaggerated, and interactive behaviours designed to capture the child's attention and provoke smiles and laughter. Typical behaviours intuitively and naturally chosen by the researcher and parents included but were not limited to:

1. Physical Comedy: Using slapstick humour such as playful falls, funny faces, exaggerated movements, or pretending to struggle with simple tasks.
2. Incongruity: Doing or saying things that are unexpected or challenge the child's understanding.
3. Exaggerated Storytelling: Telling simple, dramatic, or silly stories with animated voices, gestures, and facial expressions alongside the game.
4. Praise: Offering over-the-top encouragement with an enthusiastic tone and exaggerated excitement when the child does something small but positive.
5. Jokes and Word Play: Using simple, repetitive jokes or playful misnaming of objects and people (e.g., calling a cat a dog in a silly way)
6. Child Specific Preferences: Parents could use knowledge of preferences, memories and personable items playfully to inform their responses.
7. Bespoke Responses: Still following the child's cues but responding in an intensified way comparative to the neutral visit.

It was important adults remained authentic, therefore the behaviours of the adults were not formally trained, coached or systematically instructed in keeping with the praxiological or real-world stance of the project. Once the child had finished three games, data collection ceased and this was verbally affirmed as aforementioned by the researcher. The child was invited to play with the tabletop toys whilst the BIOPAC equipment was removed and then they were invited to collect a goody bag and have a photograph for taking part with their parent in the selfie frame. At the end of each visit, field notes were recorded by the researcher while parents informally shared their observations about the child's cognitive performance, visible pleasure, reactions, memories, abilities, and engagement with concrete concepts during tablet play. This approach was taken so that parents could speak freely in the moment without needing to complete questionnaires, hold clipboards, or divide their attention during play. Their hands were often occupied supporting the child, so the researcher typed or edited dictated comments on their behalf, allowing parents to stay fully present and comfortable. This method kept the play experience natural and enjoyable for the child while still capturing rich, parent-informed insights that would have been harder to obtain through more formal

data-collection methods. Finally, opportunities for follow-up conversations and ways to stay in-touch were arranged.

Coding of Videos – Smiles and Laughter

An initial joint open coding session commenced the coding process with both raters (the research team comprised myself as the lead researcher and PhD candidate, and an undergraduate assistant completing their final-year experiential research module).

The videos were watched together, whereby we discussed and agreed on some initial thoughts and descriptions of reactions. Together key facial features such as cheeks, eyes and mouth were identified and appropriate codes based on predefined criteria (Duchenne smile) were decided upon (fig.3). This collaborative session helped establish a shared understanding of the coding process. Each rater then independently analysed the same selection of participants videos, applying the agreed-upon codes without influence from the other rater. This step allowed for a reduced bias in assessment of the facial expressions. A consensus meeting was held and raters compared their assessments. Discrepancies arose only in determining the start point of the smaller smiles. After discussion, we agreed that a smaller smile should be coded from the moment the neutral or no-smile expression began to change. The coding framework was judged to be adequate and consistently applied by both raters. Nonetheless, during joint analysis we identified a facial reaction that fell outside the planned coding categories and was therefore not captured by the existing scheme. This limitation, and its implications for interpretation, is explored further in the Findings and Discussion section.

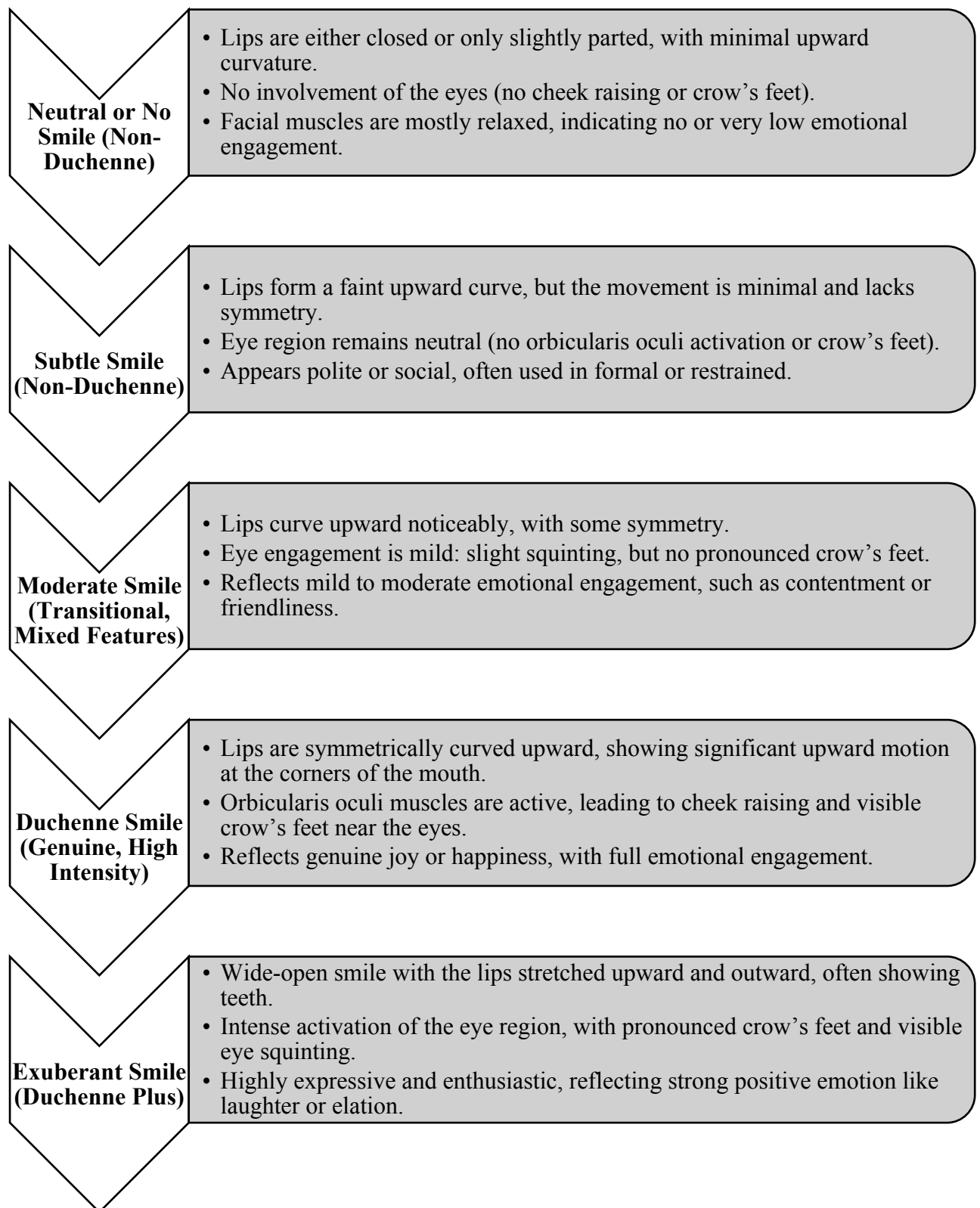


Fig. 3 Study 3 Facial Expression Codes and Categories

In vivo coding was first utilised as codes naturally emerged from the data, with parental observations directly capturing the language used, such as "cheery praise." As the raters initially watched videos together, we conducted a small trial to determine the most fitting descriptions. After reviewing the videos separately, both raters discussed and refined definitions and categories as seen in table 8. This process enabled the systematic coding of the full pooled dataset, allowing for the quantification of specific expressed HOT skills and the conditions that elicited smiles and laughter. These were then analysed using descriptive statistics to report the findings.

(Observable Higher Order Thinking Skills) Category	Description / Example Behaviour	Draft Codes
Game/Level Completion	Children successfully completing a full game or a level within a game.	Level Completed Game Completed
Categorising by shape or size	Child sorts or groups objects based on their physical attributes, such as shape (e.g. circles, squares) or size (e.g. big, small)	Matching Shape Identifying Shape Matching Size Identifying Size
Persisting (with/without) validation	Refers to a child's continued effort to solve a problem, either independently or with external encouragement.	Persevering
Matching	Refers to a child matching patterns, everyday items e.g. food or toys, colours, shapes, sizes etc.	Matching by colour Matching by shape Matching by size Matching by pattern Matching animals Matching silhouette Matching Function
Higher Order Thinking Talk (Narrating what they're doing)	Refers to a child verbally describing their actions, strategies, or reasoning while engaging in a task. This self-talk reflects cognitive processing and problem-solving skills.	Planning talk Problem-solving talk Descriptive talk Exploratory talk Reflective talk
Mental Anchoring (recall & linking to experiences and memories)	Refers to a child's ability to connect new information or tasks with past experiences, memories, personal anecdotes or prior knowledge.	Personal Connection Storytelling Recall

(Observable Higher Order Thinking Skills) Category	Description / Example Behaviour	Draft Code
Concrete Concept Labels	Refer to specific words or phrases children use to name, describe, or categorise tangible objects in the game.	Correct Animal Label Correct Mathematical Label Correct Colour Label Correct Object Label
Answering questions	Responding to questions from adults about the game, their actions or other related anecdotes.	Verbal answer Non-verbal answer
Correcting others	Refers to a child addressing inaccuracies in adults behaviour, suggestions, answers etc.	Verbal Correction Physical Correction Emotional Correction
Making Predictions	Refers to the child engaging in planning talk or responding to/initiating suggestions for what might happen next.	Event prediction Guessing
Association/Cognitive Mapping (linking to personal items)	Refers to the child connecting the game play or unfamiliar aspects of the game to things they already know. This can happen with or without the aid of the adult.	Personal Objects Personal Concepts
Recognising environmental patterns	Refers to the child identifying regularities or recurring elements in the game.	Balloon Popping Repeated game phrases Repeated game visual
Self-Appraisal	Refers to the child expressing their own pride or assessment of performance prior to or without adult praise e.g. "I did that fast"	Proud moments

(Conditions Eliciting Smiles and Laughter) Category	Description / Example Behaviour	Draft Codes
Opportunities to make decisions and choose	Refers to children making choices about the environment or within game play.	Choosing game Decisions with environment/toys
Narrative Scaffolding	Refers to adults role playing with game play elements, adding story-based descriptions to the child's actions, imaginatively expanding on what is happening.	Adding stories
Being asked (on task) Questions	Refers to adults asking questions about the game play or concrete concepts within the game.	On task questions
Environmental suspense & anticipation	Refers to adults emotively heightening or joining in with a child's awareness about forthcoming events or possibilities within the game play.	Suspense Anticipation
Receiving Expressive Praise (warm, enthusiastic, emotive)	Refers to the child receiving explicit dramatic or expressive enthusiastic praise for what they're doing.	Cheery praise
Producing/appreciating physical comedy	Refers to a child initiating or receiving physical comedic interactions e.g. bopping parent on the head, being tickled during praise.	Tickling Poking Booping
Receiving Structure Praise (measured, specific, objective orientated)	Refers to more specific and performance-based reinforcement, focusing on the child's effort, action or progress toward a particular task or success.	Formal praise
(Conditions Eliciting Smiles and Laughter)	Description / Example Behaviour	Draft Codes

Category		
Opportunities for Active Modelled Learning	Refers to the occasions where instructional language, physical demonstration and guidance were combined to assist a child with the game or tablet.	Handheld demo Adult aid Being shown
Producing or responding to Absurd Provocation	Refers to children creating or enjoying incongruity e.g. silly questions, rectifying a purposeful error.	Silly parent Feigned incompetence
Adults inciting role/imaginative play with the game	Refers to adults providing opportunities for imaginative detours based upon the game play, or the adult actively interacting via role play with concrete concepts or characters in the game.	Adult role-playing
Hearing and repeating Dynamic Wordplay	Refers to repetitious environmental phrases used often with characteristics such as alliteration, changes in tempo e.g. slowly, slowly ever so slowly, use your superpower finger, super speedy fast.	Fun Phrases
Game specific interactions	Refers to occasions where the gameplay itself incited interaction for example a demo finger appearing on the screen to give the answer if the child was taking a while, or the opportunity to pop balloons that appeared at the completion of the game.	Balloon popping Demo Finger Bee 'try again'
Being surprised	Refers to unexpected aspects in the environment, game play or following suspense/anticipation.	Surprise
Adults echoing the child's Higher Order Thinking Talk	Adults repeating what the child is saying aloud either quoted or rephrased as a question to enable clarification.	Adult repeating child

Table 8 Study 3 Conditions Eliciting Smiles and Laughter Coding

7.3.5 Findings

The physical response suggesting pleasure has occurred during activities could be attributed to smile/laughter time and intensity, with findings from a Wilcoxon signed-rank test revealed a statistically significant difference between the neutral and overt conditions ($W = 57.0$, $P = .023$), the corresponding effect size ($r = .47$) reflecting a medium-to-large magnitude of effect.

Condition	N (used in test)	Mean (s)	SD (s)	Min (s)	Max (s)	Range (s)
Neutral	22*	142.09	131.50	21	600	579
Overt (Joyful)	22	227.23	122.50	72	544	472

Table 9 Study 3 Smiles and Laughter Data Breakdown

*Note. Twenty-three children provided neutral data; however, one participant had some missing overt data due to video corruption and was excluded from the paired Wilcoxon analysis.

For completeness, a paired-samples t-test was conducted in addition to the Wilcoxon signed-rank test. The t-test indicated that smiling/laughing duration was significantly greater in the overt (joyful) condition ($M = 227.23$ s, $SD = 122.50$) than in the neutral condition ($M = 147.23$ s, $SD = 131.59$), $t(21) = 2.76$, $p = .012$, $d = 0.59$. However, inspection of the data revealed substantial variability and extreme values (e.g., 600 seconds in the neutral condition), suggesting that the assumption of normally distributed difference scores may be violated. Therefore, the Wilcoxon signed-rank test was considered the more appropriate and robust analysis, and its results are reported as primary.

Both raters reported a facial expression we chose to describe as "lightness in the face," a subtle expression often preceding full smile. This expression, arguably indicative of immersion and concentration, suggests that beyond overt smiles and laughter, there exists a unique facial cue associated with cognitive focus. This facial cue is characterised by slightly contracted cheeks, bright or "sparkly" eyes, and a mouth that remains neutral, neither turned

up in a smile nor down in a frown, but gently pursed. Unlike intensities of differing smile types used for coding the findings, this expression lacks the pronounced upturn of the lips or the creases around the eyes. Instead, it appears as a preparatory or transitional state, often preceding overt smiling, and may signal heightened attention, curiosity, or a readiness for social interaction. This expression was evident in all participants in both the neutral and overt conditions. This facial cue suggests a broader spectrum of emotional and cognitive states beyond traditional physiological categorisations of neutral, smiling, or laughing expressions (Duchenne/non-duchenne).

The heart rate difference was not significant, 42% reduced, 5% remained the same, 53% elevated. A paired within t-tests was conducted for the two conditions, the mean heart rates (calculated from the continuous event [over the full neutral or over (joyful) session] between the two conditions equated to $t(20) = 0.276$ ($p=0.393$ one tailed) thus not statistically significant. The effect size was negligible ($d = 0.06$), indicating no meaningful increase in heart rate. As the changes occurred in opposing directions, reflecting individual modes of engagement rather than uniform arousal, the bidirectional responsiveness is difficult to capture using conventional inferential statistics which prioritise directional consistency over experiential change. The praxeological approach is important here, therefore, the physiological variation is interpreted as meaningful situated within social and contextual interaction, rather than treated as statistical error. The 95% change from the neutral condition, suggests it is unlikely that a two-year-olds heart rate response would remain unchanged upon increased attempts at eliciting smiles and laughter during a HOT activity.

In terms of the second aim to discover the conditions required for HOT and pleasure to co-occur, the higher-order activities and the contextual conditions associated with each smile and laughter instance were coded and counted across the full participant group. The table below shows the observable HOT skills and conditions eliciting smiles and laughter in order of prevalence.

Expressed Higher Order Thinking Skills	Conditions Eliciting Smiles and Laughter
Game / Level Completion 100%	Opportunities to make decisions and choose 98%
Categorising by shape or size 100%	Narrative Scaffolding (e.g. adults adding 'stories' along to what child is doing) 91%
Persisting (with/without) validation 98%	Being asked (on task) Questions 78%
Matching 98%	Environmental suspense & anticipation 74%
Higher Order Thinking Talk (Narrating what they're doing) 98%	Receiving Expressive Praise (warm, enthusiastic, emotive) 43%
Mental Anchoring (recall & linking to experiences and memories) 91%	Producing/appreciating physical comedy (e.g. tickling, poking) 43%
Concrete Concept Labels 87%	Receiving Structure Praise (measured, specific, objective orientated) 39%
Answering questions 78%	Producing or responding to Absurd Provocation (e.g. silly questions, rectifying a purposeful error) 39%
Correcting others 39%	Adults inciting role/imaginative play with the game 39%
Making Predictions 35%	Opportunities for Active Modelled Learning 35%
Association/Cognitive Mapping (linking to personal items) 26%	Hearing and repeating Dynamic Wordplay 22%
Recognising environmental patterns 22%	Game specific interactions (demo finger, popping balloons) 21%
Self-Appraisal 17%	Being surprised 13%
	Adults echoing the child's Higher Order Thinking Talk 13%

Table 10. Observable HOT Skills and Smiles/Laughter Conditions

Parental field notes revealed unanimous agreement that their child's concrete conceptual knowledge, cognitive engagement, fine motor skills, and digital literacy while using the device exceeded their expectations across both conditions. However, this does not imply that all these skills surpassed expectations simultaneously. For instance, even when parents observed signs of fatigue or disengagement with the game, they noted that their child's persistence and ability to navigate the device exceeded their expectations in managing boredom. Parents attributed this to several factors, including the collaborative nature of engaging with an educational digital game together, the social context in which the child interacted with the game, and the opportunity to dedicate focused time to a game that playfully yet explicitly assesses specific knowledge and skills.

7.3.6 Discussion

This study explored the question - What replicable conditions are required to enhance the likelihood of eliciting HOT and pleasure concurrently and how can this be evidenced?

This has been explored by investigating the following objectives:

- 1) Ascertain the physical responses that suggest pleasure has occurred during activities.
- 2) Discover the conditions required for HOT and pleasure to occur simultaneously.

Before addressing the research questions and objectives, it is important to offer a brief methodological reflection to contextualise the interpretation that follows and ensure that conclusions are drawn with appropriate caution. The procedure of data collection requires reflection as all children completed two sessions, electing to experience the neutral condition first and the overt (joyful) condition second, ensuring a consistent order of exposure across participants. This sequence was retained for ethical reasons, therefore no participants interested in the research were encouraged to complete in an order solely for the purpose of counterbalancing, allowing children to acclimate to the task and minimising potential discomfort. The two conditions were administered across separate visits with an inter visit interval of 7–20 days. In experimental research, it is typically advantageous to counterbalance condition order to minimise potential order, practice or fatigue effects. Having some children experience the overt condition first could, in principle, help to establish whether differences between conditions are attributable to the condition itself rather than the sequence in which it was experienced. However, in this study the consistent ordering of the neutral condition

followed by the overt condition was appropriate and ethically sound within a praxeological, child-centred approach (Bertram & Pascal 2023) as determined by the participants. Treating the neutral condition as the baseline therefore supported a more stable and developmentally sensitive comparison across visits. Moreover, the within-participant design mitigates individual variability, and the analyses focus on relative differences between conditions rather than absolute performance. For these reasons, the fixed order does not invalidate the findings, although it is acknowledged as a possible next step to improve future research.

The methods were limited somewhat as one video did corrupt inexplicably at the point of data collection which meant one video is not to its full length, and two children claimed their right to refuse the biopac, whilst ethical and preferred, has reduced the $N = 23$ to $N = 22$ and $N = 19$ respectively for the calculations. Nonetheless, the data collection tools opted for, were the most appropriate methodological tools available at the time, tailored to the developmental stage of two-year-old children and suited for investigating complex and ambiguous subjects. An arguable strength of the methods lies in its praxeological and mixed-method design, which prioritised children's actions and responses within a meaningful, humanistic context. By combining quantified physiological and behavioural measures with qualitative video data and parental field notes, the study reduced reliance on any single indicator of pleasure, thereby potentially mitigating construct validity threats and strengthening interpretive depth. The within-participant design further enhanced sensitivity to condition differences by controlling for inter individual variability, which is particularly important in developmental research with small samples and high heterogeneity. The use of non-parametric inferential statistics (Wilcoxon signed-rank test) was appropriate given the sample size and distributional characteristics of the data, reducing the risk of Type I error associated with assumption violations. Reporting effect size (albeit not for both physiological observations) alongside statistical significance further supports interpretability and guards against overreliance on p-values. Additionally, the identification of a novel facial expression ("lightness in the face") across both conditions highlights the value of qualitative observation in capturing responses that may not be reflected in traditional physiological metrics, albeit an arguably limitation of the coding as raters did not discuss this until later analysis and reflection.

In terms of objective 1. The physical response suggesting pleasure has occurred during activities could be attributed to smile/laughter time and intensity, with findings yielding significance in the Wilcoxon Signed-Rank Test across the conditions. The physical response

could also include a change in the heart rate, though whether this is elevation remains unclear. These findings somewhat support the hypothesis increased smiling can indicate greater effort to enhance social interactions will lead to a change in expressions of HOT and heightened physiological responses. However, the elevated heart rate, whilst a change was found, did not materialise, thus not supporting the hypothesis.

Parental perspectives on children exceeding their expectations aligns with existing literature emphasising the role of social interaction in enhancing young children's cognitive and emotional development. Laughter and smiling are not merely reflexive responses to humour but serve as flexible social signals that can facilitate learning and social bonding (Addyman et al., 2018; Krumhuber et al., 2022), the presence of a more interactive social environment possibly provided additional stimuli, promoting deeper engagement and cognitive processing during gameplay akin to a flow state (Csikszentmihalyi and Csikszentmihalyi, 1988; Sturrock & Else, 2006; King & Newstead, 2020; King, 2023).

The rater's observation of a 'Lightness in the Face' aligns with research demonstrating that children display a variety of facial expressions linked to different emotional and cognitive states, though categorising these expressions definitively remains challenging (Krumhuber et al., 2022). However, this novel expression of lightness in the face is not yet accounted for by existing Early Childhood rating tools such as Leuvan, ECERS, and others. These findings highlight the complexity of assessing emotional expressions and indicators of pleasure in young children, suggesting that a broader recognition of diverse facial cues could improve the accuracy of evaluating their cognitive and emotional engagement during interactive tasks. Additionally, the findings reiterate the limitations of reductionist quantitative methods in capturing physiological states. While the captured increased intensities and frequencies of smiles, laughter, and changes in heart rate provide possible physiological evidence of pleasure, they do not capture unique observations like those noted by the raters, which could be overlooked in purely quantitative analyses. Instead, qualitative context is essential for portraying the full 'true world' of the child's experience (Gough et al., 2013) and therefore to evidence if pleasure has occurred, evidence should be provided from both qualitative and quantitative records.

In terms of objective 2. discovering the conditions required for HOT and pleasure to co-occur, table 3 highlights strategies adults can implement to create optimal conditions where HOT and laughter coexist to contribute to research ascertaining what brings joy in Early

Childhood (Aknin et al., 2013; Yonghe et al., 2015; Kyongboon et al., 2017; Hill et al., 2023). A key takeaway is that simply enhancing environmental exposure to social cues can be an enjoyable and effective approach. Environmental anticipation, suspense, and surprise, humour; including physical comedy and absurd provocation, and imaginative role play and active modelling e.g. demonstrations from an adult, arguably were features that created ‘activated’ contexts which were action orientated (Huber & Barnett, 2022).

Most influential was encouraging children's autonomy, as 98% of smiling and laughter episodes stemmed from decision-making opportunities, such as choosing a game. This principle can be extended to various play and non-play routines, fostering engagement and joy. Similarly influential was narrative scaffolding, where adults provide verbal commentary alongside a child's actions enhancing social reciprocity, shared attention, and emotional connection, reinforcing HOT (Sylva et al., 2004). Adult talk continued to be a powerful vehicle via several ways, adults validating and echoing children's own higher order thinking talk was influential, yet adult led narration was seemingly more preferential in this participant group. This poses an interesting feature combined with choice, perhaps in the six stages of play and flow (Csikszentmihalyi & Csikszentmihalyi, 1988; Sturrock & Else, 2006; King & Newstead, 2020; King 2023) adult narration can be encouraged during ‘play framing’ to transition into flow play even deeper after a child has chosen the play focus.

Both expressive and structured praise were influential, however expressive, warm and emotive praise slightly more preferential amongst participants based upon the percentage of time they were attributed to causing a smile/laughter reaction, this is perhaps due to their early Theory of Mind as expressive praise provides immediate, emotive and clear reinforcement of their behaviours. A child's preference for immediate, emotive, and unambiguous praise may reflect reliance on explicit social cues due to developing Theory of Mind abilities, as such praise reduces the need to infer others' mental states from subtle or ambiguous feedback, two-year-olds still rely on emotional cues, social referencing, and engaging feedback to interpret approval akin to their internal understanding (Tager-Flusberg, 2001; Frith, 2003; Shahaeian et al., 2023). Task-specific questioning was also influential (Yang et al., 2021; Wu & Gweon 2021), so too was dynamic word play including alliteration, rhythm and repetition for effect, therefore discursive devices of adult talk can be a powerful vehicle for HOT and the smile and laughter response to co-exist.

7.3.7 Conclusion and Recommendations

The findings convey that there was significantly more smile/laughter time and intensity recorded in the overt (joyful) condition. Furthermore, a new facial expression outside of typically used smile and laughter descriptors, labelled in this study as a ‘lightness in the face’ was identified in all participants in both conditions, providing additional insight into children’s physiological responses during HOT activities. The findings highlight the need for further research into the physiological responses of two-year-old children, more could be learnt about how pleasure is experienced and observable during their learning, particularly punctuated by this research proposing a novel facial expression to look out for. Specific exploration of the ‘lightness in the face’ would be beneficial to explore as another possible social or cognitive ‘function’ of facial expressions during thinking activities (Addyman et al., 2018, Krumhuber et al., 2022). This is particularly important for professionals using scaling tools (e.g. Leuvan, ECARS, ITERS etc) to assess children, as this type of expression currently is not explicitly mentioned yet has been identifiable in each participant in this study in both instances.

Study 4



Joyful Minds: Unveiling Insights into Two-Year-Old Smiling and Thinking

Abstract

This study employed a multimodal co-production design to identify how previously established findings on two-year-old children's expressions of HOT and smiles and laughter could be most meaningfully interpreted, prioritised, and disseminated by those working with, or caring for, young children. Across five workshops (online and in-person) and optional follow-up questionnaires, 22 participants engaged in collaborative dialogue, creative metaphor-based tasks, and shared digital reflection. Co-production was operationalised as a dialogic, relational stance in which participants shaped meaning and interpretation in real time, with themes unified rather than generated post-hoc. Participants identified three core findings from the preceding three studies within this doctoral project relevant to practice: (1) observable, embodied indicators of children's pleasure as accessible proxies for internal physiological states; (2) interdependent dispositional and situational conditions required for HOT and pleasure to co-occur, and (3) the need for clear, simple, universal messages that empower all adults in a child's world to notice, interpret, and respond to children's thinking and affect.

Participants emphasised the importance of universality, shared responsibility, and the developmental value of attuned observation as key dissemination priorities. They also articulated a dual dissemination pathway: traditional academic outputs to ensure rigour and credibility, and applied, accessible media, such as visual illustrations, short videos, and simple digital content, to ensure equitable reach for families, practitioners, and communities experiencing time, literacy, or resource constraints. Prototype illustrations and a draft website were developed to reflect these priorities. Overall, the study demonstrates that meaningful co-production can occur within time-limited contexts when transparency, creative methods, and dialogic interpretation are central. The findings provide practice-ready insights and foundations for future dissemination aimed at supporting relational joy, attunement, and HOT in EC.

7.4.1 Introduction

In social sciences co-production has become an increasingly used tool for conducting research and influencing community services (OECD, 2011; Tuurnas, 2015; Robert et al, 2024; Masterson & Laidlaw 2024). It represents a relational approach to improving services beyond coercing or consulting people for their ideas, by putting lived experiences at the heart of a study and enabling those involved to contribute to creation, designing and production of ideas and outputs. There are instrumental benefits and intrinsic benefits such as the use of wider expertise to produce better research outputs, increase a sense of social responsibility for all involved and fulfil civic duty (Social Care Institute for Excellence, 2022). Widely understood, authoritative standards and guidance are still in development for co-production (Kjellstrom et al., 2024; Masterson, 2026), as a result, many published studies still include limited or tokenistic conveyance of co-production, with a synthesis of over a thousand articles by Munce et al. (2023) suggesting that around 40% of co-production publications do not substantively include co-producers or co-designers.

Therefore, this study aims to make visible who was involved, how, in what roles, with what decision confines and scope, and how ideation was handled, so that the process itself, not only its outcomes, are clear. In this study, co-production is understood and defined as a guiding stance rather than a procedural or mechanistic method that can be enacted through a range of data collection and engagement practices (Kjellstrom et al., 2024; Masterson, 2026). What matters is transparency, where transparency of practice is evident in reporting, and principles of with-ness, joint working, togetherness, and dialogue are visible, the study can be understood as aligning with co-production (Masterson, 2026).

The literature demonstrates a proliferation of overlapping and sometimes interchangeable terms, including, but not limited to; co-production, co-design, and co-creation, with definitions varying widely across authors. This can be confusing, but it can also be liberating as there is no single, fixed or “correct” definition, as co-production is context specific, relational, and still evolving (Masterson, 2022; 2026). The most frequently cited definition stems from Vargo and Lusch’s (2004) service-dominant logic, which positions value as co-created through interaction and asserts that users are always co-producers rather than passive recipients. Given the plurality of perspectives, it is therefore important to adopt a description

that aligns with what the specific research is attempting to achieve (Kjellstrom et al., 2024; Masterson, 2026).

Furthermore, principles of effective practice that have influenced this study include those published by the Social Care Institute for Excellence (2022) who state reciprocity, accessibility and diversity should be evident in the co-production process. Social Care Institute for Excellence (2022) state these can be partially fulfilled by practical means that this study has adopted, such as consulting the target population at the point of a study's design, ensuring costs of involvement are fully covered and that value and reward (incentives) are evident. Similarly, the researcher-participant relationship should be equitable and ensure the parity of co-researchers at the point of co-production exercises (Social Care Institute for Excellence, 2022; Co-Production Collective, 2023).

Resultingly, this co-production study seeks to explore how previously established findings on two-year-old children's expressions of HOT, smiles, and laughter can be most meaningfully interpreted, prioritised, and disseminated by those working with, or caring for, young children. This is approached through co-production understood not as a fixed procedure or mechanistic method, but as a guiding stance that can be realised through multiple forms of engagement and dialogue (Kjellstrom et al., 2024; Masterson, 2022; 2026). In this study, alignment with co-production is demonstrated through transparency of practice, visible principles of with-ness, joint working, togetherness, and multi-modal dialogue (Masterson, 2022; 2026). The parameters of the co-production process, including its constraints, are made explicit throughout. Consequently, while participants contributed directly to shaping the direction of dissemination and informing the development of prototype outputs, a fully refined or polished "product" was not anticipated or required within the scope of this study. Instead, the emphasis rests on generating collaborative insights into the content, methods, and formats through which the research findings can be shared most effectively.

To address the study aims, five co-production workshops were conducted with adults who had professional and/or personal experience of supporting two-year-old children. Workshops involved the presentation of findings from three previous studies in this doctoral project, followed by collaborative discussion, creative activities, and shared reflection. Participants were invited to identify which findings they considered most important, how they should be interpreted for practice, and the most effective ways to disseminate them to families and

professionals. Optional follow-up questionnaires provided additional reflections and evaluative feedback.

7.4.2 Literature Review

It is acknowledged that conceptual ambiguity persists in co-production design and that alternative understandings of co-production exist within the literature (Munce et al., 2023; Masterson & Laidlaw, 2024) therefore, this brief review intends to share preferential process details that align most with this specific study to combat conceptual confusion, and respond to the sparse reporting of the how, which currently breeds inconsistency (Munce et al., 2023; Masterson & Laidlaw, 2024).

Stavholm et al. (2024) state that co-design is an umbrella term encompassing a range of participatory, design-based research methods which are referred to interchangeably in the literature in many phrases including but not limited to; co-production, participatory co-design, co-creation, collaborative design, co-innovation, co-research, human-centred design and user designed. Nonetheless, the desire to support mutual knowledge generation through partnerships with participants using creative exercises that reflect the realities of the context being studied is the aim of all varying termed approaches (Cumbo & Selwyn, 2022; Stavholm et al., 2024).

Hadley et al. (2024) highlight that for co-production exercise to be useful in EC services, eight principles need to be considered, these include inclusion, respect, accessibility, ethics, positive and strengths based approach, communication, authenticity of context, children's voices, critical evaluation, consultation and dialogic mechanisms. Furthermore, Hadley et al. (2024) suggest these principles must run through five core processes in co-production exercises, these are notify, confer, engage, work together and enable informed decision making. Whilst the work of Hadley et al. (2024) was successful in exploring a policy in Australia, the limitations of these principles and processes were identified as intensive and unlikely to occur shaping wider policy making, despite being a benefit laden approach. Therefore, it is potentially up to the EC sector researchers to increase child, family and professional voices in studies, lobby for change that prioritises flourishing and fulfilment, and for researchers to choose co-production methods, or praxeological methods more regularly (Pascal & Bertram, 2023).

Whilst there are evident principles, processes and benefits that co-production studies can draw from in EC services, Hendry et al. (2025) remind researchers to be transparent about the constraints of the project in terms of deadlines, budget limits for decisions, reality of delivery of the ideas and evaluation. Arguably, this is better achieved when the co-production exercises occur within a community of practice, something which Platteel et al. (2010), Pyrko et al. (2017), Prins et al. (2025) endorse. True communities of practice are learning partnerships that not only bring participants together to think collectively about authentic issues of shared professional concern but enable them to interact regularly to construct knowledge together (Platteel et al., 2010; Pyrko et al., 2017; Prins et al., 2025). Having a community of practice that promotes co-production is conducive to a culture of learning and staff continuing professional development (Corral-Granados et al., 2023), however, as Hendry et al. (2025) and Hadley et al. (2024) note, time is crucial in developing this. In education settings Stavholm et al. (2024) states that having two or more people seen equally as experts in the topic to shared lived realities and engage in design and redesign cycles is a typical characteristic of successful co-production research despite time constraints. Vicat-Blanc et al. (2025) argue that while co-production offers clear benefits for driving meaningful change and uncovering perspectives otherwise overlooked, further research and reflection are needed to understand how to use this method effectively in childhood services, particularly when engaging with marginalised groups, that children arguably are due to the realities of their voices being heard in research. Echoing this, Armitt et al. (2024) state that undertaking co-production studies, particularly when working with under-represented groups, requires careful consideration and critical reflection. Armitt et al. (2024) reflected that while ensuring adequate resourcing, equitable power, valuing diversity, building trust, and re-conceptualising the researcher's role can present challenges, these considerations are crucial to tackle given the significant benefits for participants who are under-consulted on issues affecting them, such as those with lived experience of child care and education services, especially those with diverse needs or backgrounds.

According to Dunston et al. (2009) and later Masterson and Laidlaw (2024) co-production is a dialogic and learning partnership in which researchers and participants shape exploration of ideas and/or interpretations of subjects through iterative, reciprocal exchanges. It is preferential to deliberately not use the specialist term “co-production” with participants but instead describe the collaboration in language that fits the setting and invites people to define

in dialogue and behaviour, what meaningful involvement looks like for them (Masterson & Laidlaw 2024), this helps to treat the collaboration as a negotiated, situated practice. Operational principles according to Masterson (2022; 2026) emphasise assets and intention as foundations for engagement, this means recognising and mobilising the assets such as lived experience, knowledge, connections that people contribute. Furthermore, maintaining explicit intentions at each stage of the co-production process is helpful, as it allows everyone to equally understand the freedoms and limits the research affords for and to share ideas cognisant of anything that might be most useful or unrealistic to contribute (Kjellstrom et al., 2024). Dialogue is prioritised as a reciprocal exchange that enables multiple interpretations to be surfaced and decisions to be guided without requiring full consensus. Documentation of this dialogue (e.g., meeting notes, digital recordings) makes visible how perspectives were expressed, how differences and similarities of thoughts were considered and how decisions were reached (Masterson & Laidlaw, 2024). The process or co-production is arguably best seen as a non-linear “compass” rather than a linear pipeline, moving through a reflective cycle, returning to earlier stages of dialogue and ideas as circumstances evolve. While co-production cannot be reduced to a single “correct” model, using published principles in contextually appropriate ways (Masterson et al., 2022) provides a genuine means of amplifying voice and connecting values, theory and data with practice through reflective participation (Pascal & Bertram, 2018).

7.4.3 Study Aims and Objectives

This present study has adopted a co-production study design as it intends to ‘close the loop’ of a currently active PhD research project running at University of Staffordshire (then named Staffordshire University), that ensures the already collected data, findings and recommendations can be applied as intended for praxeological and transformative purposes within practice pertaining to two-year-old care and education (Dewey, 1933; Pugh, 2011; Bertram & Pascal, 2023). Ethical approval was sought from the institute’s ethics committee and the project is a recipient of the institutes Connected Communities Public Engagement Innovation grant and Participatory Action Research fund to enable co-production with EC service providers and users to cover the costs of incentives to get involved i.e. refreshments, prize draws and costs of the production of illustrations from beyond the researchers expertise.

Massey and Berraras (2013) highlight a limitation can often be in the researcher's ability to respond with outputs suggested by the participants, and this was therefore avoided by covering costs associated with specialised output production and designing the study with Impact Validity (Massey & Berraras 2013) in mind. The framing principles for Impact Validity (Massey & Berraras 2013) are:

1. Strategic choice of research question for the study
2. Explicit and realistic strategies for using research evident from the study
3. Strategic framing, communicating and disseminating approach for the study

Whilst these principles cannot make certain of impact validity, they can influence the likelihood of having a unique contribution to knowledge via outputs most relevant to the audience associated with the subject being explored post study (Massey & Berraras 2013).

Adhering to principle 1, rather than seeking to answer the research questions developed in earlier stages of the project, the purpose of this co-production study was to validate those findings and collaboratively explore which aspects were viewed as most significant, how they should be disseminated, and which audiences should be prioritised. Consequently, the existing questions/objectives were maintained, which are:

What replicable conditions are required to enhance the likelihood of eliciting HOT and pleasure concurrently and how can this be evidenced?

- 1) Ascertain the physical responses that suggest pleasure has occurred during activities.
- 2) Discover the conditions required for HOT and pleasure to occur concurrently.

With an additional objective added to capture the co-production process and its contribution to shaping the final outputs, which is:

- 3) To determine, using multimodal coproduction dialogue, the elements of the findings regarded as most significant by EC services and service users, and to ensure that subsequent dissemination reflects their values, priorities and lived experiences.

The research question and accompanying objectives are steeped in applied value as they facilitate the exploration of a social/practical subject (thinking and smiles) and the development of strategies that can disseminate strategies that influence conditions for thinking and smiles to co-occur (Gruman & Schneider et al., 2017).

To ensure this study has impact validity accordingly with principle 1, participants were provided with headlines from three prior studies (detailed in the procedures section). This crucial step enabled participants to integrate their personal interests and experiences with a robust evidence base, creating a well-informed perspective. This process not only fostered appreciation for the subject under exploration but also enabled participants to address and validate the research questions and objectives, ensuring their suitability for further co-production activities. At the same time, it empowered participants to propose practical implications and strategies for disseminating the research and their contributions are instrumental in ensuring that the findings resonate with and influence the target audience effectively, maximising the entire projects potential impact validity.

7.4.4 Methods

Design

The primary method used in this study was a series of co-production workshops. These workshops provided the principal mechanism through which participants collaboratively interpreted, prioritised and shaped dissemination of findings from the previous studies. A multi-modal design supported these workshops through discussion, creative activities and optional questionnaires.

Co-production studies commonly involve flexible, inclusive, and dialogic approaches that bring people together to shape research processes and outputs (Bovaird & Loeffler, 2016; Hickey et al., 2018, Masterson & Laidlaw 2024). Consistent with this, the present study adopted a multi-modal co-production design incorporating both online and in-person workshops. Multi-modal formats, including verbal dialogue, shared digital documents, and creative artefacts which are recommended for facilitating accessibility, supporting diverse communication preferences, and enabling richer forms of expression (Gauntlett, 2007; Mannay, 2016).

Participants were recruited through two established routes: (1) invitations extended to individuals who had previously taken part in related studies, a practice commonly used to maintain continuity in iterative co-production cycles (Slay & Stephens, 2013), and (2) open calls shared through professional digital networks such as LinkedIn, which aligns with contemporary approaches to widening participation and diversifying participant involvement in co-production (Beckett et al., 2021).

Workshops began with an accessible, visually engaging presentation of insights from three preceding studies. Presenting evidence informally and aesthetically is recognised as a way to reduce power imbalances and promote shared understanding early in co-production encounters (Light & Akama, 2014; Leeson, 2014). Dialogue formed the core of the workshop process, supported by collaborative notetaking on shared documents and creative tasks such as constructing “ice-creams” to represent ideas or priorities. Creative and metaphor-based techniques are increasingly used in child-centred research to surface tacit knowledge, support reflection, and enable participants to communicate complex perspectives (Clark, 2011; Mannay, 2016). Deliberate reflection points were built into the sessions to slow the pace, check shared meanings, and support ongoing alignment, reflecting best practice in iterative and dialogic co-production (Hickey et al., 2018; Masterson & Laidlaw, 2024).

The workshops culminated in the collaborative development of ideas and priorities to influence an illustration and early prototypes for dissemination. Producing visual and digital artefacts as outputs reflects wider trends in co-production, where tangible prototypes help consolidate shared ideas, facilitate decision-making, and prepare research for dissemination or implementation (Sanders & Stappers, 2008). However, these do not always need to feature as Masterson and Laidlaw (2024) reminds us, that co-production can be as small as two people coming together to make a decision, and that constraints of time, budget or other contextual factors cause co-production to cease (Masterson, 2022; 2026). Thus, at the point of design, the outcome of the workshops remained open-ended. Finally, an optional opportunity to complete an individual questionnaire was offered to maximise the opportunity for all involved people to exhaust everything they wished to contribute.

Recruitment, Sampling and Participants

The participants recruited for this co-production study were adults with relevant experience of caring for, educating, or interacting with two-year-old children. This included family members, early childhood (EC) professionals, and other adults with a vested interest in the

development and wellbeing of two-year-old children. An opportunity and self-selection sampling approach was adopted. Recruitment commenced immediately following ethical approval and continued on a rolling basis throughout the data-collection period to maximise opportunities for involvement. Invitations were circulated to individuals who had participated in earlier studies within this doctoral project (5 participants returned), and additional participants were recruited through open calls shared via LinkedIn and professional networks. Participation was entirely voluntary, with no a priori sample established; therefore, all participants self-selected to take part based on their interest in the topic and availability during the study period. Participants therefore represented a range of perspectives from both professional and personal contexts, enabling collaborative reflection on the findings emerging from the previous studies. The following two tables provide a summary of participant numbers, workshop attendance, and participant roles across each stage of data collection. To maintain confidentiality and minimise the likelihood of participant identification, the workshops have been presented separately and individual participants have not been linked across workshops.

Participation occurred across three stages:

Part 1: Presentation of study findings and validation of research intentions.

Part 2: Co-production workshop activities and collaborative ideation.

Part 3: Optional post-workshop questionnaire and evaluation.

	Part 1 (Sharing headlines and validating research intentions)	Part 2 (Co-production workshop ideation)	Part 3 (Optional Individual Questionnaire)
Workshop 1 (Online)	5	3	2
Workshop 2 (Online)	3	2	2
Workshop 3 (Face to Face)	7	7	0
Workshop 4 (Face to Face)	3	3	3

Workshop 5 (Online)	4	3	2
Total Participation	22	18	9

Table 11. Study 4 Co-Production Workshop Involvement

Participants and Their Roles

Role/Capacity	1 Work-Based Learning Officer + Parent of Two Year Old 1 Local Authority Educator 8 Researchers (Ethics, Society, Secondary Education, Education, Psychology) 2 Retired Early Years Academics 3 Education Students whom are also working part-time in sector with two year old children 1 Communications Coordinator for Early Years Language Organisation Representing Socially Deprived Groups 1 Multimedia Manager + Parent of Two Year Old 1 Careers Educator + Parent of Two Year Old
Gender	17 Female 1 Male
Race	17 White European 1 Arab
Ages	3 56-65 2 46-55 0 36-45 11 26-35 2 19-25

Table 21. Study 4. Co-Production Participant Breakdown

Materials

The co-production workshops used a combination of online and in-person materials designed to support inclusive participation, flexible dialogue, and multi-modal contribution, an

approach consistent with contemporary co-production principles emphasising accessibility, valuing diverse forms of contribution, and intentional design of participation spaces (Masterson et al., 2022; 2024).

Online workshop materials

The online workshop was delivered via Microsoft Teams webinar, which provided access to cameras, microphones, chat functions, and breakout rooms, enabling dialogic and distributed participation. The use of digital platforms to widen access and support flexible modes of involvement aligns with emerging co-production practice adopting hybrid or online environments to increase reach and inclusion (Hickey et al., 2018; MacLachlan et al., 2024). An aesthetic, informal PowerPoint presentation was shared to introduce insights from three previous studies in an accessible format, reflecting recommendations to use clear, relational, and non-hierarchical communication in co-production contexts (Masterson et al., 2022).

Participants were able to collaboratively edit a shared digital document, contributing written reflections and comments during discussions. Multi-modal data capture, including written, spoken, and visual contributions, supports the principle of valuing different forms of knowledge expression in co-production (Nordin et al., 2023).

Workshops were held in afternoons or evenings to enhance accessibility and accommodate participants' commitments, consistent with co-production guidance emphasising responsiveness to participants' practical needs (MacLachlan et al., 2024).

In-person workshop materials

The in-person workshop used the same PowerPoint materials but incorporated tactile and relational activities. A breakfast table was provided to create a welcoming environment and reduce power distance, an approach routinely highlighted in co-production pedagogy and practice (Hickey et al., 2018).

Participants worked with tactile creative materials to construct metaphorical “ice-creams,” enabling both individual reflection and collaborative meaning-making. Participants used paper templates shaped like ice creams to visually represent and prioritise ideas. Different scoops represented key messages, dissemination priorities, or important findings, while

toppings and decorations enabled participants to add supporting thoughts, examples, or actions. The activity encouraged visual reflection and provided a tangible focus for collaborative discussion. Ultimately, participants chose how metaphors and visuals facilitated articulation of their thinking and contributions.

Creative and metaphor-based materials are frequently used in co-production and participatory design to surface tacit knowledge, support dialogue, and allow participants to express ideas in non-verbal or non-linear ways (Sanders & Stappers, 2008; Mannay, 2016;).

This approach also aligns with recent recommendations to use methods that enable varied forms of contribution and reduce reliance on formal verbal articulation (Masterson et al., 2022). Such methods are also widely used within co-production because they enable participants to contribute ideas in multiple forms, reducing reliance on formal discussion and supporting more equitable participation (Masterson 2024)

Questionnaire materials

A short follow-up questionnaire was distributed through Microsoft Forms and emailed directly to participants. The use of asynchronous digital methods complements multi-modal co-production designs by allowing reflection outside group settings, consistent with hybrid co-production practices documented in recent research (MacLachlan et al., 2024).

Procedure

Fig 4. Succinctly visualises the full procedure.

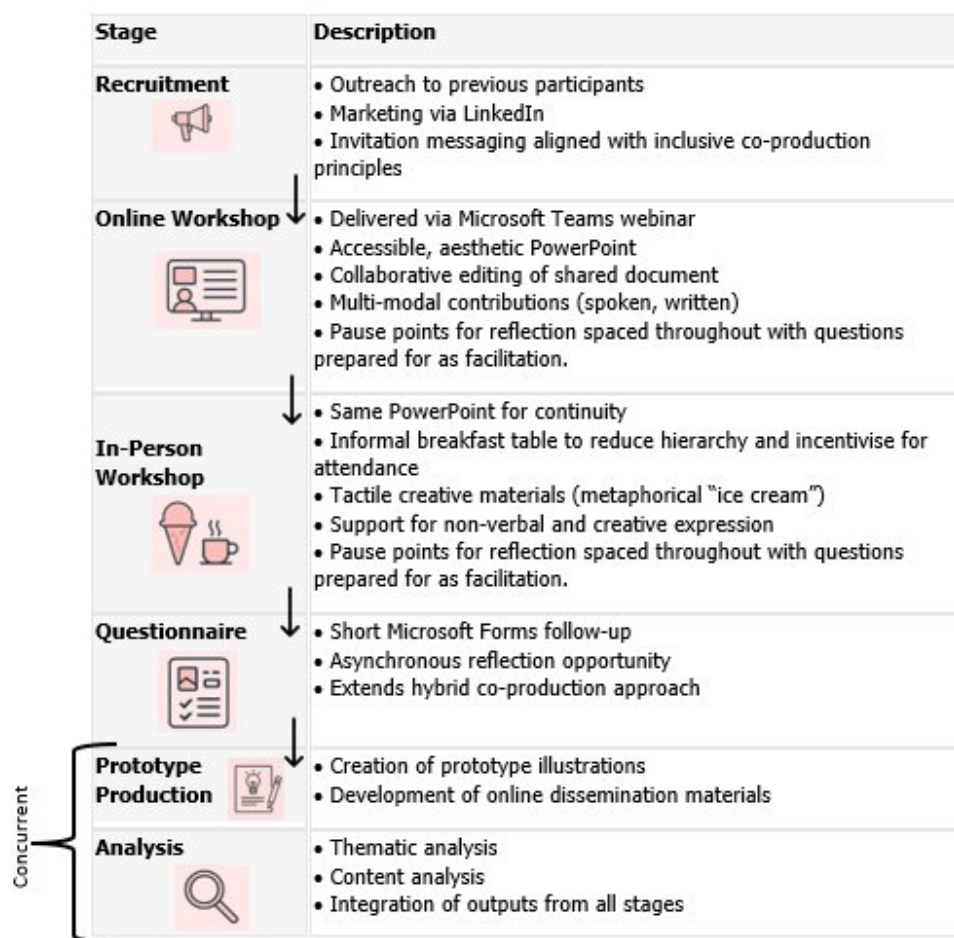


Fig.4 Study 4 Methodological Procedure Chart

The research was carried out within an intensive three-month timeframe in order to recruit participants, conduct data collection, spend the allocated funds, and report findings back to the Connected Communities research team. Recruitment began immediately and continued on a rolling basis throughout the data-collection period to maximise the potential for participation. Invitations were sent to previous studies participants, and posts were shared through LinkedIn to reach additional EC professionals, caregivers, and sector members.

Because of the limited timeframe, workshops were launched as soon as recruitment began, with sessions running throughout the first month. These workshops served as the primary site of co-production. Each session opened with an accessible overview of the project headlines, including a review and validation of the research questions, aims, and priorities for dissemination. This ensured that the direction of the project reflected the perspectives of those who would ultimately use or benefit from the findings.

The second part of each workshop was highly interactive. Participants worked either in small groups using collaboratively editable digital documents or through hands-on creative activities using metaphorical “ice creams.” Pre-prepared pause points and structured questions supported collective reflection, alignment of ideas, and confirmation of shared understandings. These prompts were designed to surface priorities relating to sector needs, audiences, formats, inclusivity, and ongoing involvement, including:

1. What contribution participants felt the research could make to the EC professional sector
2. Preferred formats for accessible dissemination
3. Key messages families might need from the research
4. Key messages professionals might need
5. How to ensure resources appeal to diverse professionals, caregivers, educators, and parents
6. Cultural, contextual, or demographic considerations for inclusive and equitable design
7. How to incorporate feedback from both professionals and caregivers throughout the resource’s development

Workshops concluded by revisiting all contributions to ensure the documentation was an accurate representation of the dialogue and co-produced ideas shared during the session.

Following attendance at a workshop, participants were offered a short optional questionnaire delivered via Microsoft Forms. The purpose of this asynchronous follow-up was twofold: to evaluate participants’ experience of the workshop and to provide space for any final reflections individuals wished to contribute privately and with more time to process the discussion. Questions pertaining to sharing further thoughts included:

1. Can you share any specific activities or strategies you've found particularly effective in eliciting smiles and laughter concurrently with higher order thinking in two-year-olds?
2. What practical tips or advice would you offer to adults who may be unfamiliar with the nuances of interacting with two-year-olds?

3. What conditions do you think are required for Higher Order Thinking and pleasure to occur concurrently?
4. What do you think are the physical responses in two-year-old children that suggest pleasure has occurred during activities?
5. Is there anything else you wish to add which you think might be important for sharing insights from this project that you have not had the opportunity to say/write in the group task?

Due to funding turnaround causing a tight time constraint there was no time to build a community of practice as recommended by Platteel et al. (2010), Pyrko et al. (2017), Corral-Granados et al. (2023), Prins et al. (2025). Therefore, the sessions were isolated instances, which could arguably also impede the ability to design and redesign during the single session (Stavholm et al., 2024). However, this was made clear and appreciated by the participants, relating to the importance of transparency of the studies constraints during the workshops procedure (Hendry et al., 2025).

Action was taken immediately after the workshop series to engage an illustrator to begin developing prototype visual materials that reflected the co-produced ideas. However, due to the strict data-collection deadline, only preliminary concept exchanges were possible before analysis and reporting needed to begin.

The final month of the project was dedicated to analysis and prototype development. Thematic analysis of workshop transcripts and questionnaire responses was conducted using the Braun and Clarke (2018) approach, involving familiarisation, initial coding, theme development, review, refinement, and naming. In parallel, content analysis was performed on the creative “ice creams” to identify recurring symbols, priorities, metaphors, and meaning-making patterns. Content analysis was conducted by using the themes generated by participants during the workshops as initial codes, which were then applied to the creative materials to identify any expansions, recurrences, or divergences in meaning across the data. These two analytical strands were then synthesised to generate a coherent set of thematic insights and dissemination priorities. It is important to note that according to Masterson and Laidlaw (2024) co-production projects do not generate themes solely through post-hoc analytical procedures; instead, much of the core categorisation happens within the workshops

themselves, through the collaborative processes that define co-production. Therefore, this study purposefully avoids overstating the complexity of formal analysis when, in practice, key thematic structures already emerged through participants shared dialogue, interaction, and meaning-making during the workshop sessions rather than from researcher driven thematic sorting afterwards. Therefore, each workshop engaged in its own situated, collective analytic work, with participants naturally generating, refining, and validating themes in real time. The post-workshop analysis did not create new themes but instead involved bringing together, unifying, and confirming this collaboratively produced documentation across workshops to ensure that all perspectives were accurately represented and coherently integrated and optional questionnaire responses were also factored in.

A final written report was produced for publication in the Connected Communities magazine and shared with participants and wider university connections. Encouragingly, following publication, one participant representing an EC organisation re-established contact to express interest in future dissemination and potential involvement in any future co-produced projects, an organic outcome that reinforced the relational and participatory strengths of the research design and procedure.

7.4.5 Findings

Themes are presented according to the priorities generated through the co-production workshops. While all themes informed Objective 3, the themes of Observational Value and Optimal Conditions also contributed directly to Objectives 1 and 2 concerning indicators of pleasure and the conditions supporting the co-occurrence of HOT and pleasure.

Across the workshops, participants demonstrated a high degree of agreement regarding the aspects of the earlier studies they considered most important for practice and dissemination. Four overarching priorities consistently emerged: (1) ensuring findings were accessible and applicable to all adults supporting two-year-old children (Universality), (2) recognising early childhood development as a shared responsibility across families, professionals and communities (Shared Responsibility and Opportunity), (3) strengthening adults' confidence in observing and interpreting children's embodied expressions of thinking and pleasure (Observational Value), and (4) simplifying key messages so they could be readily understood and applied across diverse contexts (Simplifying Priorities).

Participants also identified a set of optimal dispositional and situational conditions that they believed increased the likelihood of HOT and pleasure occurring concurrently. Alongside these priorities, considerable attention was given to how findings should be disseminated to ensure both academic credibility and practical accessibility.

The following sections present each theme in turn, before outlining participants' recommendations for dissemination and their reflections on the co-production process.

Universality (Accessibility & Practicality)

Participants emphasised that the value of the research lay in its universal applicability, its capacity to offer guidance that is accessible, affordable, and meaningful for all adults can use. They appreciated that the insights translated easily into everyday practice without requiring specialised training, expensive equipment, or additional workload. As one participant summarised, *“The findings are easy to apply in reality,”* while another highlighted that the research provides *“practical tips... which are not expensive or difficult to do.”*

A particularly resonant message was the universal power of smiles and laughter in EC, which participants felt is often undervalued in professional discourse. They described smiles as a shared, accessible resource that all adults can intentionally use to promote connection, attunement, and development. As one participant expressed, *“The power of a smile for everyone to use means we can all be experts in maximising smiles and thinking concurrently.”* Others noted that practitioners and families alike *“need to reprioritise the importance of eliciting smiles and laughter in childhood,”* emphasising that these simple relational moments are fundamental to emotional expression, development, and shared joy. Together, these reflections position universality not only as ease-of-use, but as a commitment to practices that can be embraced by anyone supporting a two-year-old child.

Shared Responsibility/Opportunity

Participants emphasised that supporting two-year-olds is a collective responsibility, shared across all adults and professionals who interact with young children, not only early years professionals or parents. They described the research findings as providing a valuable opportunity for everyone in a child's world to contribute to nurturing relationships, effective communication, and developmentally attuned interaction. As one participant expressed succinctly, *“everyone in contact with two-year-olds needs to use this research.”*

Workshop discussions highlighted several real-world examples where participants recalled observing interactions with young children being experienced as misaligned or developmentally inappropriate, such as brief medical appointments or rushed encounters with health visitors. Participants noted that these everyday social contexts, though outside traditional early years settings, carry significant relational weight for young children. Because of this, they argued that professionals in such roles should be equipped with the knowledge and confidence to communicate in ways that recognise the child's perspective, emotional needs, and developmental stage.

The theme of shared responsibility therefore extended beyond simply dispersing information; it reflected a belief that every adult has both the opportunity and obligation to support early development and quality of life. Whether through brief moments of connection or ongoing caregiving, participants felt that the research could empower all adults to interact with two-year-olds in more attuned, respectful, and supportive ways. This inclusive framing positions the findings not as specialist knowledge, but as a shared resource for anyone who shapes a child's everyday world.

Observational Value

Participants emphasised the critical importance of taking time to observe and reflect on young children's (available) physiological cues such as facial expressions, non-verbal or bodily communication as a foundation for supporting development. They expressed concern that such attuned observation is often overshadowed by practices that prioritise academic achievement, checklists, or milestone-driven assessments. This can result in adults overlooking the subtle but meaningful ways children communicate their thinking, emotions, and needs through their whole bodies.

Across workshop discussions, participants highlighted that young children embody their feelings and intentions, and that adults should intentionally attend to this embodied communication, especially facial expressions. They argued that although adults cannot see internal physiological responses such as heart rate, they can interpret outward indicators that are equally informative. As one participant noted, it *“needs to be clearer that despite not being able to see heart rate, facial expressions are important physiological data.”* These everyday cues offer essential insights into how children experience interactions and environments, and should therefore guide how adults respond.

Participants also recognised a gap in existing assessment tools, suggesting that current checks (such as the two-year-check) could be strengthened through prompts that help adults reflect more intentionally on children's emotional and physiological communication. One participant proposed that *"perhaps a questionnaire to accompany the ASQ or two-year-check probing this would be helpful,"* highlighting a desire for structures that prompt adults to notice what might otherwise be missed.

Together, these reflections emphasise the developmental value of attuned, relational observation. Participants argued that observation is not a bureaucratic task but a relational practice, an opportunity to understand the child's internal world and respond supportively. This reframing arguably positions observation as a key mechanism for emotionally responsive, equitable early childhood practice.

Simplifying Priorities

Participants emphasised the importance of refocusing priorities toward children's emotional wellbeing, joy, and natural cognitive engagement. They valued the research for highlighting that positive affect is not secondary but fundamental to learning, noting that *"happy children will learn more effectively."* This shift was seen as a corrective to everyday pressures that elevate less meaningful tasks over relational and affective experiences. Participants also connected this emphasis to wider concerns about mental health, suggesting that practices which intentionally foster positive emotional experiences for both children and adults should be treated as central rather than optional: *"In this day and age with mental health challenges, anything that can support a feel-good response in children and adults alike should be a priority."*

Optimal Conditions

Participants identified a set of conditions they believed were most influential in enabling smiles, laughter, and HOT to co-occur in interactions with two-year-olds. These conditions reflected two interconnected domains: Dispositional Attributions, relating to the internal states and orientations of adults and children, and Situational Attributions, relating to the external features of the interaction or environment. Participants stressed that these domains interact dynamically; for example, an adult's intentional use of humour or anticipation (a

situational strategy) may elicit a positive physiological or emotional shift in both the adult and child (a dispositional change), thereby enhancing the overall quality of the interaction.

<i>Dispositional Attributions</i>	<i>Situational Attributions</i>
Awareness, knowledge and confidence of the adult. Adult ‘tuning’ into their own visceral physiological response during interactions with two-year-olds. Mindset reprioritisation shifting the focus onto happiness/pleasure.	Adult ‘performing’ by providing increased suspense, anticipation, humour and memories into tasks. Adult providing playfulness and humour in various guises, including non-play tasks. Adult observing or documenting (via questionnaire/reflection) children embodied physiological responses to inform further practice. Providing increased exposure to environmental smiles and laughter. Providing environments and interactions that reflect and respond to children’s likes and preferences.

Table 13. Study 4 Conditions for HOT and Smiles and Laughter to Co-occur

Strategic Framing, Communicating and Disseminating

Participants conceptualised dissemination needs in two interconnected domains: traditional academic impact and applied influence, reflecting their awareness of the different audiences the research must reach and the differing demands of each context. They recognised the importance of academic rigour, the expectations placed on researchers to produce high-quality scholarly outputs, and the structural realities of research culture. At the same time, they were acutely aware of the practical constraints faced by families and frontline professionals, particularly those in contexts of deprivation, and emphasised that dissemination must “*meet people where they are.*” Together, the co-produced themes demonstrate that participants saw dissemination not as a single pathway but as a dual-strategy system: rigorous academic products serve as a foundation of credibility, while applied,

accessible formats ensure that the findings meaningfully influence real-world practice. Their reflections highlight a sophisticated understanding of both the structural expectations of research and the practical realities of families and frontline professionals reinforcing the need for dissemination that is both academically robust and socially responsive.

Traditional Academic Impact

Participants acknowledged the value of producing conventional academic outputs such as peer-reviewed articles, conference presentations, and books, as spaces where the methodological rigour underpinning the findings can be made explicit. They felt these outputs offered legitimacy, reassurance, and authority that could support the broader uptake of the research. Participants observed that high-quality academic dissemination often remains a central professional expectation for researchers, even when working within co-production designs. Participants also noted that these traditional formats can serve as a “bridge” to applied contexts, particularly through professional events or training opportunities where they would expect to encounter research of this kind: *“If this research was on the roster, I’d want to attend the event.”* Their reflections indicated an appreciation of both academic responsibilities and the field’s expectations, suggesting that the project successfully avoids the pitfall of separating co-produced insights from scholarly dissemination, enabling their own lived experiences as parents and education professionals to propose solutions within the constraints of the workshop and research culture.

Applied Influence

In parallel, participants emphasised that the research must be accessible to those working with, and caring for, two-year-olds in everyday contexts. They stressed the necessity of digital, multimedia, and low-effort formats that can reach busy parents and professionals effectively, especially those for whom academic language, lengthy texts, or formal events would be exclusionary or impractical. Suggestions included an online hub to house learning modules, newsletters, podcasts, infographics, and short videos, supported by an active social-media presence that could deliver “quick wins” and visual summaries. As one participant explained, *“Evidence-informed practice can only happen if it meets me where I am, and where I am right now is not reading lengthy difficult articles or expensive events.”*

Another highlighted the inequities tied to literacy demands: *“The families I work with are in areas of high deprivation and parents have reading ages of seven... it needs simple language and imagery.”* Participants widely endorsed the idea that social media, visual communication, and brief, engaging content would make the research equitable, approachable, and relevant to those who stand to benefit most.

Responsive Documentation

Some multi-media mock-up resources were therefore created by an illustrator to help make these suggestions a reality

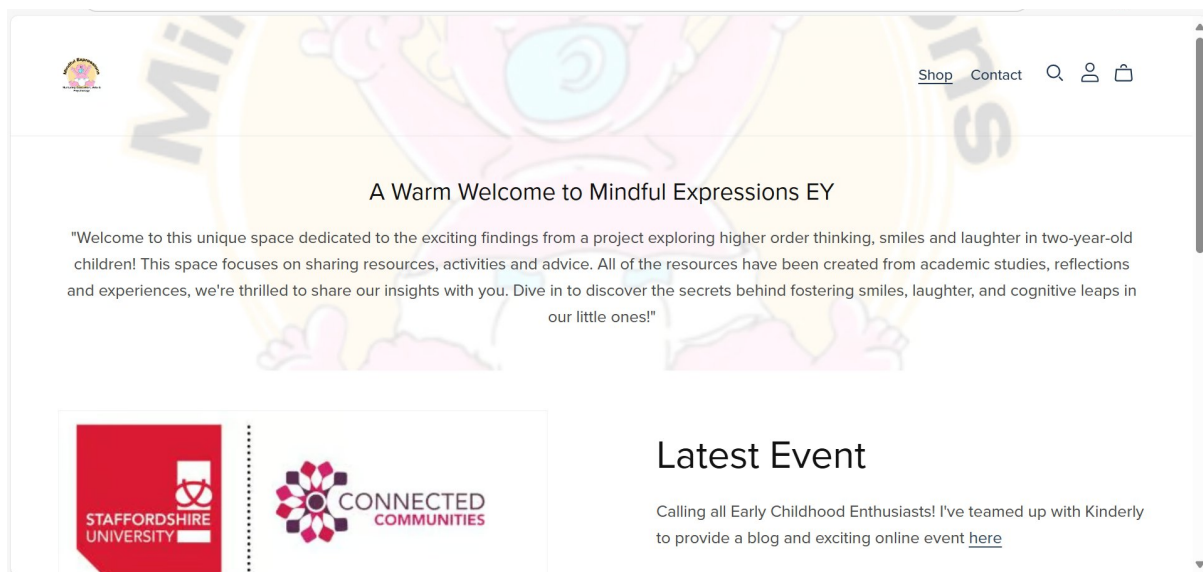


Fig 5. Study 4 Dissemination Website Prototype Page 1

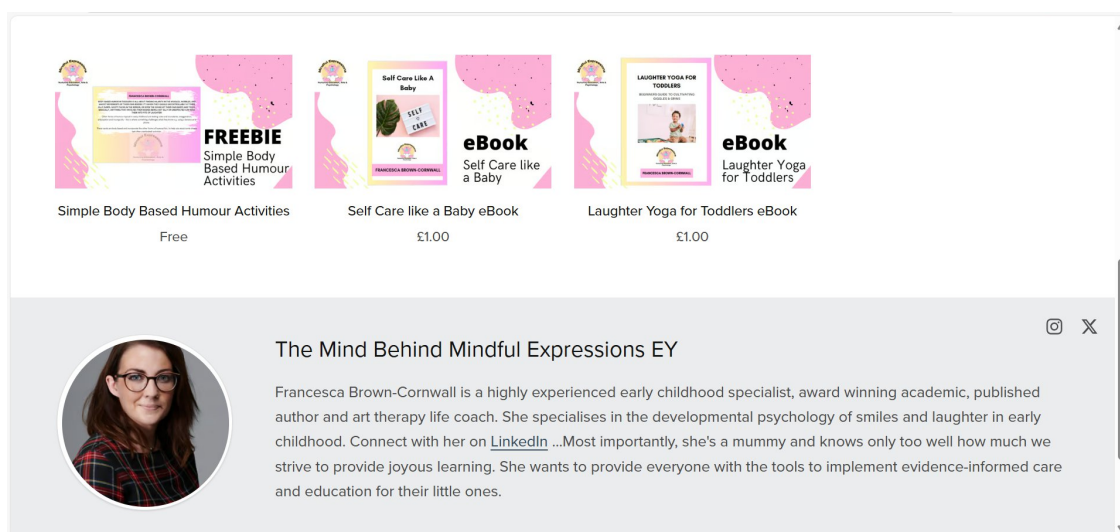


Fig 6. Study 4 Dissemination Website Prototype Page 2

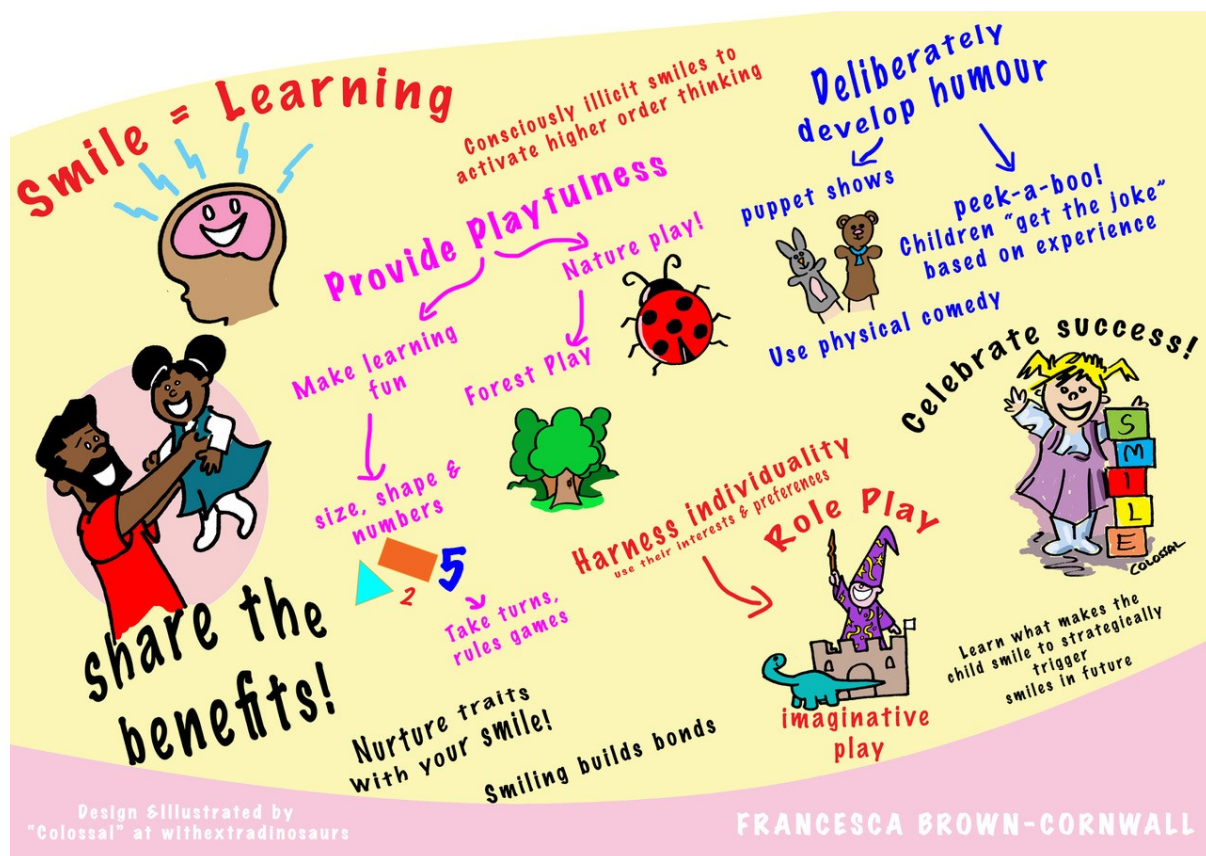


Fig. 7. Study 4. Co-Production Workshop Illustration

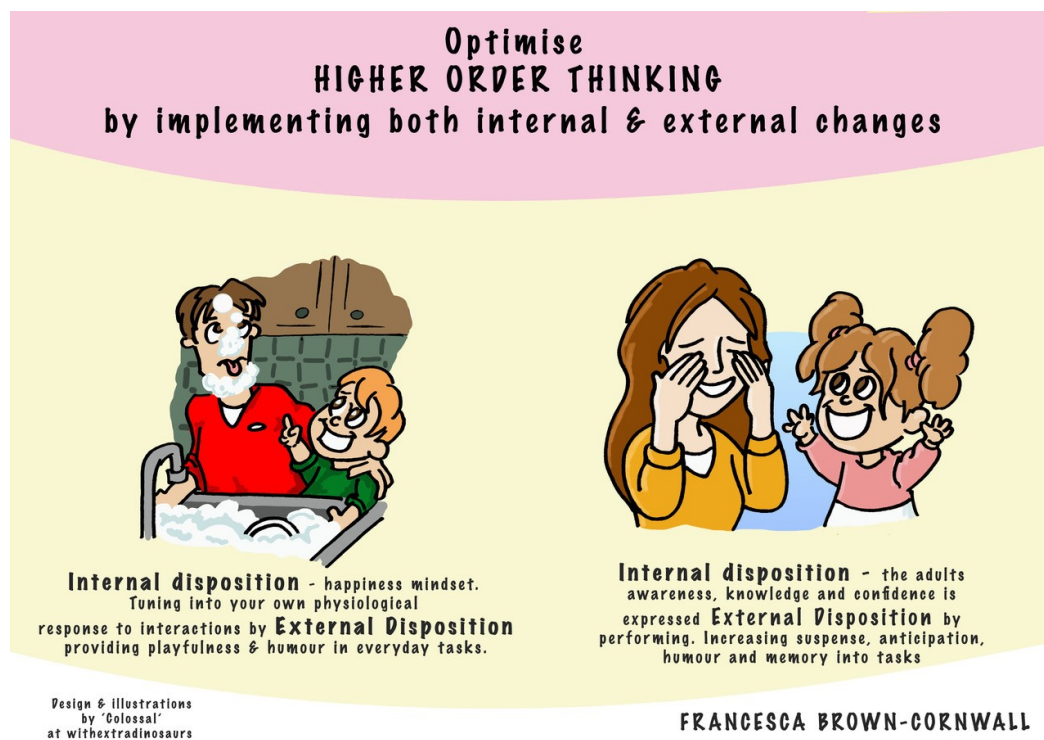


Fig. 8 Study 4 Illustration Dissemination Prototype

Although there was not time to redesign these with the insights from the participants, it was important to respond tangibly to their production ideas.

Optional Workshop Evaluation

Analysis of the post-session optional questionnaire data evaluating the experience quality of the co-production design revealed three overarching areas of feedback: the perceived difference the session made personally or professionally, the aspects of the session participants identified as highlights, and any suggested changes for improvement. Across all responses, participants' feedback was overwhelmingly positive and reflected engagement with the workshop content.

Perceived Personal and Professional Impact

Participants reported a range of personal and professional benefits arising from their involvement in the workshop. Several described enhanced critical and innovative thinking, with some noting that learning about the research prompted them to reflect differently on developmental interactions with their own two-year-old children. Others described gaining a deeper appreciation of the complexities of EC engagement, particularly in understanding children's physiological expressions of pleasure and the conditions that support higher-order thinking. Participants working in education or training contexts indicated that the session encouraged them to consider how the research could be disseminated to students and apprentices, thereby extending the potential impact of the findings. A number of attendees also described clear intentions to implement changes in practice, such as integrating "daily smile and laughter time" into routines or using newly acquired insights to support children more attunedly.

Workshop Highlights

Participants consistently highlighted the presentation of the research findings as among the most valuable aspects of the session. Many appreciated gaining insights into the emerging evidence base, including the conditions that facilitate pleasure and higher-order thinking in two-year-olds and the behavioural signs that indicate children's enjoyment and engagement.

Several participants emphasised the importance of interactive group discussion, noting that the opportunity to share thoughts with others deepened their understanding and enabled them to explore the implications of the research collaboratively. A notable theme in the feedback concerned the perceived passion and enthusiasm of the facilitator, which participants felt enhanced their engagement and motivation. Attendees also described the session as “inspiring” and emphasised their interest in seeing the finalised dissemination materials, which they believed could “drive change” and benefit the wider EC community.

Suggestions for Improvement

Across all responses, participants expressed a high level of satisfaction with the session, and no significant changes were suggested. Several explicitly stated that they would change “nothing” about the structure, content or facilitation of the workshop. One participant noted that attending in person enhanced their engagement, an endorsement of the relational nature of the co-production process rather than a critique of the session design. The consistency of these responses suggests that the workshop was experienced as well-paced, accessible and meaningful in its co-production format.

7.4.6 Discussion

The first objective to ascertain the physical responses that suggest pleasure has occurred during activities was met through participants’ detailed accounts of the whole-bodied indicators they routinely observe in two-year-old children. These included physiological and expressive cues. Participants emphasised that although internal physiological responses such as heart rate are not directly visible, external manifestations, including facial expressions, serve as powerful accessible and reliable alternatives for evidencing pleasure and development. This reinforced the importance of attuned, relational observation as a core professional skill in EC practice as upon reflection, the physical responses are often very clear to adults, but the adult response is not commensurate.

The second objective, to discover the conditions required for HOT and pleasure to occur concurrently, was also covered. Participants articulated two clear, interrelated sets of optimal conditions through which thinking and smiling could co-occur. These conditions reflected both dispositional attributions, relating to the mindset, attunement and emotional stance of the adult and the child, and situational attributions, relating to features of the interaction or environment. Dispositional elements included the adult's awareness, confidence, attunement to their own physiological responses, and a deliberate reprioritisation of joy as a pedagogical focus. Situational elements included the intentional use of suspense, humour, anticipation, playfulness and the crafting of environments rich in opportunities for smiles, laughter and spontaneous problem-solving. Participants noted that these conditions can be established with relative ease and minimal cost, yet emphasised the need for increased awareness raising to ensure they are consistently recognised, adopted and embedded in everyday practice.

The third objective, to determine, through multimodal co-production dialogue, which elements of the findings were most significant for EC services and service users, and to ensure dissemination reflected their values and lived experiences, was also met. Participants identified the priority messages for families and professionals, shaped the visual and narrative framing of the research outputs, and co-produced dissemination pathways suited to both academic and applied contexts. Their contributions informed the development of prototype creative outputs, including illustrations and a website, ensuring that dissemination was grounded in their expressed needs, preferences and realities.

This study provides an example of how co-production can be mobilised to generate practice relevant knowledge and tangible creative outputs, including illustrations and a prototype website, which reflect the lived realities and priorities of participants. This orientation aligns closely with the praxeological tradition in EC research, which emphasises the integration of ethical reflection, collaborative action and situated knowledge construction (Pascal & Bertram, 2012; 2018). The production of an illustration directly inspired by the co-production workshop is a clear example of the praxeological commitment to grounding outputs in participants' experience, and to valuing artefacts as both communicative and analytical tools.

The study also responds to long-standing concerns about conceptual ambiguity within co-production literature. Previous reviews highlight the inconsistent and interchangeable use of terms such as co-production, co-design, participatory design, co-creation and collaborative design, each of which may obscure underlying methodological differences (Munce et al.,

2023; Masterson & Laidlaw, 2024). The approach taken here aligns with recent efforts to clarify process details of co-production. Stavholm et al. (2024) state this design of research encompasses diverse participatory design methodologies, unified by the pursuit of mutual knowledge generation using creative, contextually meaningful exercises. These features were central to this study, where a combination of tactile and digital methods enabled the surfacing of participant knowledge.

Analytically, the study reflects Masterson and Laidlaw (2024) identification of six core mechanisms underpinning meaningful co-production: intention, assets, dialogue, documentation, interpretation and understanding. These mechanisms describe how meaning-making emerges through iterative, reciprocal dialogue and shared clarification rather than through researcher-driven post-hoc analysis (Masterson & Laidlaw, 2024). In this study, the workshops themselves served as sites of collective analytic work. The researcher's role following the workshops therefore focused less on generating new themes and more on unifying, consolidating and validating the interpretations that participants had already developed. This approach is compatible with reflexive thematic analysis (Braun & Clarke, 2019; 2021), which emphasises flexible, interpretive meaning-making and rejects the idea that themes simply “emerge” without researcher intentionality and reflexive awareness (Braun & Clarke, 2019).

The study also aligns with contemporary principles for EC co-production. Hadley et al. (2024) propose that effective co-production in EC requires attention to inclusion, accessibility, strengths-based communication, contextual authenticity and dialogic mechanisms. Although these principles can be resource-intensive, they remain crucial for ensuring meaningful engagement and representation (Hadley et al., 2024). Pascal and Bertram (2023) argue that EC researchers have a responsibility to amplify practitioner and family voices through participatory and praxeological methods, particularly where policy structures do not readily support such collaboration. This study contributes to that idea by involving both parents and professionals in the development of priorities and outputs, and by producing dissemination materials that reflect their values.

Time constraints prevented the establishment of a sustained community of practice, yet the level of engagement demonstrated an appetite for continued collective learning. Communities of practice require recurring interaction, shared professional purpose and opportunities for iterative knowledge construction (Platteel et al., 2010; Pyrko et al., 2017; Prins et al., 2025).

Hendry et al. (2025) similarly highlight that realistic expectations regarding time, budget, and the limits of idea implementation must be made explicit in co-production research. Although the timeframe limited ongoing collaboration, the study nonetheless demonstrated that meaningful co-production can take place within practical constraints when the scope, freedoms and limitations are clearly communicated, as recommended by Masterson et al. (2022; 2026) and Kjellstrom et al. (2024).

Importantly, participants articulated a sophisticated understanding of dissemination needs, distinguishing between the value of traditional academic impact and applied, accessible influence. This distinction mirrors empirical findings from Nordin et al.'s (2023) systematic review, which suggests that co-production outcomes must be communicated across multiple modes to address differences in audience need and accessibility (Nordin et al., 2023).

Participants affirmed that while academic outputs provide rigour and legitimacy, applied media, such as illustrations, accessible web content and short videos, are essential for reaching families and practitioners, especially those facing time, literacy or resource constraints. This dual emphasis aligns with broader knowledge-translation literature emphasising visual and creative dissemination as vital for equitable impact (Mannay, 2016).

7.4.7 Conclusion and Recommendations

The findings of this study have several implications for practice, research and dissemination. First, the development of multimodal, visual and practice-ready materials should be prioritised as a means of supporting busy practitioners and families. Visual and creative methods, which lower barriers to engagement and enhance accessibility, offer a particularly promising route for EC dissemination. The illustration and prototype website produced during this project provide a strong foundation for future expansion into a more comprehensive digital resource hub housing micro-modules, newsletters, podcasts, short videos and visual summaries.

Second, the analytic approach adopted here wherein participants generated themes through workshop dialogue which was subsequently unified, offers a valuable model for future co-production studies. The explicit use of Masterson and Laidlaw (2024) mechanisms (intention, assets, dialogue, documentation, interpretation, understanding) may help researchers articulate their co-production processes with greater transparency. Similarly,

aligning analytic reporting with reflexive thematic analysis could support methodological clarity and strengthen scholarly credibility of co-production designs.

Finally, the appetite for sustained engagement suggests future work could aim to develop a community of practice centred on relational joy, attunement and HOT with two-year-olds. Although this study's timeframe did not allow for such a structure, the literature indicates that communities of practice can support collaborative knowledge construction, shared professional reflection and long-term improvement when time and resources permit.

Future research should build upon the dual dissemination strategy highlighted by participants. Traditional academic dissemination via journal articles, conference papers and book chapters remains essential for demonstrating methodological rigour, framing the work within established scholarly debates and supporting professional legitimacy. However, applied dissemination routes are equally important for ensuring equitable access to findings. Given participants' concerns about literacy barriers, time constraints and socioeconomic deprivation, future dissemination efforts must ensure materials are simple, visual, low-burden and available through digital platforms and social media. This aligns with broader research calling for co-production to reach under-represented and marginalised groups more effectively (Vicat-Blanc et al., 2025; Armitt et al., 2024).

The study provides evidence that co-production can be methodologically transparent and practically impactful when dialogic mechanisms, creative materials and iterative analytic processes are prioritised. It contributes to the emerging field of EC co-production by demonstrating what is possible within tight constraints and by laying the groundwork for scalable creative dissemination that meaningfully connects research with the communities it seeks to serve. Participants confirmed the key behavioural indicators of expressed higher order thinking and pleasure, defined the optimal dispositional and situational conditions for the co-occurrence, and actively shaped the interpretation and dissemination of findings. As a result, the project offers ideas that can be meaningfully integrated in the everyday lives of two-year-olds, and be shared in ways that are accessible, equitable and resonate with those who use it.

7.5 Experiential and Legitimacy Phase Summary

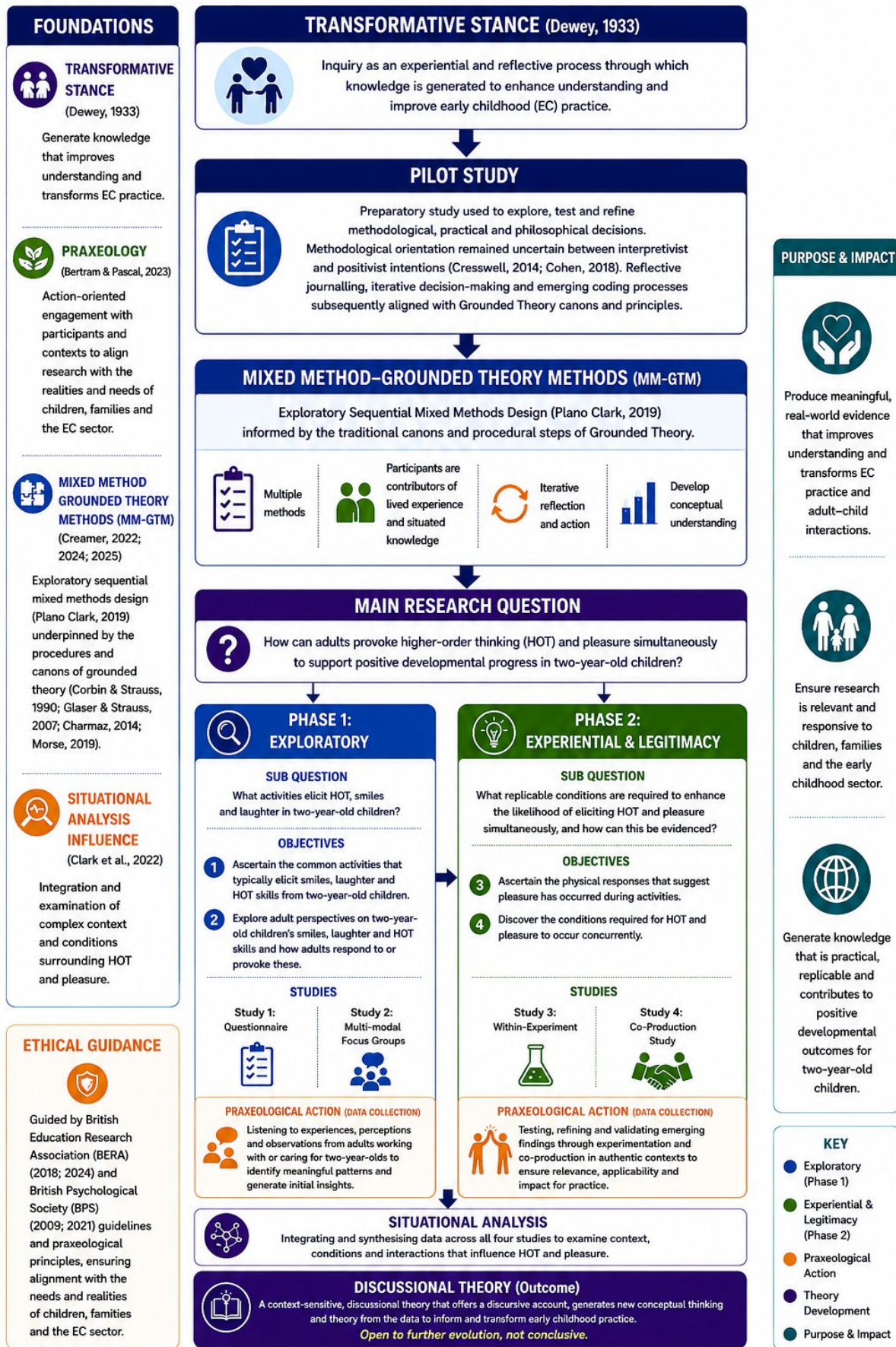
The Experiential and Legitimacy Phase created space to apply and refine the concepts generated during the Exploratory Phase, shifting the research from initial theorisation to practical validation, a process that Carr-Fanning and Rihtman (2025) found can adapt the evidence base for use in context while combining insider expertise with academic rigour. This has enabled emerging ideas to be experienced first-hand, examined through experimental methods, and legitimised through co-production with an invested audience, something which Christodoulou (2025) highlights is important during MM-GTM to move on from exploring, to ‘explaining’.

Headlines from study three and four include analysis indicating significant differences in smiling and laughing intensity between conditions (neutral and overt (joyful)). Study three also revealed that children outperformed parental expectations in their HOT, and that children’s physiological response are unlikely to remain unchanged during such interactions with 42% of participants showing a reduced heart rate, 5% remaining the same, and 53% accelerated. In addition, the discovered ‘situational and dispositional’ findings relevant to optimal conditions eliciting HOT and smiles and laughter that were identified during study three and were discussed and validated in study four, during which signified an appetite for both traditional and applied methods of dissemination of the findings to influence the EC sector and families. Collectively, the studies in this phase demonstrate the plausibility, applicability and the perceived value of developing a discussional theory to answer the research questions and to provide guidance for adults facilitating HOT and the smile and laughter response in two-year-olds. These insights serve as a bridge to the overall analysis chapter, where findings from both phases are drawn together to present a coherent and practice relevant discussional theory to answer the research questions.

Chapter 8 - Analytical Discussion

The research intends to generate a discussional theory via the influence of Situational Analysis to unify the inquiry (Glaser & Strauss, 2007; Morse, 2019; Clark et al., 2022) that meaningfully responds to the research question, aims, and objectives, but does not claim to be conclusive, rather, open to further evolution. A discussional theory therefore represents a form of theory development that moves beyond description of findings by providing a discursive account generating new conceptual thinking and theory from the data.

The research questions, sub questions, objectives and corresponding studies are summarised below in fig. 1



Abbreviations: HOT = Higher-Order Thinking; EC = Early Childhood

Fig. 1 Research Structure and Design Infographic

This research took an interpretivist and transformative stance (Cresswell, 2014; Cohen 2018; Mertens, 2015) to design research via an exploratory sequential mixed methods approach (Plano Clark, 2019) via MM-GTM (Creamer, 2022, 2024, 2025), underpinned by the traditional canons and procedural steps of grounded theory (Corbin & Strauss, 1990; Glaser & Strauss, 2007; Charmaz, 2014; Morse, 2019). The design has been structured across two interconnected phases; ‘Exploratory’ and ‘Experiential and Legitimacy’ (Dewey, 1933; Pugh, 2011), each comprising of two studies, sequentially progressing that contribute to a unified inquiry. Therefore, this chapter outlines the analytical process used to integrate the four studies into a cohesive whole, drawing on grounded theory approaches influenced by Glaser and Strauss (2007), Clarke et al. (2022), and Creamer (2025).

Ethically, the research has been guided by BERA (2018, 2024) and BPS (2009, 2021) guidelines and praxeological principles, ensuring alignment with the needs and realities of children, families, and EC sector (Bertram & Pascal, 2023). Therefore, this chapter shows how a discussional theory was iteratively constructed to generate practice based insights that are meaningful for the intended audience of the EC sector (Lincoln & Guba, 1985; Lambert, 2019) thus, the analytical response to the aims and objectives of this research is not merely summarising findings, but provides an ‘alive’ and active contribution avoiding the shortcomings of research that claims to use grounded theory but fails to generate a theory after data collection (Morse et al., 2021; Stough & Lee, 2021).

Thus, grounded theory principles have been applied flexibly, not rigidly (Charmaz, 2014; Morse, 2019; Stough & Lee, 2021), with attention to legitimacy, confirmability, and practical relevance. This chapter details the procedure for developing the responding discussional theory influenced by the steps of situational analysis (Clarke et al., 2022) for theoretical integration and generation. This theory is presented as a plausible and meaningful response to the research aims and objectives, with links and contributions to both literature and practice made evident. This chapter also reflects on the research journey drawing the studies together, addressing issues of generalisability, comparability, analytical complexity, and challenges of multi-study integration (Clark, 2005; Teddlie & Tashakkori, 2009; Charmaz, 2014; Mertens, 2015; Durdella, 2019; Plano Clark, 2019).

8.1 Analytical Process Unifying the Research via the Influence of Situational Analysis

Grounded theory is not a step-by-step road map to follow (Charmaz, 2014, Morse et al., 2021) thus, researchers must adopt the canons, principles or traditions of grounded theory with curiosity, and remain responsive to the research context, just as grounded theory methods were proposed for (Glaser & Straus, Morse et al., 2021). Straussian Grounded Theory is influenced by Dewey's reflective theory through its view of the individual as a reflective 'actor', where thinking and action are inseparable and continuously shaped by personal and contextual conditions (Corbin, 2021). As circumstances evolve, actions are adjusted accordingly, with reflection on consequences guiding further decision making which emphasises an ongoing, responsive process of inquiry and adaptation (Dewey, 1933; Glaser & Straus, 2007; Corbin, 2021). Therefore, when conducting research using grounded theory canons or principles (Corbin & Strauss, 1990; Glaser & Strauss, 2007) analytical approaches should be chosen that are best suited to the participants, data type, time and place. The process most suited to this research was to separately and sequentially analyse each individual study using approaches best suited to that data set, the participants and intentions of the studies aims, objectives and phase of the larger research. Each study could be written up to inform the following study which provided the recommended respite in between as suggested by Glaser and Strauss (2007) enabling the Dewey (1933) reflective cycle to be benefited from in a sequential manner suited to the MM-GTM design (Plano Clark, 2019, Creamer, 2025). The details of individual study analytical processes and findings can be found in their corresponding chapters.

To draw the studies together and unite the research, each study and its data sets were revisited. Revisiting the data directly means the discussional theory emerges from raw data through systematic analysis and is intended to plausibly explain aspects of HOT, smiles and laughter in two-year-old children and not just present the individual analytical interpretations of the studies (Glaser & Strauss, 1967, 2007). MM-GTM is data driven, therefore, the discussional theory must be as close to the data as possible (Creamer, 2025). Following canons or principles of grounded theory means the discussional theory must emerge through coding, constant comparison, memo/reflective journal writing, and theoretical coding and integration which are all grounded in data evidence (Glaser & Strauss, 1967; Birks & Mills, 2015). This process helps to ensure that the discussional theory is not speculative, but evidence based, conceptually rich with signs of saturation and integrated with clear

relationships between theoretical and practical perspectives (Glaser & Straus, 1967,2007; Charmaz, 2014; Morse et al., 2021). For this to carefully occur, the steps taken meant that each written up study was re-read, each of the studies reflective journals were reviewed, and crucially, the raw data of each study was revisited i.e. questionnaire (study one), multi-modal focus groups (study two), videos, screen records, physiological data (study three) and transcripts (study four).

When data from multiple studies are analysed together, patterns across contexts or underlying processes may surface that were not visible within each individual study (Plano Clark, 2019). Reengaging with multiple studies after their completion enables theoretical coding which requires constant comparison, complementary to the sequential comparison which has already occurred (Plano Clark, 2019; Creamer, 2025). Spending time comparing codes and concepts across the full data set, not only across summarised findings and analysis sections of individual studies, provides depth to the analytical process due to sustained engagement with the data (Charmaz, 2014). Personally, this stage became not only an intellectual exercise but a moment of contemplative engagement, marked by a sense of gratitude for adult participants openness and reciprocity of the emotions expressed by children. Although this was felt as a natural and involuntary response to the data, it is arguably methodologically and contextually appropriate, described in some literature as a valid and insightful response, helping researchers connect with underlying meanings, refine categories, and remain grounded in lived experience (Charmaz, 2014; Clarke et al., 2022). Charmaz (2014) describes this experience as a sense of ‘awe and wonder’, where researchers may experience an emotional resonance with the data and a recognition of the privilege inherent in research.

Whilst situated in this contemplative state, initially, in vivo coding was taken, moving to a more focused and axial coding process. It was important during axial coding to ask, ‘what is the data doing?’ and to use action/reflective phrases or verbs rather than theme titles in keeping with theory generation (Glaser & Strauss, 2007; Charmaz, 2014; Clarke et al., 2022). Reflections were noted through the coding process to help tracing links and ideas, enabling constant comparison. The comparison could occur within a data type (e.g. one child’s video comparative to another), across data types (e.g. multi-modal data units) and against emerging categories (e.g. shared or contrasting ideas). This was particularly useful for the quantitative data as it could then be recontextualised within the emerging discussional theory (Creamer, 2025).

The results of this coding and comparative reflection could then evolve into theoretical coding and integration. The theoretical coding was ‘messy’ and therefore was influenced by situational analysis to help visualise and better understand connections and gaps Clark et al., (2022). Situational analysis has been described as valuable for social science subjects which are interdisciplinary, such as this research (Clarke et al., 2022). Situational analysis was benefited from due to its alignment with Straussian Grounded Theory, particularly through social worlds/arenas mapping (Glaser & Strauss 2007; Clarke et al. 2022). Similarly, another reason why situational analysis was utilised was due to Dewey’s (1933) influence on the methods development, owing to the focus on personal experience and reflective thought, valuing prior knowledge, which resonated with the research’s stance and research design (Dewey, 1933; Clarke et al., 2022). Situational analysis has been used successfully with other published MM-GTM multi-studies to unify inquiry (Frieze, 2022) especially helpful for interpretivist stances. Situational analysis encourages detailed note taking to explore positionality, experiences, and commitments, as well as their influence on data interpretation (Clarke et al., 2022). The analytical process involves iterative development of situational, social worlds/arenas, positional, and relational maps, each accompanied by memo writing to deepen understanding (Clarke, 2005; Clarke et al., 2022). Making sense and producing the narrative from these ‘messy maps’ results in a situated, dialogic, and evolving discussional theory rather than a fixed endpoint (Charmaz, 2014; Morse et al., 2021), allowing for a transparent, plausible account, albeit one that others may view differently, to respond to the research aims and objectives (Glaser & Strauss, 2007).

The initial abstract situational messy map (fig.9) was handwritten, with points added in complement to previously coded, word-processed data from each individual study. These existing codes were not rewritten by hand but viewed alongside the map digitally. Sensibly as this initial messy map was both digital and physical, instead of using lines to create a traditional relational map, colours (different pens or digital highlighters) were used to indicate possible relationships; thus, a separate relational map is not included.

briefly) Physiological/Neurobiological processes and expressions of adults and children	routines) Pets/animals EC Development Assessment Systems or Curricula Professional Reflective Prompts and Tools Physical and social spaces children frequent (nursery rooms, home) Digital environments Willingness to perform and create
<i>Collective Human Elements/Actors</i>	<i>Implicated/Silent Actors/Actants</i>
EC Professional Sector (Local Authority, Private, Voluntary, Charity and Independent) EC Researchers and Trainers National/International EC Organisations (ECSDN, EECERA etc.) Families (Parents/Guardians/Carers and siblings/extended members) Multidisciplinary Family Services Policy Makers and Government	Blending cognition and emotion: Rarely conceptually linked or seen as intertwined, emotion and cognition are often perceived in parallel. Change to thinking and smiling as a co-productive phenomenon. Smiling is not assessed in developmental outcomes. Laughter is rarely measured or documented. No affective aspect of EC curricula or frameworks. Lack of pedagogical practice guidance with joy (eudaimonia) at the centre Lack of reflective tools that include co-eliciting smiles, laughter and HOT (emotion and cognition too commonly separated) Limited training on smiles and laughter or affective cognition A palpable hope for practical change,

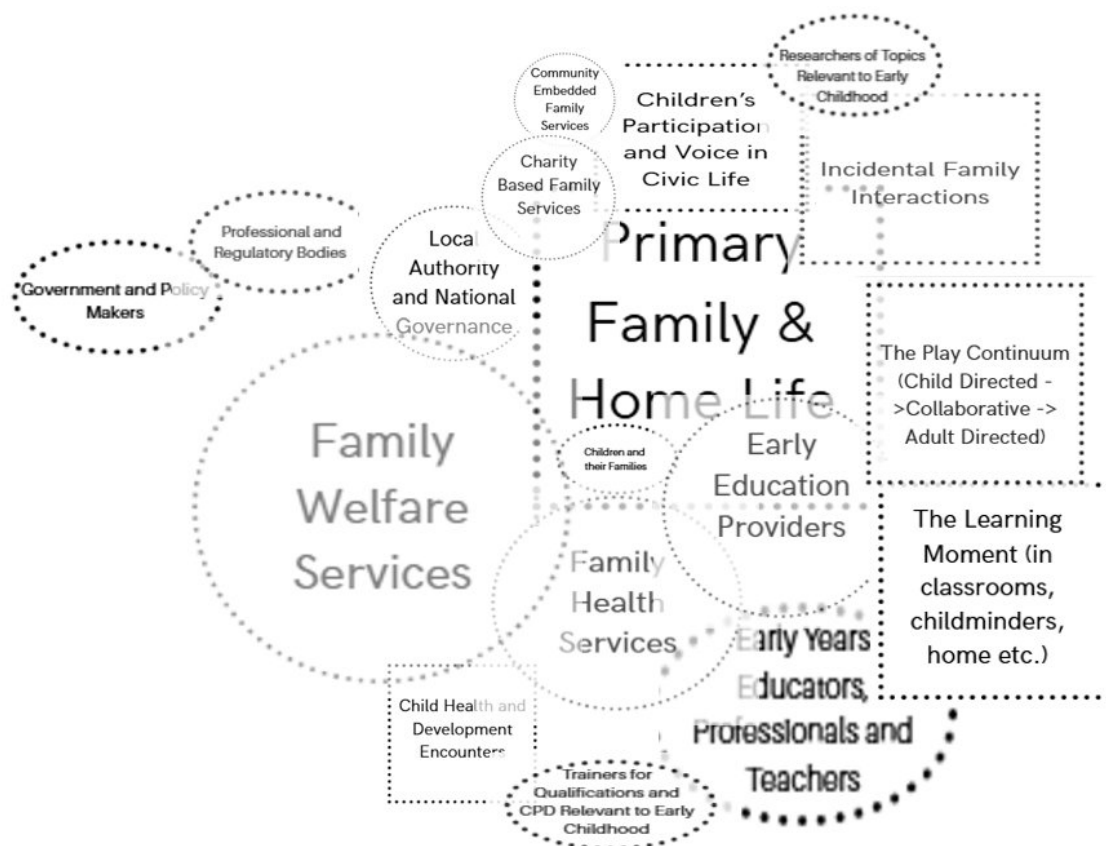
	urgency around ‘feel good’ priorities and methods
<i>Discursive Constructions of Individual and/or Collective Human Actors</i>	<i>Discursive Construction of Nonhuman Actants</i>
Construction of/Performance of a ‘Smile Expert’ (everyone can be one) Relational attunement prerequisite for emotion-cognition responsive practice Dispositional Awareness	Joy as a strategic pedagogical tool (daily reflective prompts) Humour as a tool of inquiry Semiotic data: smiles and laughter as evidence (cortical limbic system in action) most immediate and observable physiological marker
<i>Political/Economic Elements</i>	<i>Sociocultural/Symbolic Elements</i>
Disrupting ‘Adult Agendas’ - EC Services and Early Years Education politicised causing bureaucratic pull of curriculum, targets, or managerialism, yet the real work is smiling, laughing, playing and connecting.	Practice co-eliciting HOT smiles and laughter are equitable, cost-effective, universal, low resource. Appreciating the power of a smile and ‘Universality of smiles and laughter’ Implementing low barrier and high impact actions that invite deeper emotional/cognitive engagement. Using the language of smiles and laughter, transcending verbal language (not peripheral or incidental, but a primary indicator of engagement, connection & cognitive resonance).
Temporal Elements	Spatial Elements
Appreciating the age of Two being a	Acknowledging the postcode lottery of EC Service provision funding, quality and

critical/sensitive period of development. Understanding emotional thinking is the context of all learning at two-years-old. Emotion central to cognition and cortical limbic system.	qualifications/training of staff and marginalized families. Noticing the ‘learning moment’s shared space
Major Issues/Debates (Usually Contested)	Related Discourses (Historical, Narrative, and/or Visual)
Questioning the ambiguity of smiles and laughter as data, yet cognitive development is seen as measurable and observable. Responding to HOT researched as executive functioning performance or linguistic rather than embodied in EC. Questioning professional identity and purpose: EC Services professionalism of the workforce, school readiness, school-based services, good levels of development’ Prioritising joy and the emotional wellbeing and mental wellness of adults and children	Making knowledge radically accessible: Moral imperative to share knowledge widely versus the structural realities of academia creating inequity in access to knowledge. Preferred transformative modalities for dissemination of this work – if research is about life, it must live in the world! Professionalism and playfulness, infantilising a subject. Question Why expertise is formal not emotional. Learning as cognitive versus emotional and affective Becoming more childlike versus being an adult: Being more like the child, not just <i>for</i> the child
Other Kinds of Elements Quantitatively measuring embodied response, tracking affective reactions, observing physiological markers and expressions	

Table 14. Situational Analysis Step 2. Ordered Situational Map

This then evolved into an abstract social world/arena map (fig 10) to convey the broader situation of expressions of HOT and smiles and laughter in two-year-old children within EC. Usefully, fig 10. identifies the complexity of a child’s world whereby HOT and the smile and

laughter response can reside within or be influenced by the actors/actants identified in the ordered situational map (table 14). The map key explains what has been interpreted as the arena, social world and organisation, the dotted lines indicate the unfixed and porous nature of how these could be related. Clarke (2022) states the dotted lines are important on these maps as we cannot fix or assume directionalities of influence, boundaries or the many possibilities of how elements can connect in these worlds. Praxeologically this helps to represent the participants ecospheres (Pascal & Bertram, 2023) without imposing or forcing relationships.



Key

Arena (broad fields where social interaction occurs)	Social World (groups with shared commitments, practices, or discourses)	Organisations (named or typified institutions or bodies)
Primary Family and Home Life	Early Years Educators, Professionals and Teachers	Family Health Services
The Play Continuum (Child Directed -> Collaborative -> Adult Directed)	Researchers of Topics Relevant to Early Childhood	Family Welfare Services
The Learning Moment (in classrooms, childminders, home etc.)	Trainers for Qualifications and CPD Relevant to Early Childhood	Community Embedded Family Services
Child Health and Development Encounters	Professional and Regulatory Bodies	Early Education Providers
Children's Participation and Voice in Civic Life	Children and their Families	Local Authority and National Governance
Incidental Family Interactions	Government and Policy Makers	Charity Based Family Services

Fig 10. Situational Analysis Step 3. Social World/Arena Map

Finally, an abstract positional map was developed to share the range of key factors that exist and how they could relate to and affect each other on an axis of influence on practice associated with HOT and the smile and laughter response in two-year-old children. The abstract nature of this represents the uniqueness of individual children allowing for a multiplicity of positions to be imagined and therefore the positions shown in fig 11. are to be perceived as transient and changeable.

SA Positional Map Template

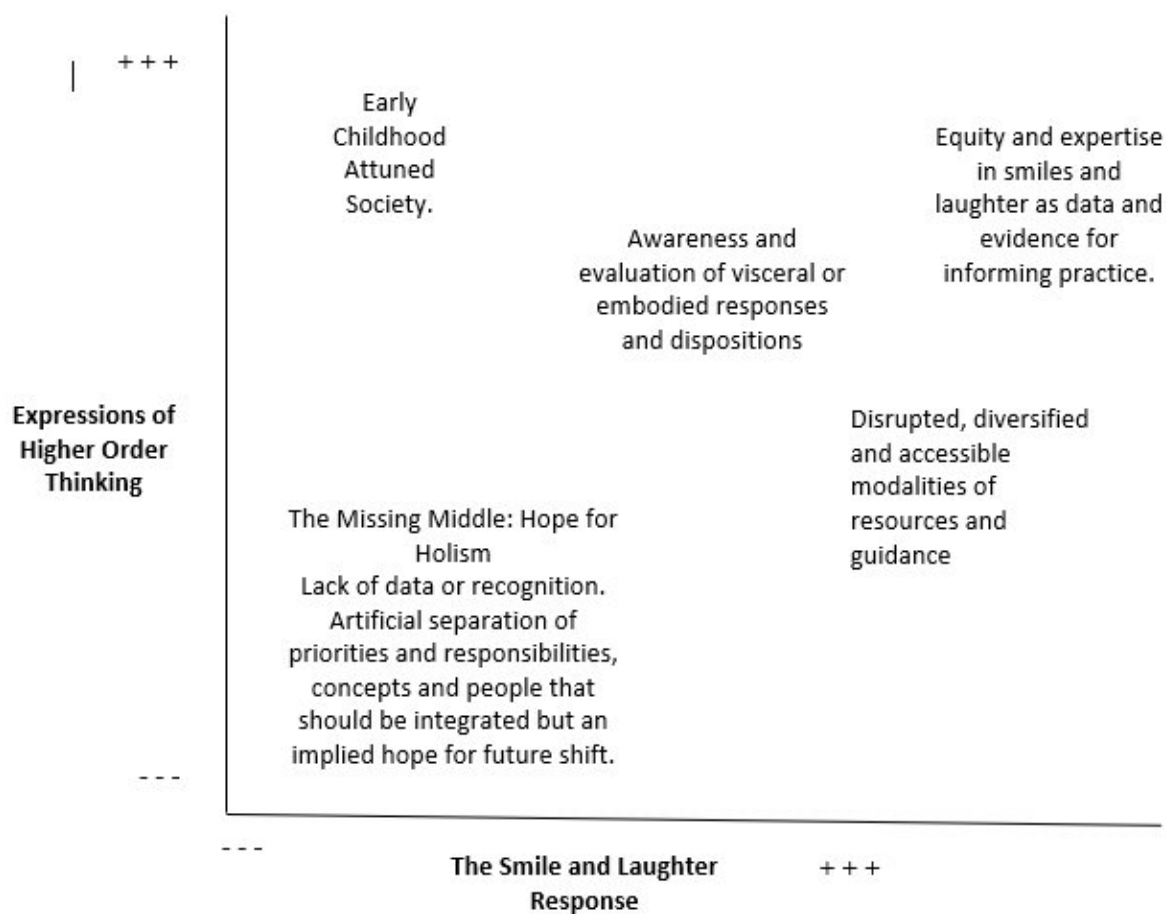


Fig. 11 Situational Analysis Positional Map

These maps coupled with this explanatory narrative of the process intends to exceed proposing a linear or predictive theory based on summarising the findings of the studies (Glaser & Strauss, 2007). The Ordered Situational Map lays out the human, nonhuman, discursive and material aspects of the situation of HOT and the smile and laughter response

in two-year-old children. The Social Worlds/Arena Maps lays out the collective actors and the arenas they act within. The Positional Map shows transient discursive issues and the potential level of influence. The intention of these maps is to explain instrumental aspects pertaining to activities and conditions relevant to eliciting expressions of HOT and the smiles and laughter response in two-year-old children. Opting to produce a discussional theory via this process provides a theoretical perspective for understanding and discussing HOT and the smile and laughter response in two-year-old children in practical and applied contexts, rather than mere explanation of what was found in the four studies (Corbin & Strauss 2015).

8.2 Proposing the Discussional Theory

The following section outlines a working discussional theory that has been developed through the aforementioned process. This theory is expected to evolve through future empirical and conceptual refinement beyond this thesis, this proposed theory serves as a foundation for ongoing development within the EC sector. The discussional theory is shared as an original contribution, with later sections of this chapter relating the theory to existing literature, justifying the relevance to the research aims, objectives, questions and practice.

The discussional theory this thesis proposes is the ‘Expressive Embodiment of Affective Cognition’ theory (EEoAC).

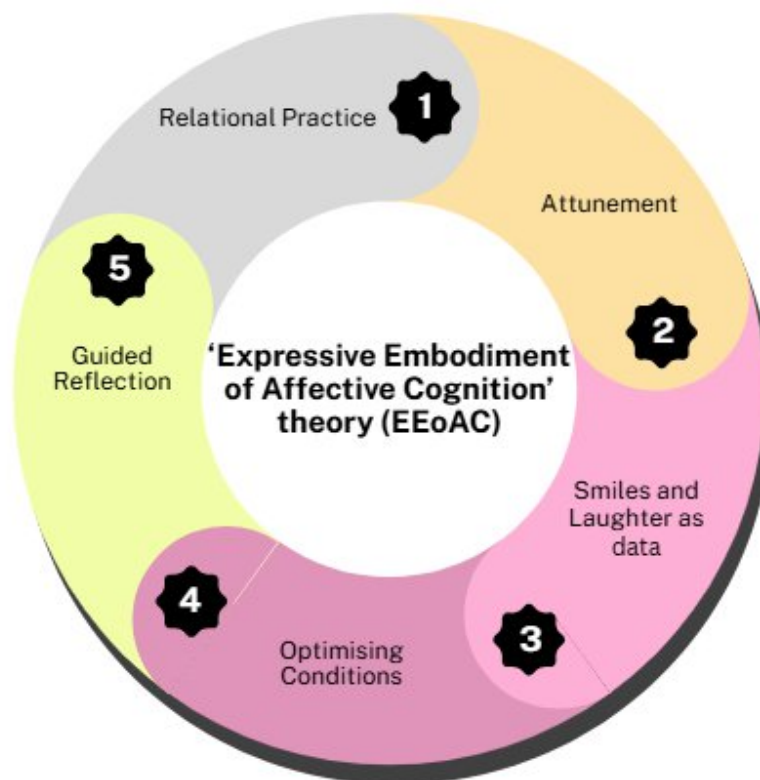


Fig. 12 Proposing ‘Expressive Embodiment of Affective Cognition’ theory

EEoAC theory proposes that at two-years-old, HOT and the smile and laughter response are not separate domains, but part of an embodied, socio-affective system that can be harnessed to elicit development, such as HOT and pleasure concurrently. EEoAC theory positions cognition as not distant from the body rather as co-constitutive, emphasising that in early development, expressions of emotions and thinking are not isolated but develop as one intertwined system of knowing, sensing, and relating, with EEoAC being enacted and co-created in context with other actants in conditions which can be optimised bespoke for the benefit of individual development. EEoAC suggests that the body is not just a vessel carrying emotions and thinking but *is* the knowledge and emotion working together, therefore, EEoAC is enhanced through sensorial experiences, attuned emotional exchanges, and curated social interactions. Practically, it is proposed EEoAC can be observed to help with understanding the development of the child and determine future support for them, this is achieved via tuning into children’s body language, gestures, facial expressions, affective shifts, and expressive play and seeing them as meaningful as any verbalisation. Furthermore, observable physiological signs such as smiles and laughter can be used as evidence to inform practice

which can be systematically enhanced with careful guided reflection homing in on EEoAC rather than curricula milestones or other competing responsibilities. It is proposed that adult practice associated with EEoAC need not be expensive, resource intensive or complicated, but arguably does require some assistance in raising awareness and interrupting responsibilities via shareable, accessible and multi-modal adult resources that explain what EEoAC is, and the steps to be taken to implement EEoAC based provision.

EEoAC serves to potentially challenge conventional separations between emotion and cognition in EC development practices, assessment and monitoring tools and environments by contributing a practice-oriented lens to articulate how emotion and cognition co-develop through embodiment during everyday interactions which any adult, no matter how brief the interaction, can maximise upon with curation of social experiences and guided reflection. EEoAC provides EC services with an evidence based rationale for pedagogies that prioritise concepts such as joy and happiness, disrupting competing responsibilities such as curricula milestones.

Key cyclical implementable practices according to EEoAC theory follow five steps;

- Relational Practice
- Attunement
- Smiles and Laughter as Data
- Optimising Conditions
- Guided Reflection

Relational Practice

Relational practice refers to the intentional building of trust, connection, and emotional safety between the adult and the child (and the situation of their interaction) as relationships are not the backdrop to development, but a pre-requisite. It involves being consistently present, responsive, and emotionally available to children cognisant of wider societal influencers. Familiarity enables more accurate, intricate knowledge of the child and their preferences/background and can build a strong connection. Relational practice is built via active listening with children (especially through non-verbal cues and appropriate physical touch), via routine rituals of connection (like greeting routines or shared laughter). This relational practice facilitates better reading of limbic/physiological signals (attunement) and supports a child's agency and expression as it builds trust. Relational practice encourages professionals in the EC sector to consider more their relations than policy or curricula might

ask of them, it moves from legal duty of care into attentive relationality. Current challenges mean that adults sometimes conflate relational practice with being caring, for example doing everyday routines (feeding, toileting, settling) however, deep relational practice involves intentional, skilled use of interactions to build trust, co-regulate emotions, scaffold identity, and support learning. It is important to avoid framing relational practice as ‘just what good practitioners do naturally,’ as this risks rendering the specific skills involved invisible and diminishing what does and doesn’t denote a high quality relation. Without a deeper appreciation of relational work, the skills can appear intangible, as much of the practice occurs through tone, timing, emotional attunement, and responsiveness which are far harder to articulate than curriculum-based activities or routine care practices. Similarly, relational practice does not refer solely to adult child bonds but encompasses a much broader scope, including relationships with families, peer interactions, the creation of a relational culture within the setting/environment, the wider societal context such as situations and actants that shape the dynamics.

Attunement

Attunement is the ability to perceive and respond to another’s emotional state with sensitivity and appropriateness, it can involve actively trying to enter the child’s world, rather than encouraging them to fit into the adult’s world. This can be achieved by observing children’s body language, facial expressions and observable physiological signs of the limbic system in action whilst remaining flexible to shift actions based on the child’s cues. Adults working with children may begin to realise that positioning themselves as actants and recognising the presence of other actants within the interactional environment (relational practice) opens up a more context-sensitive approach to attunement than traditional "serve and return" perspectives allow, aware of how issues identified in the situational analysis maps may be influencing the situation. While serve and return presumes a linear exchange between the adult and child, the concept of actancy in relational practice via attunement reframes interaction not simply about timely, mirrored responses, but involves multi-directional sensitivity to the dynamic network of relational influencers at play. Attunement is arguably highly skilled practice that goes beyond instinct but due to much of the work being non-verbal, observational and evaluative, it can be difficult for adults to articulate what is happening in the moment. Practice requires deliberate awareness, reflection, and ongoing

learning to identify diversity as what feels attuned for one child may feel overwhelming for another, and cultural differences further shape these expectations. Attunement can be supported as a skill via multi-modal and accessible training resources by providing interactive role play scenarios to practice emotional responsiveness or via practicing mindfulness to be present in the moment and attuned to oneself before trying to relate to others deeply.

Smiles and Laughter as Data

Children's facial expressions provide non-verbal, real time physiological feedback to adults who can use this as data to interpret the expressions and gauge smile and laughter intensity using coding such as the following:

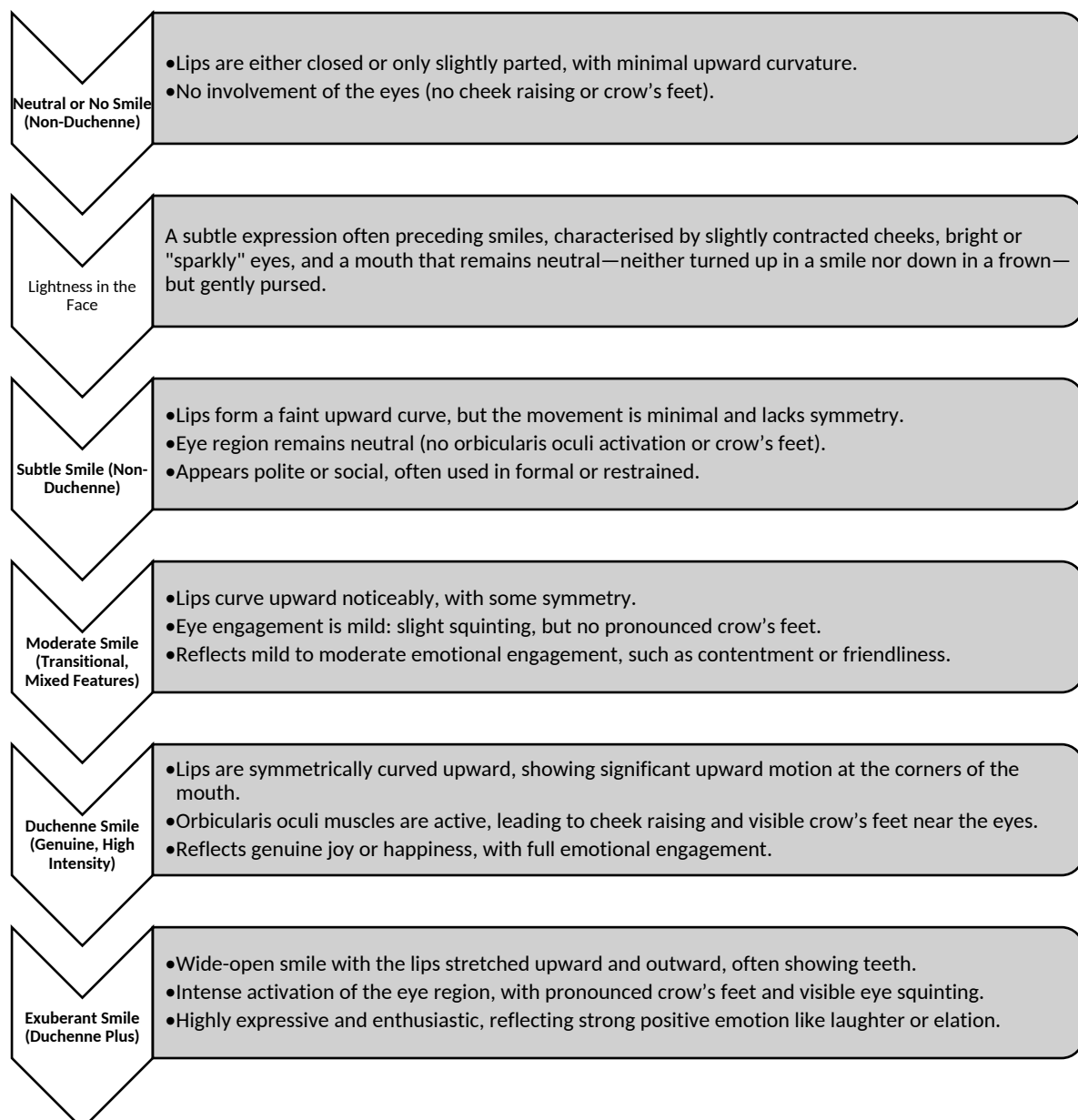


Fig.13 Facial Coding Using EEoAC Theory

This can help in validating children's emotional expressions as evidence of thinking/limbic system in action and responding practically by engaging with the emotion as part of the learning process, using observations of smiles and laughter to reflect on quality of relationships, overall wellbeing, communication development, affective (social, emotional and cognitive) development. These expressions should be seen as serious developmental data that, when contextualised and interpreted with care, can provide deep insight into children's social, emotional, and cognitive growth. Smile intensities and types provide details needed for every adult to become a 'smile expert' and thus can use smiles and laughter as data, adult skills can be supported in multi-media resources via providing video observations for them to analyse, they can pause them to discuss what a child's face might be expressing. Furthermore, encouraging adults to verbalise what they observe and infer from the expression, as narrating the learning can be powerful alongside the child and during evaluation of practice.

Optimising Conditions

Adults can optimise the conditions for EEoAC by creating time and space for presence, slowing down enough to notice subtle shifts, and resisting the pressure to rush through routines for other competing 'adult' priorities. This requires developing observational literacy so that moments of joy are not dismissed as background noise or incidental moments, but instead valued as rich data through documentation and collective reflection just as a child hitting a clear milestone i.e. learning correct colour labels, would be valued. Reflexivity is essential, as adults must constantly question their interpretations and remember the many actants influencing the situation. These conditions deepen further when they are held as a collective cultural ethos across the whole context, rather than left to individual adults. Yet, if such practices are not held carefully, several pitfalls arise: children's emotions risk being instrumentalised, the frequency of smiles may be confused with the quality of relational depth, and practices can become fragmented if relational practice, attunement and smiles and laughter as data are treated as isolated tools rather than an interconnected.

Specific practice-based details to be implemented directly with and for children include enhancing environmental exposure to smiles and laughter and increasing environmental anticipation, suspense, and surprise, with humour, including physical comedy and absurd

provocation as a pedagogic tool. Adults creating ‘activated contexts’ by being involved in imaginative role play, modelling e.g. demonstrations from an adult, narrative scaffolding, where adults provide verbal commentary alongside a child's actions enhancing social reciprocity, shared attention, and emotional connection. Furthermore, specific adult talk that validates and echoes children’s affective talk can include task-specific questioning, dynamic word play including alliteration, rhythm and repetition for effect for example, ‘cheery praise’ as opposed to structured praise. Finally, spaces that encourage children's autonomy, decision-making opportunities such as choosing and predicting, having time to persist, mentally anchor and associate during their activities and play can also aid in EEoAC.

Guided Reflection

High quality practice in EC cannot be reduced to the visible routines of care, rather, it requires a theoretical positioning that recognises the significance and connection between relationships, attunement, emotional expression, and adults reflecting to construct high quality environments for children to flourish. Within this perspective, children’s smiles and laughter are not decorative moments, but significant evidence for EEoAC. The challenge for adults lies in creating conditions where these expressions can be noticed, contextualised, and interpreted without oversimplification. For example, if interpreted too narrowly i.e. only a sign of happiness, smiles and laughter risk being trivialised and stripped of their relational and developmental significance. Instead, a theoretical reflective lens can help adults perceive these moments as relationally charged and developmentally rich. Such a stance requires adults to work reflexively, acknowledging how their own presence, interpretations, and cultural assumptions shape both what is noticed and how it is valued. The purpose of reflective practice in EEoAC therefore shifts from asking if children are smiling to exploring why, with whom, and under what conditions they do so, positioning relational attunement and emotional expression as critical practices within EC.

EC professionals can use guided questions as prompts (below) to reframe their professional identity not only as educators but also as joy facilitators, interrupting rigid adult agendas, and

embracing a more childlike orientation.

Relational Practice	Attunement	Smiles and Laughter	EEoAC
•When do I feel most present with children during the day? What helps me slow down enough to really notice them? •How do I show children that their small expressions (a glance, a half-smile, a giggle) matter to me? •Do I tend to focus more on tasks/routines than on relational moments? How can I rebalance this? •Am I equally attentive to children who smile and laugh less frequently, or do I give more weight to children who express joy more outwardly, or who show upset regularly?	•What cues did I notice today that were subtle rather than obvious (e.g., a change in breathing, a shift in body posture)? How did I respond? •In moments of laughter or smiling, was I truly attuned, or did I assume I knew the meaning? •Did I adapt my response to the child's individual temperament and cultural context? How? •Do I ever project my own feelings ("she laughed because she likes me") onto children's behaviour? How can I step back from that?	•When a child smiled or laughed today, what was happening around them? With whom were they interacting? •Did the smile or laughter signal joy, relief, curiosity, or something else? How can I be sure I'm not oversimplifying? •What patterns am I noticing over time about when/with whom this child smiles or laughs? What might this tell me about relationships, belonging, or comfort? •How might my own mood, energy, or assumptions shape the way I notice or interpret children's expressions?	•What insights emerge when I share my observations with colleagues? Do they notice things I missed? •How can we, as a team, create conditions (time, space, ethos) that allow these relational moments to flourish and be recognised as valuable data? •How might societal issues and expectations influence when/how a child expresses joy? Am I interpreting their smiles and laughter through only my own cultural lens? •Do I value quiet relational moments (soft eye contact, calm presence) as much as outward joy or acquisition of a curricula milestone? How do I balance these in documentation?

Fig.14 EEoAC Theory Professional Guided Reflection

8.3 Answering the Research Questions

In keeping with grounded theory, transformation and praxeology, this research asks of itself to appraise its own quality “is the substantive proposed conceptualisation of new meaning from this research project grounded in the data?” This is the main type of question for researchers to consider ensuring that their research is of value and worth (Straus & Corbin 2005; Morse et al., 2021). To achieve this, it was important to revisit the data directly when analysing the full study, unifying the two phases and generating EEoAC theory as a working discussional theory to propose an answer to the research questions and sub questions as a full piece, rather than via summarising isolated studies.

Main Research Question: How can adults provoke Higher Order Thinking and pleasure simultaneously for positive developmental progress in two-year-old children?

EEoAC presents a means through which the data has identified how adults can provoke HOT alongside the smile and laughter response in two-year-old children attend to the steps suggested. The theory acknowledges that children are unique, differing in susceptibility to extrinsic factors, individual interests, preferences, and any underlying SEND, EEoACs focus and implementable steps may make it particularly well suited for children whose learning is often marginalised by conventional, outcome driven approaches as EEoAC potentially disrupts current two-year-old assessments as it prioritises smiles and laughter unified with cognition. Within EEoAC, adults can interpret these variations in each of the steps presented to tailor their responses and co-elicite HOT and smiles/laughter in a way that is both personalised and developmentally appropriate.

Relational practice emerged strongly from the data as a necessary precursor as without trust, familiarity, and secure attachment, attempts to provoke HOT and smiles and laughter concurrently were more likely to struggle to gain traction. Thus, relational practice forms the first step of EEoAC and is positioned as a non-negotiable foundation of the following steps. However, adults must also be mindful that cognition and smiles/laughter should not be approached as separate phenomena. The data suggests they are often intertwined; therefore the second step of attunement is important so adults can become sensitive to observable signs of physiological shifts in children. This perspective challenges conventional pedagogical approaches which frequently prioritise cognitive outcomes over affective ones or can perceive personal, social and emotional development as separate from cognition and intellect. From this perspective, efforts to co-elicite HOT and smiles/laughter must remain cognisant of their interdependence.

Another key finding of the data is that smiles and laughter themselves can act as pedagogic tools. They are not simply by-products of engagement but function as meaningful, observable markers of learning, inclusion, and equity. Importantly, they are both free and universally accessible, which positions them as a powerful tool for equitable assessment and early intervention. EEoAC therefore identifies the third step of using smiles and laughter as data in their own right, to inform how adults might adapt activities to elicit HOT and affective responses concurrently. EEoAC acknowledges the complexity that smiles and laughter are perceived as ambiguous signals and may not always indicate genuine engagement or developmental progress, which is why a possible categorising of smiles and laughter as data is provided, and that relational practice and attunement are pre-steps to this.

This relational and collaborative nature of adult and child interactions, whether through play, routines, or structured activities was also shown to be crucial. When adults dedicated focused time to supporting specific knowledge and skills while simultaneously enhancing the child's situational experience, children frequently exceeded expectations (particularly evident in parental reports in study three). This suggests that EEoAC holds potential not just for eliciting developmental progress but for recalibrating adult perceptions of what two-year-olds are capable of achieving. It could be argued that practice which is dual natured, concentrating on both thinking and smiles and laughter could dilute the attention to measurable learning outcomes or personal, social and emotional development, however EEoAC seeks to reframe the body (physiology) not as a vessel for learning, but as the learning in two-year-old children, that they can be an accelerator for each other.

Study four emphasised the necessity of dissemination, therefore sharing EEoAC with adults so that they are equipped to understand how HOT and the smile and laughter response can be elicited together is arguably important. Without such awareness, opportunities for positive developmental progress risk being unseen, thus, to provoke HOT and the smile and laughter response in two-year-old children, it is proposed that yes this is possible, via EEoAC and awareness raising.

Sub Question What activities elicit Higher Order Thinking and smiles and laughter in two-year-old children?

The data suggests that a wide range of activities can elicit HOT alongside smiles and laughter in two-year-old children, provided that opportunities are both varied and attuned to individual needs. Offering the full complement of play typologies, rather than privileging or restricting certain forms, appeared important. Children sought out play naturally, particularly in social contexts, and when adults extended playfulness into non-play situations such as care routines, the boundaries between learning and care were blurred in productive ways. Humour, especially age and stage appropriate physical comedy was also significant. When humour required children to assess, interpret, and even produce their own humour or jokes, HOT was activated in tandem with smiles and laughter. Similarly, expressive and performance-based activities including mark making, imaginative play, artistic expression, and multi-sensory exploration, enabled children to experiment, perform, and self-direct, often resulting in spontaneous laughter and cognitive engagement, particularly if in an outdoor environment.

Literacy based activities, including stories, narration, and dramatic retellings, tended to be most effective when adult led, suggesting that adult modelling and performative talk are crucial. Similarly, adult talk types, particularly those incorporating anticipation, suspense, and exaggeration were consistently associated with heightened HOT and laughter. Children were also observed to sensory seek and self-select activities that maximised their own engagement, with self-initiated play in study two often leading to the richest HOT and laughter responses. Beyond specific play types, the level of challenge and exertion was decisive: “sweet spot” activities (those not too hard and not too easy) provoked problem-solving, persistence, and heightened emotional responses, suggesting a synergy between effort, cognition, and smiles and laughter.

Furthermore, the data indicates that warm praise, responsive experiences, and activities tailored to children’s developmental profiles and preferences magnified outcomes. When adults prioritised and actively recognised the importance of smiles and laughter in learning, they not only elicited these responses more frequently but also began to use them as pedagogic data, intentionally designing further HOT/laughter situations. In some cases, adults even engaged in forms of playful co-regulation, using humour and comedy as a way to ‘biohack’ stress, helping children neutralise negative feelings through shared laughter strategies.

During study four participants felt there was a problematic perception in wider society not attuned to the practices and needs of two-year-olds that wrongly perceives focusing on things such as smiles and laughter as trivialising supporting development. The data suggests the opposite that humour could act as a vehicle for meaning making, requiring children to interpret incongruity or anticipate resolution which are both HOT and social/emotional processes. Similarly, study four identified some societal perspectives that self-initiated play alone is sufficient, rendering adult-led activities and the efforts recommended in EEoAC as unnecessary. While the data does highlight the power of self-selection, it also shows that adult involvement, particularly in the optimising conditions step of EEoAC, that adults can elevate experiences beyond what children achieve independently.

Sub Question What replicable conditions are required to enhance the likelihood of eliciting Higher Order Thinking and pleasure concurrently and how can this be evidenced?

The data indicates that several replicable conditions enhance the likelihood of eliciting HOT and pleasure concurrently, and these can be evidenced through both observable behaviours and physiological responses. Smiles and laughter emerged as prosocial tools, signalling not only emotion but also cognitive engagement and interaction with the environment. Their presence, particularly when accompanied by HOT talk, suggests that the limbic system is active and healthy. Conversely, the absence of such emotive cognitive markers can itself provide evidence for the need for targeted intervention. Study three highlighted that the intensity and timing of smiles and laughter were significant, with a 95% likelihood of accompanying heart-rate change (either acceleration or deceleration). Observable features such as “faces lighting up” (study two) or the “lightness in the face” (study three), offered a unique form of evidence for emotive cognitive engagement that surpassed verbal expression. Importantly, children were not only recipients of humour but producers of it, deploying smiles and laughter to reshape social situations, for example, neutralising tension in response to boundary setting behaviour which demonstrates agency in both social and cognitive domains.

Optimal conditions were further evidenced when children received stimuli, cognitively appraised the situation, and concluded with an emotive or physiological response. However, these moments required attuned adults to notice and interpret the subtleties of expression, including masked or partial affect (e.g., smiles “in the eye”). Adults’ own participation, particularly when smiling and laughing in non-hierarchical ways, created abundant conditions for reciprocity. Moreover, social actants such as adequate challenge, individual temperament, and adult perceptions of performance shaped the extent to which HOT and pleasure were co-elicited. Relational practice and attuned adults who can respond dynamically to these factors were most successful in fostering optimal conditions, thus EEoAC seeks to provide a step-by-step system to leverage this practice.

The evidence also suggests that exposure plays a self-reinforcing role. The more opportunities children have to experience HOT and smiles/laughter concurrently, the more they may self-seek such contexts, while adults observing these benefits also become more likely to reproduce them, creating a cycle of EEoAC-optimised situations. Bodily expressions further highlighted EEoAC’s proposition that thinking and emotion manifest diversely and inseparably in the child’s body as the observable physiology is the child’s knowledge and emotion entwined. Spaces that encourage autonomy and decision-making which allow children to choose, predict, persist, and mentally anchor experiences were especially effective

in sustaining EEoAC conditions. Adults could amplify these contexts by creating “activated environments” through imaginative role play, modelling, narrative scaffolding, and the use of affective talk. Dynamic talk types, such as alliteration, rhythm, repetition, and “cheery praise,” were more effective than structured praise alone.

Nonetheless, physiological markers such as heart-rate changes or facial lightness are too ambiguous to reliably evidence HOT, as they may reflect excitement, stress, or fatigue rather than higher cognition. However, EEoAC addresses this by emphasising contextual interpretation as when such markers co-occur with HOT talk, problem-solving, or reciprocal humour, they provide converging evidence of optimal conditions. Others may argue that adults’ deliberate cultivation of humour and affect risks manufacturing situations rather than respecting the spontaneity of play. Yet the data indicates that adult involvement need not undermine authenticity when relational practice is strong and hierarchy is softened, adult interventions are experienced as co-creation rather than imposition.

8.4 Positioning the Proposed Discussional Theory within Existing Literature and Professional Practice

Glaser and Strauss (1967; 2007) and added to by Charmaz (2014) and Morse (2019) emphasise the importance of developing theory that is closely connected to the lived experiences and social realities of the individuals it seeks to explain, a sentiment held and stated by participants during each study was that “smiles and laughter are entangled with expressions of HOT in ways that are unrecognised unless explicitly asked about [which, until this research had never happened for the participants].” Therefore, participants themselves identified the gap in existing literature and practice for this topic which EEoAC seeks to respond to. By generating a discussional theory directly from the data, it increases the chance that EEoAC is relevant and meaningful to the audience it is intended for, rather than being imposed externally or disconnected from context (Costley et al., 2010; Koro et al. 2022). Positioning a new discussional theory with the reality of its audience therefore not only strengthens its applicability but also enhances its capacity to resonate with and be validated

by those who will engage with it, as study four especially gave recognition to (Glaser & Strauss, 1967; 2007).

Presently in literature and practice in EC the connection between smiles and laughter and HOT, or similar topics such as humour in EC learning, is under theorised (Di Stasi et al., 2025) and therefore excluded from pedagogical strategies, training and accessible resources in the sector or for parents (Addyman, 2018). EEoAC responds to data of this research and that (albeit limited) in the field which has discovered humour, smiles and laughter are connected to cognition and can signal, provoke or enhance engagement (Hoicka et al., 2008; Hoicka & Butcher, 2016; Di Stasi et al., 2025). Currently in literature and practice, smiles and laughter are rarely treated as helpful physiological and semiotic data, and shunned as too ambiguous, let alone seen as a professional practice to be cultivated with intentionality (Krumhuber & Kappas, 2022; Scott et al., 2022;). The use of smiles and laughter as analytic data in EC research has often been subject to hesitation, with debates centring on their validity as indicators of learning, engagement, or relational connection (Holmbom Strid, 2023; Zöggeler-Burkhardt et al, 2023). However, continued deliberation over whether such expressions “count” risks stalling progress and overlooking the pedagogical significance. EEoAC offers a constructive response to this impasse by operationalising smile categories and intensities as analysable features of interactions. Rather than pausing at questions of methodological legitimacy, EEoAC encourages professionals to engage directly with this data in practice, acknowledging that even if particular coding categories prove limited, their trial generates insight and movement within the field. This orientation aligns with recent calls to embrace embodied and relational markers of learning as part of a broader recognition of children’s multimodal communicative repertoires (Fleer & Li, 2022; The Attachment Research Community, 2023). In this way, EEoAC advances the study of smiles and laughter from theoretical possibility to practical enactment, grounding inquiry for everyday adult-child interactions rather than suspending it in unresolved methodological debate. Similarly, this research has discovered there is a desire to prioritise and utilise smiles and laughter more, and the notion of prioritising such things as happiness, joy or eudaemonia (Pascal & Bertram, 2018; 2022) is also gaining traction, with some professionals calling out for a focus on more joy-based guidance for early years in policy (Kingston-Hughes, 2022). This research identifies there is a need and desire for EC service practice and policy to be disrupted as EEoAC repositions smiles and laughter not as byproducts of practice, but integral to how HOT can be experienced, shared and deepened.

EEoAC recognises that positioning smiles and laughter as expressions or indicators of wellbeing related to cognition is not always simple, for example for neurodivergent adults and children (Scott et al., 2022) expressing and reading such social signals can be problematic. Similarly, requiring professionals to unpack smiles and laughter as data risks putting undue pressure on already heavily workloaded sector to interpret every micro-expression as pedagogically significant. After all, children's development can be somewhat reliably charted through more observable and measurable indicators, such as language acquisition, motor skills, or problem-solving, which could provide a more objective picture than the subjective reading of a child's smile for example the widely used Ages and Stages Questionnaire-3 (ASQ-3) (Office for Health Improvement and Disparities, 2025). EEoAC adds a different perspective to the readily available assessments of EC quality such as Leuvan Scales and ECRS etc. The findings highlight an opportunity to extend research into the physiological responses of two-year-old children as more could be learnt about how pleasure is experienced and observable during children's learning, particularly punctuated by this research proposing a novel facial expression to look out for. EEoAC is particularly important addition for professionals using scaling tools (e.g. Leuvan, ECARS, ITERS etc) to assess children, as the combination of emotion and cognition and categories of expressions are currently not explicitly mentioned. It is appreciated that investing too heavily in the interpretation of smiles and laughter arguably risks moving EC practice away from concrete developmental evidence and towards what some may perceive as speculation (Krumhuber, 2022) However, in EC, cognitive development cannot be meaningfully understood without recognising the role of emotion, and bodily engagement for children who express themselves in diverse ways beyond language and currently there is no tool that explicitly values this connection, this seems at odds with the evidence that young children do not learn through rational thought alone, but through emotionally laden, relational, and sensory experiences (Denham & Bassett, 2020; Kreutzmann et al., 2020). These experiences are not merely precursors or background conditions for children's thinking, but central opportunities for cognition in an embodied form (Gibbs, 2019; Kreutzmann et al., 2020). Emotions, similarly, are not incidental states to be managed, but active forces that shape how children make meaning and construct understanding (Immordino-Yang et al., 2019; Denham & Bassett, 2020). In EC contexts, EEoAC could hold significant implications for pedagogy, inviting professionals to view emotional expression not as a sideline to learning but as learning in action itself (Trevvarthen & Delafield-Butt, 2018; Schore, 2019). This perspective emphasises that thinking is not abstract, disembodied reasoning, but emerges through play, movement,

sensory experience, and relational attunement. Accordingly, EEoAC calls adults to design environments and relationships that actively support and harness embodied, emotionally laden engagement as foundational to the development of thought (Panksepp & Biven, 2018; Shonkoff & Phillips, 2021). As a discussional theory, EEoAC contributes to knowledge by offering a language and process for EC services to attend to the inseparability of cognition and emotion in EC as it opens up space for rethinking curriculum, observation, and assessment in ways that value the full humanity of the child, as thinker, feeler, and embodied learner.

Recent mapping of brain functional development and subcortical trajectories provides biological evidence that emotion and cognitive systems are not developing in isolation but are co-constituted in infancy (Gilmore et al., 2024; Weiyan et al., 2025). Theoretical and review work from embodied and dynamic-systems perspectives argues that multisensory, sensorimotor and social-communicative processes create the conditions for emotion cognition coupling early in life, for example research by Nava et al. (2023) exploring multisensory integration argue that infants' perceptual worlds inherently combine emotional and cognitive information, supporting early learning through embodied, multimodal experiences. Similarly, Tsomokos (2025) convey that embodied cognition perspectives highlight how sensorimotor, emotion and cognitive systems co-emerge, suggesting that goal-directed actions in infants are simultaneously emotionally and cognitively scaffolded. EEoAC contributes a practice orientated application which can shift EC services away from an artificial separation of emotion and cognition, and toward holism approaches amenable to the more recent research into development in the first two years, for example, developmental systems approaches which treat early social-cognitive growth as a dynamic system where emotional engagement and cognitive capacities are inseparable (Kartner et al., 2024). Ilyka and Johnson (2024) explicitly model the affect–cognition interface in infancy, proposing testable markers of how the two systems mutually reinforce one another.

EEoAC also extends the work on relational practice which is increasingly recognised as a pedagogical approach that foregrounds the significance of relationships in shaping children's learning, wellbeing, and development, as Kupilla and Millei (2017) state professionalism in EC has been reimagined as relational, moving away from technical competencies towards practices that value care, interdependence, and social responsibility. At its core, relational practice involves adults intentionally fostering trust, reciprocity, and connection within early years settings, where pedagogy is enacted through interactions as much as through planned

curriculum (Hedges & Cooper, 2018). Relational approaches can be central to conceptions of pedagogical leadership, where trust and collaboration form the basis for effective practice and professional growth (Fabry, 2024). Papatheodorou and Moyles (2020) extend relational practice to a broader perspective whereby cross-cultural and wide contextual dimensions influence relational practice in a setting.

Actor-Network Theory (ANT) regards learning as emerging from relational, socio-material networks in which human and non-human actors carry equal analytic weight, for example, within classroom settings, ANT reveals how enacted situations are co-constituted through assemblages of influences such as educational conversations shaped by interactions among people, procedural instructions, policy, curricula (Shwarz et al., 2025). In EC contexts, ANT has been applied to trace how standards and metrics become enacted through material and policy assemblages which influence professional practice, Osterhoff et al. (2023) recommend professionals become more reflective and critical of such influences, thus more aware themselves of things that are influencing their situations and resulting practice. These enacted situations highlight how situational influences can persuade practice and EEoAC therefore empowers professionals to be aware of and utilise this to their benefit, rather than unconsciously being influenced. EEoAC considers enacted situations and ANT at a much more local level whereby EC services can think specifically about the immediate and wider situational influences to improve their practice.

Huffhines et al. (2023) highlights the growing evidence base for guided reflection and reflective supervision as mechanisms for improving practice in EC services and wellbeing for the professionals. Similarly, coaching, particularly when structured around cycles of guided reflection and feedback, consistently enhances instructional quality and supports child learning outcomes (Schachter et al., 2025). Chen (2023) qualitative study with preschool to year three teachers maps reflection-for/in/on-action across technical, practical, and critical dimensions, evidencing how deliberately guided reflective processes help teachers adapt practice to complex classroom realities. EEoAC therefore contributes another specific type of guided reflection that can be used specifically for EC professionals to benefit from when exploring emotion and cognition.

8.5 Reflection on the Analytical Journey Unifying the Studies

Reflecting on how methodological choices and the broader research context have shaped the analysis is integral to maintaining analytic integrity and transparency. Each study has already been reflected upon individually, this section focuses on drawing the full study together.

Engaging in MM-GTM (Creamer, 2022, 2024, 2025), alongside situational analysis (Clarke et al., 2022) has highlighted both the opportunities and challenges of working across multiple studies to develop a unifying theoretical account. One of the most persistent difficulties has been grappling with the notion of saturation. While elements such as questionnaire responses and semantic patterns appeared to reach a point of semantic saturation (Cohen et al., 2018), it remains problematic to ‘prove’ saturation, particularly as further avenues for research are still evident with an evolving discussional theory. Revisiting the multi-study dataset did not always generate novel insights, which can signal that theoretical saturation has been approached (Glaser & Strauss, 1967; Charmaz, 2014; Plano Clark, 2018). At such a stage, categories appear well developed, relationships among them are established, and further data would potentially cease to advance the theoretical account (Birks & Mills, 2015). Rather than signalling limitation, this can strengthen the coherence and plausibility of an emerging theory while also leaving scope to use revisit for confirming category fit, clarifying analysis, and enriching memo development (Dey, 2004). Nevertheless, caution is required due to an absence of new insights possibly reflecting premature analytic closure or analytic blind spots (Charmaz, 2014; Morse et al., 2021). Alternatively, perhaps reflecting upon whether analysis has achieved conceptual depth whereby there is evidence of analytic range, connection to existing literature, resonance with practice, and credibility of process (Nelson, 2017; Clarke, 2022) is a better means to ascertaining if saturation has occurred. Taking this perspective, whilst reluctant to claim full saturation, analysis has generated conceptual depth as the situation of HOT and the smile and laughter response in two-year-old children, rather than human behaviour alone, has provided a source for analysis, demanding consideration of multiple perspectives and nonhuman elements (Frieze et al., 2021).

Strict adherence to situational analysis would have required messy mapping from the outset, yet this research drew instead on a reflective diary, aligning more closely with a critical canon of grounded theory (Glaser & Strauss, 1967; 2007). This approach enabled merging grounded theory inquiry with situational analysis principles to construct a discussional theory aligned with the research aims, rather than to apply situational analysis rigidly. The analytical process of situational analysis to unify the research was both time-consuming and cognitively taxing, and the sheer volume of data was at times overwhelming. Yet this abundance is not

necessarily a limitation in situational analysis, where analytic richness is enabled by drawing on diverse and extensive sources (Clarke et al., 2022). Provided the process remains data-driven, with coding and constant comparison oriented around the central questions and aims, and analytic attention is given to both human and nonhuman elements, the combined use of grounded theory and situational analysis can be judged effective as a unique contribution to knowledge has been made via the EEoAC. While this does not imply overconfidence in this working discussional theory simply because methodological ‘rules’ have been followed, it does provide plausibility to both the theorising and the process through which it was constructed (Clarke et al., 2022).

8.6 Summary

This chapter has introduced and developed the discussional theory of EEoAC as a response to the research questions and sub-questions. While recognising its status as an early iteration, the chapter has outlined both the potential benefits and the limitations of EEoAC, alongside reflection on the iterative process through which it was generated. In doing so, it provides a foundation for the following chapter, which will draw out the implications of this work, articulate its contribution to knowledge, and set out recommendations for future directions.

Chapter 9 Conclusion and Recommendations

This chapter concludes the thesis by summarising the key findings, outlining the contributions to knowledge, and identifying potential directions for further study. The contribution aligns with Florian (2024) view that educational research should raise awareness of critical issues, stimulate discussion, and promote adaptability to prevent stagnation in thinking. While this thesis has made both theoretical and practical contributions throughout, the conclusion is not intended as a definitive or complete account. Instead, it provides a foundation for continued exploration and the beginning of a longer research journey and career. As Roffey-Barensten and Reilley (2025) suggest, the doctoral process demonstrates the capacity to conduct original inquiry, yet its deeper purpose lies in opening new questions and pathways for scholarship. In this respect, the conclusion represents not an ending, but a continuation, inviting further refinement, testing, and extension of the ideas developed in the thesis across broader and more diverse contexts. Similarly, Alves et al. (2023) describe doctoral education as a transformative learning process through which researchers gain not only disciplinary expertise but also transferable, personal, social, and reflective capacities, reinforcing the view that the PhD forms the foundation of an ongoing scholarly identity.

A reminder of the research aims, objectives and structure are included in Fig. 1

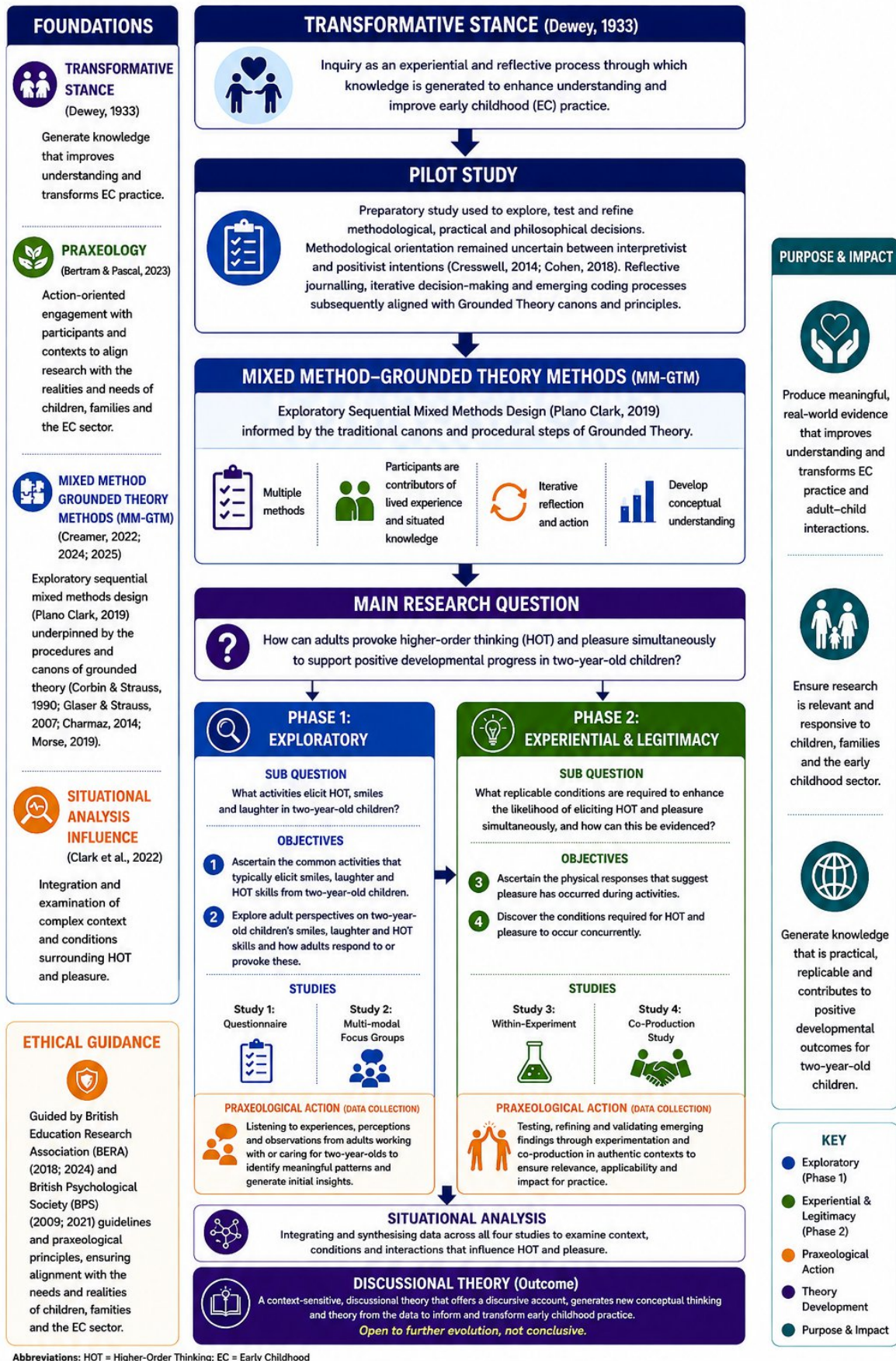


Fig. 1 Research Structure and Design Infographic

9.1 Key headlines from the Research

Across four studies, this thesis has shared how adults' purposeful engagement with two-year-old children via practices such as varied play, humour, and relational attunement for example can simultaneously elicit HOT and a smile/laughter response arguably promoting eudaimonic flourishing in EC (Pascal & Bertram, 2023). By grounding the inquiry in authentic contexts via participants lived experiences, this research contributes a discussional theory (EEoAC) that demonstrates how relations, attunement, emotional expression, cognitive challenge, and situational conditions can carefully coalesce to support developmental progress resulting from the praxeological stories of the data (Oliveira-Formosinho & Formosinho 2006; Pascal & Bertram 2012, 2023). The findings collectively suggest that smiles, laughter, and expressions of HOT are not incidental to learning but integral to it, therefore a practical loop proposed by EEoAC theory is presented to help further enrich experiences for two-year-old children. Theoretically, the thesis advances understanding of how emotion and cognition intertwine in EC interactions, offering a conceptual springboard for further formal theory generation (Glaser & Strauss, 2007; Charmaz, 2014; Morse, 2019) and inviting replication across diverse populations to test the comparability and generalisability of these findings in more depth in the future. While claims of saturation were balanced by satisfying plausibility, future research should maximise difference between groups (Glaser & Strauss, 2007) to examine how contextual and cultural variations shape the relational and emotional mechanisms noted in this research and to trial out the possibilities EEoAC theory might afford to saturate possible data even further.

Practically, the findings advocate for EC policies and professional practices that prioritise human connection, where eliciting joy, humour, and thinking are seen as mutually reinforcing educational aims rather than competing ones, something which the data and literature evidence an appetite for (Reed & Parish, 2021; Pascal & Bertram 2023; Little et al., 2023; Kingston, 2024, 2025). EEoAC should not be shared with professionals through instruction alone, instead, it is recommended that emotionally resonant storytelling, visual cues, embedded reflective practice, and multimodal dissemination for example via digital, social, and community based mechanisms are essential pathways for translation of this thesis into practice, resonant with co-production principles and characteristics (Hadley et al., 2024; Stavholm et al., 2024). Within a climate of resource constraints and wellbeing challenges

(The Royal Foundation Centre for EC 2025), this research offers a realistic, equitable, and universally accessible approach for promoting developmental flourishing through the power of a smile for all two-year-old children.

9.2 Contribution to Knowledge

The research contributes to knowledge, a new discussional theory via EEoAC which adults can use to provoke HOT and pleasure simultaneously in two-year-old children through the proposed cyclical practical application. The research responds to a eudaemonic gap identified by Pascal and Bertram (2020) and Hoosen et al. (2024) whereby new understanding and ideas to help promote conditions that could lend themselves to happiness and fulfilment are proposed. The findings challenge conventional developmental and pedagogical assumptions that position cognition and emotion as separate domains, instead demonstrating their interdependence and mutual reinforcement. EEoAC offers a structured yet flexible means through which adults can intentionally co-construct learning moments that elicit both cognitive complexity and emotional engagement, positioning smiles and laughter as legitimate indicators of developmental expression rather than incidental by-products of situations, relevant to embodied cognition (Fincher-Keifer, 2019; Pearce & Miller, 2025).

The data highlights relational practice as a non-negotiable foundation for eliciting both HOT and smiles or laughter, showing that trust, familiarity, and secure attachment are prerequisites for sustained cognitive and emotional engagement. When adults are attuned to children's physiological and behavioural cues, they can interpret and respond to subtle expressions of engagement, leading to deeper, personalised learning encounters (Siraj et al., 2025). This relational attunement challenges outcome-driven pedagogies that often privilege measurable cognitive gains over embodied or emotional indicators of learning.

Another contribution lies in redefining smiles and laughter as equitable pedagogic tools and physiological assessment data. EEoAC recognises these expressions as observable, universally accessible markers of engagement, particularly valuable for children whose learning may otherwise be marginalised by traditional assessments (Alvari et al. 2021). By offering a framework that enables adults to use smiles and laughter as data, EEoAC extends current understandings of formative assessment and advocates for a more holistic, embodied model of evidencing learning and development, similarly to how Addyman et al. (2018) were able to provide insight into social development of preschoolers and babies through their smiles.

The research further contributes by identifying the types of activities and conditions that optimise the co-elicitation of HOT and smiles and laughter, something which has been under researched (Addyman et al., 2018, Frausel et al., 2020). Activities that blend cognitive challenge with social interaction, such as humour, imaginative play, expressive arts, and narrative performance, were perceived by adult participants to evoke both intellectual and emotional engagement, particularly when adults model performative talk, suspense, and playful exaggeration. These findings support that humour and play can act as vehicles for meaning-making, interpretation, and problem-solving, reframing the body, especially smiles and laughter, as potential signs of cognitive sophistication rather than solely an output (Hoicka et al., 2022; Mazzocconi & Ginzburg, 2022). In evidencing the replicable conditions required for concurrent HOT and smiles and laughter to occur, the research demonstrates that relationally secure, attuned, and non-hierarchical adult-child interactions generate the most fertile ground for development. (Sim & Fei Xu 2017).

Observable physiological and behavioural markers, such as smiles, laughter, and facial “lightness” when co-occurring with problem-solving and HOT talk, provide converging evidence of cognitive–emotional engagement, similarly to other discursive devices (Wiggins 2017) we use to express ourselves. EEoAC advances the notion that the body itself is not separate from learning but *is* the site of learning, as emotion, thought, and physiological expression operate as an integrated system whereby the conditions can be optimised (Fincher-Keifer, 2019; Pearce & Miller 2025).

This work contributes theoretically by proposing a model that repositions emotional expression at the centre of early cognition and practically by offering a replicable pedagogic cycle that adults can apply to enhance developmental progress in two-year-olds. It calls for a

recalibration of adult perceptions of young children's capabilities, recognising that thinking and pleasure are not competing domains but synergistic and when thought of together can accelerate learning. Through EEoAC, early education can move towards a more relational, embodied, and equitable understanding of cognition, positioning joy and laughter as essential elements of intellectual growth, something arguably relevant to the government agenda for supporting overall educational wellbeing (RH King Charles, 2024; Department for Education, 2025).

Individual studies also make their unique contributions, study one contributes uniquely to the understanding of how adults consciously eliciting smiles, laughter, and expressions of HOT can enhance early learning experiences and relationships. By fostering purposeful awareness of the benefits of smiles and laughter, adults can create meaningful moments of shared engagement that enrich cognitive and emotional development, even during non-play activities such as bedtime routines (Gee, 2020). Setting appropriate levels of challenge, alongside varied opportunities for play and socialisation, can further strengthen this process (McGhee, 1979; Loebach & Cox, 2020). When adults initiate smiles and laughter, they can evoke positive embodiment of learning during challenging moments as effectively as, or even more effectively than, verbal encouragement. Additionally, by observing and responding to each child's unique preferences, reactions, and humour, adults can tailor experiences that stimulate genuine joy and cognitive engagement (Hoicka, 2011, 2021; Hoicka & Telli, 2022). The findings indicate that deliberately eliciting smiles, laughter, and expressions of HOT supports both children's learning and emotional wellbeing while also benefiting adults through enhanced connection and shared enjoyment. These outcomes highlight the importance of EC services embracing practices that intentionally cultivate human connection and wellbeing through the simple yet profound power of a smile.

Study two echoes and contributes by demonstrating how deliberately eliciting smiles, laughter, and expressions of HOT through strong adult-child relationships can advance both emotional and cognitive development. It highlights that when adults consciously integrate joyful expressions into everyday interactions, they not only enhance learning but also promote eudaimonic wellbeing, where pleasure and growth occur together (Pascal & Bertram 2023). The findings suggest that optimal practice involves adults engaging with performative intention during activities to stimulate curiosity, anticipation, memory, and creativity, allowing children to express themselves freely across varied contexts. Creating opportunities for sensory exploration, valuing individual preferences, acknowledging diverse backgrounds,

and nurturing self-expression further enriches this process. These suggestions for optimal practice are easily implementable in any interaction adults have with children, which is arguably a responsibility of every adult in society to improve the quality of life for children (The Royal Foundation Centre for Early Childhood 2023).

The study offers insight by presenting evidence that adults can purposefully identify, reflect on, and adapt practices to foster eudaimonic flourishing. This perspective extends beyond traditional early years priorities of meeting basic needs and achieving academic outcomes, proposing instead an approach where emotional connection and developmental progress are equally valued. In a climate of limited resources and social challenges such as underfunding and the cost of living crisis (ECSDN, 2020; Anna Freud Organisation, 2023; The Royal Foundation Centre for Early Childhood, 2023; Parent-Infant Foundation, 2023; Foundations, 2023; Nuffield Foundation, 2024; Early Years Alliance, 2024), intentionally eliciting smiles, laughter, and HOT represents an inclusive and empowering approach to early education. Participants' reflections revealed their own sense of fulfilment and joy in concentrating on smiles and HOT, reinforcing the transformative potential of prioritising combined positive emotional and cognitive engagement (Dewey, 1933; Pugh, 2011).

Study three makes a distinctive contribution by integrating physiological, behavioural, and emotional indicators to explore how pleasure and HOT co-occur during early learning experiences. The findings provide original insights into how smiles, laughter, and observable physical responses, such as heart rate variation, may serve as indicators of cognitive engagement and emotional fulfilment. The evidence from smiling frequency and intensity suggests that heightened social interaction efforts are closely linked to expressions of HOT and affective engagement. These results emphasise the value of using both qualitative and quantitative approaches to understand the depth and authenticity of children's experiences, moving beyond reductionist interpretations of physiological data to include the realities observed during play and learning, especially in expressions such as smiles, happiness or humour where this has been previously overlooked (Hoicka et al., 2008; Esseily et al., 2015; Hoicka & Butcher, 2016; Stasi et al., 2025). A particularly novel contribution of study three is the identification of a new facial expression described as "lightness in the face," which was consistently observed but is not yet captured in existing EC assessment frameworks such as the Leuven or ECERS scales. This discovery expands the current understanding of how children display pleasure and engagement, offering fresh opportunities for refining assessment tools and professional observation practices. By highlighting this unrecognised

expression, the research contributes to a more specific identifier for emotional and cognitive indicators in young children, something of which may be useful in the wake of a newer scaling tool (SSTEW) created by Siraj et al. (2025) where expressions of ‘happiness’ are looked for, but no codes or categories defining this yet provided. The study also reveals that conditions fostering autonomy, decision making, and narrative scaffolding most effectively promote the simultaneous presence of HOT and pleasure as nearly all observed smiles and laughter occurred during moments when children exercised choice, demonstrating the empowering role of agency and child voice in learning and research (Flewitt, 2020; Olsen, 2024; Lundy, 2007, 2025). Adult narration, expressive praise, and dynamic talk, including rhythm, repetition, and word play, were found to enhance shared attention and cognitive engagement, showing that adult verbal and emotional attunement are central to deep learning experiences. Furthermore, environments rich in anticipation, humour, and imaginative role play created “activated” contexts that supported emotional vitality and cognitive growth (Barnett, 2022).

In advancing understanding of the mechanisms through which joy and thinking coalesce, this research provides a new foundation for professionals to design situations for children. By proposing the novel concept of “lightness in the face” and evidencing the reciprocal nature of smiles, laughter, and HOT, the study extends current theoretical and practical boundaries in EC education. It calls for a more holistic interpretation of pleasure as both an emotional and cognitive state, encouraging future research and practice to recognise children’s expressive cues as vital indicators of learning, wellbeing, and eudaimonic flourishing which can all be embodied (Tsomokos, 2025).

The findings of this study offer valuable implications for both policy development and future research within EC services. From a policy perspective, the evidence supports a reframing of early years practice to recognise smiles, laughter, and expressions of HOT as meaningful indicators of both cognitive and emotional wellbeing. Embedding these dimensions into national early years frameworks would move beyond a narrow focus on academic preparedness and developmental norms or milestones, rather promoting a more balanced approach that values relational connection and eudaimonic flourishing (Betram & Pascal, 2023). However, as Chapter 2 shared, there is a concern that the government agenda may indeed contrast in direction, with more school-based provision being recommended, thus a potentially different pedagogic trajectory (Sutton Trust, 2023; Nesta, 2025).

Professional training programmes could also benefit from including content on recognising and responding to children's emotional and humour-based cues, enabling professionals to identify subtle signs of engagement such as the newly observed "lightness in the face." This would enhance reflective practice and cause a change in provision, something which is noted as important element of reflection in EC (Johnston, 2018; Foong et al., 2018; Harris, 2018; Taylor, 2018; Rogers et al., 2020; Dobson, 2021; Purcell & Schmidt, 2023). Furthermore, the findings suggest that policy revisions to quality assessment tools, such as the Leuven or ECERS scales, are warranted to incorporate a broader range of expressive indicators of learning and pleasure. In light of economic and social pressures affecting EC services, emphasising connection, laughter, and joy offers an equitable and cost-effective means of supporting both child and adult wellbeing, reinforcing the importance of human relationships as the foundation of high-quality provision (Reed & Parish 2021).

Study four contributes to knowledge by evidencing how methodological rigour and multi-modal dissemination can co-exist within co-produced research, demonstrating that impact is maximised when traditional scholarly outputs are integrated with creative, audience-centred dissemination strategies that make research both discoverable and usable in the real-world contexts it seeks to inform (Massey & Berraras, 2013). Participants identified two interrelated forms of impact, traditional and applied, which together enhance the accessibility, credibility, and reach of research outcomes. The study contributes to understanding of how co-produced research can balance academic credibility with practical accessibility, positioning methodological rigour and applied influence as complementary rather than competing imperatives echoing the benefits discovered by Armitt et al. (2024), Hadley et al. (2024) and Vicat-Blanc et al. (2025).

Future research should build on the insights from the four studies further examining the physiological and emotional correlates of pleasure and HOT. Mixed-methods studies could integrate heart rate, facial micro-expressions, and qualitative observations to capture a richer picture of the interplay between emotion and cognition. The novel expression of "lightness in the face" warrants dedicated investigation to validate its presence, meaning, and implications for assessment and pedagogy. Longitudinal research would also be valuable to explore how early experiences of joy, humour, and autonomy influence children sustained cognitive and emotional development over time. The significant work of Ekman and Friesen, (1971) and Ekman et al., (1987) on the Duchenne smile noted that whilst smiling has biological foundations, its frequency, intensity and social meaning can be shaped by culturally

embedded display rules, relational norms and early socialisation practices, resulting in variation across societies in how positive affect is expressed and interpreted. Therefore, future cross-cultural studies could extend understanding of how laughter and smiles function within diverse social and cultural contexts, informing globally relevant pedagogical models. Finally, further exploration of practitioner reflexivity and emotional intelligence could illuminate how adult awareness and attunement shape children's engagement and flourishing. Collectively, these directions advocate for a more holistic, relational, and emotionally responsive model of EC services, one in which joy, curiosity, and human connection are recognised as vital drivers of both learning and wellbeing (Reed & Parish, 2021; Pascal & Bertram, 2023; Hoosen et al. 2024; Kingston-Hughes, 2024;2025).

In addition to its theoretical and practical contributions, this research has begun to influence professional discourse, with both Staffordshire County Council and Thrive at Five initiating contact following the Study 4 workshops and its publication in the Connected Communities magazine to request resources and discuss future collaboration. This demonstrates early evidence of impact and affirms that there is a sector-wide appetite for research-led practices that promote wellbeing and learning through smiles, laughter, and HOT

9.3 Brief Reminder of Limitations and Corresponding Recommendations

Across the four studies, several methodological and practical limitations were identified, whilst these are discussed in detail in each study individually (Chapter 6 and 7), they are briefly recapped in this section to prelude next steps for the future.

In study one, while the open ended questionnaire produced rich qualitative data on expressions of smiles, laughter and HOT among two-year-olds, the sample was likely skewed toward adults who engage with social media and email for professional or academic purposes. Consequently, the findings may not fully represent the broader demographic of adults regularly interacting with two-year-olds. Future studies could strengthen representativeness by employing mixed recruitment strategies that reach a wider range of caregivers and professionals beyond digital platforms.

In study two, the integration of discursive, content, and thematic analyses provided a credible understanding of participants' explicit and implicit responses; however, this triangulated

approach increased analytic complexity and demanded considerable time, methodological expertise, and interpretive precision. Future research might address this by streamlining analytic frameworks or employing collaborative, interdisciplinary teams to support the integration process.

Study three faced practical challenges related to data collection, including a corrupted video file and two participants exercising their right to refuse the Biopac heart rate measure, although ethically appropriate, these factors reduced the completeness of the physiological dataset and subsequent analysis. Future work could mitigate such issues through the inclusion of more flexible child-centred physiological measures e.g. skin temperature. It should be acknowledged that policy and professional guidance relating to young children's use of digital technology has continued to develop since Study 3 was undertaken (Department for Education 2026). However, the digital technology used within Study 3 was limited to supporting the research process and data capture rather than serving as the focus of investigation or a sustained pedagogical intervention. Consequently, the findings should be interpreted primarily as evidence relating to children's expressions of higher-order thinking and pleasure, rather than as an evaluation of digital technology use itself. Future research may nevertheless benefit from considering these findings alongside emerging policy discussions concerning the appropriate, effective, and developmentally sensitive use of technology within early childhood contexts

Finally, study four was constrained by a short turnaround period linked to internal funding requirements, limiting the opportunity for co-production of dissemination resources with participants. Subsequent research would benefit from extended timelines to enable collaborative creation of applied outputs that reflect the perspectives of those involved.

Collectively, these reflections highlight the need for broader recruitment strategies, methodological streamlining, and enhanced participatory practice in future studies to strengthen both the rigour and reach of research in this area. More generally inviting replication across diverse populations to test the comparability and generalisability of these findings in more depth in the future. While claims of saturation were balanced by satisfying plausibility, future research should maximise difference between groups and beyond an England/UK centric situation to examine how contextual and cultural variations shape the relational and emotional mechanisms noted in this research. Finally, to trial out the

possibilities EEoAC theory might afford to saturate possible data even further approaches to research expansion should be considered.

Although the limitations of this research have been acknowledged, it is important to also note the scope and ambition of this doctoral project, Phyo et al., (2023) state that the intellectual demands and layered nature of academic research and writing, can be experienced as both challenging and motivating. This multi-study approach generated considerable multi-modal qualitative and quantitative data, resulting in a rich, layered and reflexive evidence, providing both challenge and motivation. The research being designed as an exploratory sequential mixed methods approach (Plano Clark, 2019) via MM-GTM (Creamer, 2022, 2024, 2025), underpinned by the traditional canons and procedural steps of grounded theory (Corbin & Strauss, 1990; Glaser & Strauss, 2007; Charmaz, 2014; Morse, 2019) provides a strength in the coherence of its research design, the transparency of analytic decisions, and the sustained engagement with multiple forms of data showing a commitment to achieving the demanding and formative experience doctoral study provides (Phyo et al., 2023).

9.4 Next Steps

Throughout the course of the PhD, a clear enthusiasm has emerged for data collection and for engaging with the lived stories of individuals within EC contexts. Particular value has been placed on the reflective processes that accompany the analysis and interpretation of these narratives, as well as the immersive experience of gathering rich, meaningful data in the field (Dewey, 1933). This journey has deepened an appreciation for qualitative inquiry and its potential to explain complex human experiences. At the same time, it has highlighted areas for further professional growth, particularly in academic writing and in articulating complex ideas with clarity and precision (Phyo et al., 2023). Future actions will therefore focus on strengthening these aspects through targeted writing development, such as engaging in academic writing workshops, seeking mentorship, and setting structured writing goals in the traditional dissemination of the work of this thesis to enhance the effective communication of research insights and contribute more confidently to academic dialogue within the field. Study four also highlights a strong appetite within the sector for applied research influence, particularly through the creation of high-quality visuals, multimedia outputs, and other accessible forms of dissemination. To realise this potential impact, securing research funding

will be essential. Therefore, further skills in successfully applying for research grants, as well as exploring innovative and creative methods for sharing data and research findings with diverse audiences will need to be developed. Strengthening these capacities will support the translation of research into practice, ensuring that the insights generated have meaningful and sustained influence within the EC field.

As part of a post-doctoral dissemination strategy, a multi-platform approach will be adopted to extend the reach and impact of the research. A dedicated website will serve as a central hub, hosting embedded resources such as webinars, online learning modules, eBooks, and downloadable materials designed to support professional engagement and knowledge exchange. Complementing this, a curated social media presence through a dedicated Instagram account with a coherent visual identity will promote accessibility and dialogue with a broader audience. Additional channels, including a podcast, Substack, and LinkedIn newsletter, will be used to share emerging ideas, reflections, and shorter-form writing, helping to sustain writing momentum and ongoing engagement with both academic and practitioner communities. Whilst these public-facing outputs are important, the dissemination strategy will prioritise the publication of at least four peer-reviewed papers to provide contribution that has academic rigour.

A key aim of the post-doctoral phase will be to further develop and extend the EEoAC theory through collaborative inquiry and sector engagement. Building on the initial findings, the next stage will focus on creating opportunities for the theory to be disseminated, discussed, and constructively critiqued across academic, professional, and family communities. In keeping with grounded theory principles, this phase will intentionally seek contexts of difference across cultural, organisational, and relational settings to enhance comparability and move the theory toward greater data saturation (Glaser & Strauss, 2007). By trialling and applying the EEoAC framework in diverse, practice-based environments, feedback and reflective dialogue will inform ongoing refinement. This iterative process of testing, reflection, and theoretical elaboration will ensure that EEoAC continues to evolve as a robust and contextually responsive framework responsive to the complexities and lived realities of EC services, especially pertaining to HOT and the smile and laughter response of two-year-old children.

Crucially, and in alignment with the eudaemonic ethos of this research, a final pledge is to continue to prioritise joy in educational work, whether in research, EC practice, or higher

education career development, ensuring that cognitive and emotional benefits are intentionally integrated rather than emerging merely as by-products.

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Appendices

Appendix 1 Ethical Approval Forms



Life Sciences and Education

ETHICAL APPROVAL FEEDBACK

Researcher name:	Francesca Cornwall
Title of Study:	STEAM as a vehicle for Higher Order Thinking Skills and the Smile and Laughter Response
Status of approval:	Approved

Thank you for addressing the committee's comments. Your research proposal has now been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal.

You should arrange to meet with your supervisor for support during the process of completing your study and writing your dissertation.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site.

A handwritten signature in grey ink, appearing to read 'Dr. Naemi'.

Signed: Dr Roozbeh Naemi

Date: 26.10.208

Ethics Coordinator
School of Life Sciences and Education

Pilot Study, Study 1 & Study 2 approved on one application.



Institute of Education

ETHICAL APPROVAL FEEDBACK

Researcher name:	Francesca Cornwall-Brown
Title of Study:	SU_22_054 'Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children.'
Status of approval:	Approved

Thank you for your ethics application. Your research proposal has been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal. This approval is valid only for as long as you are employed at the University.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site.

Signed:

Date: 04.01.2022

A handwritten signature in black ink, appearing to read 'Sharon Inglis', with a horizontal line underneath.

Dr. Sharon Inglis

Chair of the Institute of Education Ethics Panel



Institute of Education

ETHICAL APPROVAL FEEDBACK

Researcher name:	Francesca Brown-Cornwall
Title of Study:	Higher Order Thinking and the Smile and Laughter Response in Two-Year-Old Children
Status of approval:	Approved

Thank you for addressing the committee's comments. Your research proposal has now been approved by the Ethics Panel and you may commence the implementation phase of your study. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal. This approval is valid only for as long as you are employed at the University.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics Backboard site.

Signed:

Date: 12.04.2024

John McGarry

John McGarry
Ethics Co-ordinator

Study 4

Appendix 2 Participant Information Examples

'Smiles and Laughter' Staff Information Leaflet

My name is Francesca Cornwall, I am a lecturer in the Education Department at Staffordshire University and a PhD candidate. I am also a qualified Early Years Practitioner with a current DBS. I am looking to collect data in partial fulfilment of stage 1 of my PhD. I would be extremely grateful if you could take the time to read this information letter and consent to being involved should you so wish.

What is the project about?
This first phase of the project seeks to collect naturally occurring reaction ranges in play, and better understand the types of activities that elicit learning and smiles/laughter.

Why have I been chosen?
You have been chosen because you are a professional working in the 2 year old room, offering Good or Outstanding provision.

What does it involve?
Taking part means you would be enabling me to collect data in the following ways:
1. Questionnaire's for parents/guardians of 2 year olds on what smiles and laughter mean, how thinking skills develop, and how as a parent/guardian you react to such behaviours.
2. Key persons providing a brief introduction to their group which will include a photo of each participating child and their current developmental level.
3. Professional discussions with the 2 year old staff team on what smiles and laughter mean, how thinking skills develop, and how as professionals they react to such behaviours.
4. Access to photographic and video observations with accompanying field notes taken at the nursery by the staff team. These are to evidence instances of thinking skills/smiles and laughter. These are to be taken as they naturally occur during the day and shared with me electronically via cloud technology.
Individuals can keep a copy of their own completed questionnaires/professional discussion responses should they so wish. You will also receive a 'learning log' of all observations taken on child and my analysis/thoughts.

'Smiles and Laughter' Staff Information Leaflet

Are there any risks or benefits?
The research has been approved by the Schools Ethics Committee at Staffordshire University that agree there are no personal benefits for the people who take part, but 'Learning Logs' of all observations on children will be provided to key persons and parents to benefit future provision. Knowledge that is gained as a result of the research will be made available via a PhD thesis, and potentially academic journal articles, and sector specific outputs for example training materials, magazine articles or blog posts. You will also receive a debrief letter at the end of data collection summarising what was discovered.
Your participation is completely voluntary. If you change your mind at any point, you can withdraw at any time up to the point at which the data is analysed (10 working days following receipt of the debrief letter) and you don't have to give a reason for doing so.

Will I be identified in the report?
No. None of the information that participants provide will identify them or be attributed directly to them in the final report. The anonymity of everyone who takes part will be protected in the final document as synonyms or alphabetical labels. Photographs will be analysed according to specific facial characteristics, this will be presented in written reports as close up sections of facial features rather than portrait images.
Any information that is provided will be confidential and accessed only by the researcher and stored electronically protected by encryption and cyber security for the duration of the PhD (5 years, then 10 years post publication).

Contact
This research is being undertaken for the purpose of completing a PhD at Staffordshire University. If you have any queries or questions related to this research, please contact me on 01782 294780, or by email at francesca.cornwall@staffs.ac.uk. If you have any concerns about this research, please feel free to contact my supervisor, Dr. Lyn Machin L.B.Machin@staffs.ac.uk

Staff Consent

- ☒ I confirm that I have read the information sheet and had opportunity to ask further questions.
Date _____ Signature _____
- ☒ I have read the information sheet regarding the General Data Protection Regulation 2016 (GDPR) and I give my consent for my data to be processed in accordance with the GDPR, and confirm my understanding of the research.
Date _____ Signature _____
- ☒ I confirm that I understand I can withdraw at any time until the findings are being analysed (10 working days following receipt of the debrief letter) without reason.
Date _____ Signature _____
- ☒ I confirm that I agree to data being collected from me via recorded professional discussions.
Date _____ Signature _____
- ☒ I confirm that I agree to capturing field notes, photographic and video observations of children.
Date _____ Signature _____

Pilot Study Staff Leaflet

'Smiles and Laughter' Parent Information Leaflet

My name is Francesca Cornwell, I am a lecturer in the Education Department at Staffordshire University and a PhD candidate. I am also a qualified Early Years Practitioner with a current DBS. I am looking to collect data in partial fulfillment of stage 1 of my PhD. I would be extremely grateful if you could take the time to read this information letter and consent to being involved should you so wish.

What is the project about?

This first phase of the project seeks to collect naturally occurring reaction ranges in play, and better understand the types of activities that elicit learning and smiles/laughter.

Why have I been chosen?

You have been chosen because you are the parent/guardian of a 2-year-old child currently attending a setting offering Good or Outstanding provision.

What does it involve?

Taking part means you would be enabling me to collect data in the following ways:

1. Questionnaire's for parents/guardians of 2 year olds on what smiles and laughter mean, how thinking skills develop, and how as a parent/guardian you react to such behaviours.
2. Key persons providing a brief introduction to their group which will include a photo of each participating child and their current developmental level.
3. Professional discussions with the 2 year old staff team on what smiles and laughter mean, how thinking skills develop, and how as professionals they react to such behaviours.
4. Access to photographic and video observations with accompanying field notes taken at the nursery, that evidence instances of thinking skills/smiles and laughter. These will be taken as they naturally occur during the day.

Individuals can keep a copy of their own completed questionnaire/professional discussion responses should they so wish. You will also receive a 'learning log' of all observations taken on your child.



'Smiles and Laughter' Parent Information Leaflet

Are there any risks or benefits?

The research has been approved by the Schools Ethics Committee at Staffordshire University that agree there are no personal benefits for the people who take part, but 'learning logs' of all observations on children will be provided to key persons and parents to benefit future provision. Knowledge that is gained as a result of the research will be made available via a PhD thesis, and potentially academic journal articles, and sector specific outputs for example training materials, magazine articles or blog posts. You will also receive a debrief letter at the end of data collection summarising what was discovered. Your participation is completely voluntary. If you change your mind at any point, you can withdraw at any time up to the point at which the data is analysed (10 working days following receipt of the debrief letter) and you don't have to give a reason for doing so.

Will I be identified in the report?

No. None of the information that participants provide will identify them or be attributed directly to them in the final report. The anonymity of everyone who takes part will be protected in the final document asonyms or alphabetical labels. Photographs will be analysed according to specific facial characteristics, thus will be presented in written reports as close up sections of facial features rather than portrait images. Any information that is provided will be confidential and accessed only by the researcher and stored electronically protected by encryption and cyber security for the duration of the PhD (5 years, then 10 years post publication).

Contact

This research is being undertaken for the purpose of completing a PhD at Staffordshire University. If you have any queries or questions related to this research, please contact me on 01782 294781, or by email at francesca.cornwell@staffs.ac.uk. If you have any concerns about this research, please feel free to contact my supervisor, Dr. Lyn Machin L.B.Machin@staffs.ac.uk



Family Consent

- ✓ I confirm that I have read the information sheet and had opportunity to ask further questions.
Date _____ Signature _____
- ✓ I have read the information sheet regarding the General Data Protection Regulation 2016 (GDPR) and I give my consent for my data to be processed in accordance with the GDPR, and confirm my understanding of the research.
Date _____ Signature _____
- ✓ I confirm that I understand I can withdraw at any time until the findings are being analysed (10 working days following receipt of the debrief letter) without reason
Date _____ Signature _____
- I confirm that I agree to data being collected via:
 - ✓ Questionnaires (yes/no)
 - ✓ Photographic/Video Observations (yes/no)
 - ✓ Field Notes (yes/no)
- Date _____ Signature _____



Pilot Study Family Leaflet



Smiles and Laughter Questionnaire

This questionnaire is seeking to understand adult perspectives on smiles, laughter and thinking skills in two year old children in partial fulfilment of the first data collection phase of a PhD being completed by Francesca Cornwall of Staffordshire University. Please only respond to this questionnaire if you have frequent and consistent access to two year old children in either a personal or professional capacity. Please answer the questions as best you can, there are no correct or incorrect answers. Taking part means you are happy to complete this online questionnaire. The questionnaire includes 22 questions, all of which are open ended so you may write as much, or as little, as you so wish. If you wish to leave questions unanswered, this is fine. The questionnaire can take between 5 minutes and 20 minutes depending on how much you wish to share. Your participation is completely voluntary. If you change your mind at any point, you can withdraw at any time up to the point at which the data becomes aggregated for analysis purposes (approximately two weeks after taking part) and you don't have to give a reason for doing so. None of the information that you provide will identify you or be attributed directly to you in the final report as this questionnaire is anonymous, unless you choose to disclose your contact details, even if this is the case the final document protects respondents with labels. The legal basis for processing your personal data for research purposes under GDPR is a 'task in the public interest'. If you would prefer to take part in this questionnaire via a telephone call, or have any queries or questions related to this research, please contact me on 01782 294781, or by email at francesca.cornwall@staffs.ac.uk. If you have any concerns about this research, please feel free to contact my supervisor, Dr. Lyn Machin L.B.Machin@staffs.ac.uk. Thank you for taking the time to read this information, and offering voluntary participation by completing and submitting the questionnaire.

Study 1 Participant Information on Questionnaire

Participant Information Sheet

My name is Francesca Brown-Cornwall, I am a lecturer in the Education Department at Staffordshire University and a PhD candidate. I am also a qualified Early Years Practitioner with a current DBS. I am looking to collect data in partial fulfilment of stage 1 of my PhD. I would be extremely grateful if you could take the time to read this information letter and consent to being involved should you so wish.

Title of Research Project

Smiles, Laughter and Thinking in Two-Year Old Children

You are invited to take part in a research study. Before you decide whether or not you are happy to take part, it is important that you understand what the project is about, why I am inviting you to take part, and exactly what is involved. Please take the time to read the following information carefully.

What is the project about?

The project seeks to find out if adults can provoke complex thinking and pleasure simultaneously for positive developmental progress in two-year-old children.

Why have I been chosen?

You have been chosen because you are offering care/education for 2-year-old children in a professional or personal capacity.

What does it involve?

Taking part means you will engage in an online video call and share your opinions of smiles and thinking in two-year-old children. You will be invited to share photographs to support the points that you make via a secure and anonymised link.

Are there any risks or benefits?

There are minimal personal risks or disadvantage involved in taking part in the research, though you are welcome to conduct your own risk assessment in accordance to your own policies and procedures and I will oblige in supporting this.

If you decide to go ahead, you can sign the attached consent form to make sure that you fully understand what you are agreeing to and have had opportunity to discuss the project in detail. The research has been approved by the Schools Ethics Committee at Staffordshire University.

There are no personal benefits for the people who take part, but you will receive a debrief letter at the end of data collection summarising what was discovered.

Your participation is completely voluntary. If you change your mind at any point, you can withdraw at any time up to the point at which the data becomes aggregated for analysis purposes (10 working days following receipt of the debrief letter) and you don't have to give a reason for doing so. If there are any questions in discussions that you would prefer not to answer, you do not have to answer them.

Will I be identified in the report?

No. None of the information that participants provide will identify them or be attributed directly to them in the final report. The anonymity of everyone who takes part will be protected in the final

document as synonyms or alphabetical labels will be used. Photographs will be analysed according to specific facial characteristics, thus will be presented in written reports as close up sections of facial features rather than portrait images (if included at all).

Any information that is provided will be confidential and accessed only by the researcher stored electronically protected by encryption and cyber security, or, in locked cupboards located in a locked office for the duration of the PhD (6 years then 10 years post publication).

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR). I do not require to take names, places or retain any personal details. The data controller for this project will be Staffordshire University. The University will process your personal data for the purpose of the research outlined in this information sheet. The legal basis for processing your personal data for research purposes under GDPR is a 'task in the public interest'. You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you. You have the right to access information held about you. Your right of access can be exercised in accordance with the GDPR. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner's Office, please visit www.ico.org.uk

FOR FURTHER INFORMATION

This research is being undertaken for the purpose of completing a PhD at Staffordshire University. If you have any queries or questions related to this research, please contact me on 01782 294781, or by email at francesca.cornwall@staffs.ac.uk. If you have any concerns about this research, please feel free to contact my supervisor, Dr. Lyn Machin L.B.Machin@staffs.ac.uk

Consent to Return

- ✓ I confirm that I have read the information sheet and had opportunity to ask further questions.

Date 9/08/2021 Signature 

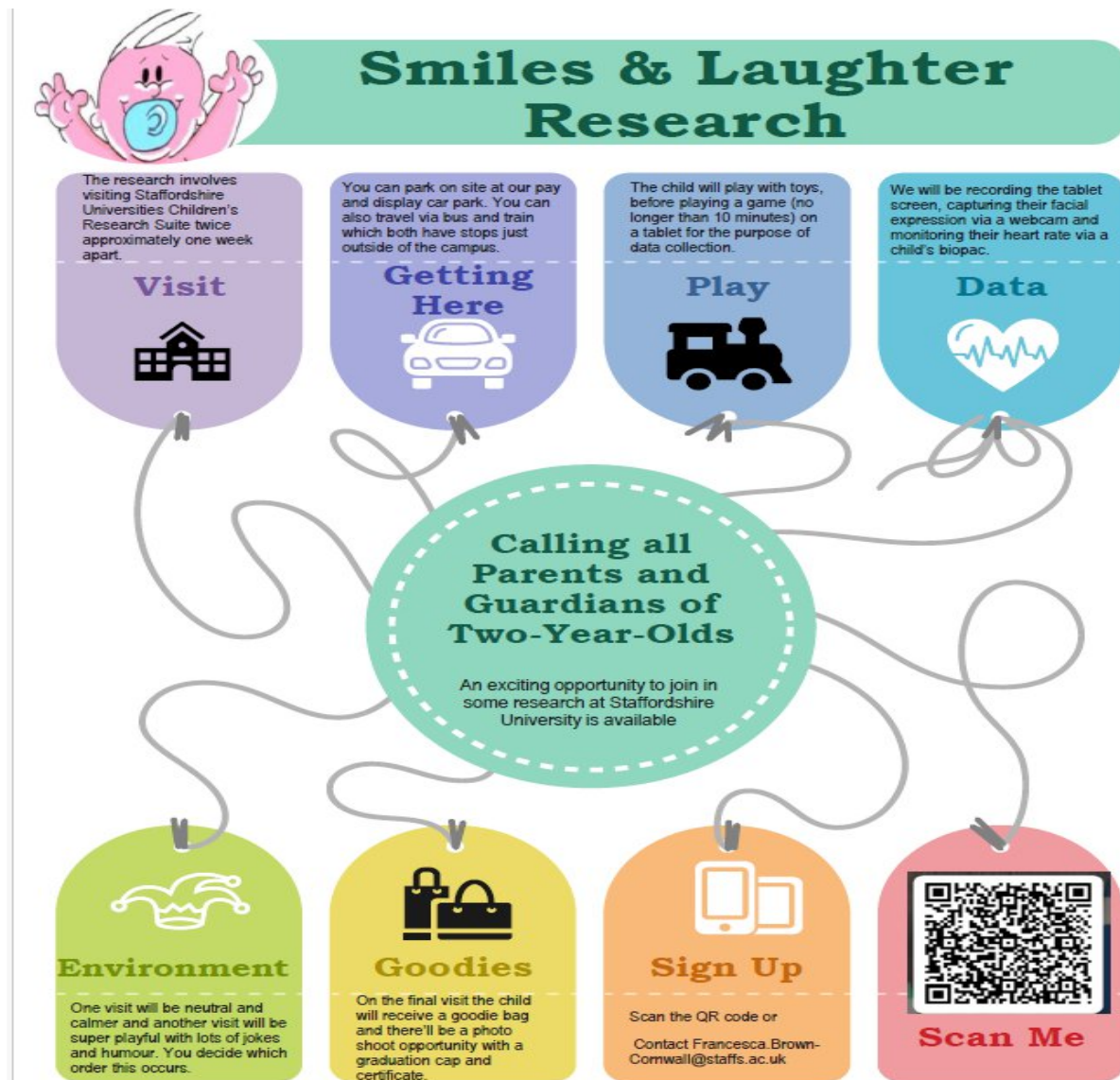
- ✓ 'I have read the information sheet regarding the General Data Protection Regulation 2016 (GDPR) and I give my consent for my data to be processed in accordance with the GDPR,' and confirm my understanding of the research.

Date 9/08/2021 Signature 

- ✓ I confirm that I understand I can withdraw at any time until the findings are being analysed (10 working days following receipt of the debrief letter) without reason

Date 9/08/2021 Signature 

Electronic signatures are fine. Simply copy and paste consent into an email and return to francesca.cornwall@staffs.ac.uk or I am happy to provide paper copies.



Study 3 Recruitment Poster and Information Leaflet

Consent for Higher Order Thinking, Smiles and Laughter Project Participation

Please complete this form following accessing the information on the project and asking any questions/queries you may have.

When you submit this form, it will not automatically collect your details like name and email address unless you provide it yourself.

* Required

1. Please indicate who you are * ☐

☐ Parent/Guardian of a two-year-old child

Study 3 Consent Form



Please visit [LinkedIn](#) or [ResearchGate](#) for full professional information, links to my publications and accolades.

Embedded links to connect and learn more about me



Video

PhD Research Project Participation

I am currently recruiting participants for my third study on smiles, laughter and higher order thinking in two-year-old children.

Participation is required from parents/guardians along with their two-year-old child and includes attending Staffordshire University children's suite for two activities approximately 1 week apart. The activity includes playing on a toddler app on one occasion where smiles and laughter are exaggerated, and another when smiles and laughter are natural. At the end of participation there is a photo ceremony and certificate/goodies for the child [Please express your interest to be involved here](#)

Embedded Forms

You might find the following article of interest



Stacked articles to click and progress through

Study 3 Participant Sway with embedded forms to arrange information meetings

✨ JOYFUL MINDS: UNVEILING INSIGHTS INTO TWO-YEAR-OLD THINKING AND LAUGHTER ✨

None of the information that participants provide will identify them or be attributed directly to them in the final report. The anonymity of everyone who takes part will be protected in the final document as pseudonyms or alphabetical labels will be used.

Any information that is provided will be confidential and accessed only by the researcher stored electronically protected by encryption and cyber security.

Your data will be processed in accordance with the General Data Protection Regulation 2016 (GDPR). The data controller for this project will be Staffordshire University. The University will process your personal data for the purpose of the research outlined in this information sheet. The legal basis for processing your personal data for research purposes under GDPR is a 'task in the public interest'. You can provide your consent for the use of your personal data in this study by completing the consent form that has been provided to you. You have the right to access information held about you. Your right of access can be exercised in accordance with the GDPR. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner's Office, please visit www.ico.org.uk

Study 4 Participant Information ahead of Workshop Participation

Appendix 3 Study 1 Questionnaire Questions

1. Please indicate in what capacity you
2. have frequent and consistent access to 2 year old children, for example, parent, nursery professional etc.
3. What do you think are the causes of smiles and laughter are in the 2 year old children you have access to?
4. How do you respond to smiles and laughter cues?
5. Do you think a 2 year old child is likely to smile or laugh upon mastering a new skill? Please explain your reasons.
6. Is there anything you do to purposefully elicit smiles and laughter?
7. What do you think are 'Higher Order Thinking' skills in 2 year old children?
8. Is there anything that you do to purposefully elicit your 2 year old/s to develop their 'Higher Order Thinking' skills?
9. What activities do you offer that encourage 'problem solving' for your 2 year old/s?
10. Do you find these 'problem solving' opportunities elicit smiles and/or laughter in your 2 year old/s?
11. How/why do you think 'problem solving' activities can provoke smiles and/or laughter in 2 year old/s?
12. Are there reasons why they may not provoke smiles and laughter in 2 year olds?
13. What activities do you offer that encourage 'imaginative' play in your 2 year old/s?
14. Do you find these 'imaginative' play activities elicit smiles and/or laughter in your 2 year old/s?
15. How/why do you think these 'imaginative' play activities can provoke smiles and/or laughter in your 2 year old/s?
16. Are there any reasons why they may not provoke smiles and laughter in 2 year olds?
17. What activities do you offer that encourage your 2 year old/s to have a go at 'goal directed' tasks?
18. Do you find that 'goal directed' tasks can elicit smiles and/or laughter in your 2 year old/s?
19. How/why do you think that these 'goal directed' tasks provoke smiles and/or laughter in your 2 year old/s? .
20. Are there any reasons why they may not provoke smiles and laughter in 2 year olds?
21. What activities do you offer that encourage your 2 year old/s to use their 'memory'?
22. Do you find activities that encourage your 2 year old/s to use their 'memory' elicit smiles and/or laughter?
23. How/why do you think activities that require 'memory' use in your 2 year old/s can provoke smiles and/or laughter?
24. Are there any reasons why they may not provoke smiles and laughter in 2 year olds?
25. Do you think there is any relationship between smiles/laughter and Higher Order Thinking skills in 2 year olds? Please explain your answer.

Appendix 4 Study 2 Descriptive Analysis

Multi-Modal Case Study (CS)	Can adults provoke Higher Order Thinking and pleasure simultaneously for positive developmental progress in two-year-old children?	a. What activities or conditions elicit Higher Order Thinking, smiles and laughter in two-year-old children? b. What can adults do to maximise upon this in practice?
Sessional Care CS	Purposefully eliciting HOT and pleasure simultaneously is possible and perhaps sits within the area of ‘humour development’ which communication, language and social, emotional development are cornerstones of. Adults working with children can utilise their awareness of cognition (how children think and the nature/nurture influence) and the biology of pleasure (‘feel good chemicals’) to inform the activities they offer. A conscious and purposeful awareness of this can have a string of benefits for both the child and adult, especially in; relationships, emotional competence, helping children deal with ‘big feelings’. Whilst life circumstances and personality preferences are diverse, all adults working with children have humour, jokes and kindness at their disposal whilst helping children to develop. Smiles and laughter are possibly the least environmentally effected ‘teaching tool’ at our disposal i.e. regardless of socio-economic status, level of need etc a child/adult can still use smiles and laughter as a vehicle for learning.	Peekaboo games and anything with an element of surprise, anticipation and opportunity to test boundaries and ‘work out’ the circumstance. Non-play can provide an important opportunity for HOT and smiles and laughter e.g. jobs around the house. The task perhaps does not matter, it is the social context and circumstance which is the vehicle for thinking and pleasure. ASD/SPD has differences in manifestation of pleasure, though the genuine indicators of ‘smile in the eye’ remains the same. Equally, the profound importance of relationships can still elicit pleasure and HOT.
School Nursery CS1	Purposefully eliciting HOT and pleasure simultaneously is possible and perhaps sits within the area of ‘humour development’ which physicality, communication, language and social, emotional development are cornerstones of. Relationships are the foundation in providing both challenge and pleasure, initially with physical or silly	Expression play and time for dancing, singing, physicality and children to use their ‘100 languages’ can elicit HOT and smiles. Non-play can provide an important opportunity for HOT and smiles and laughter. Role modelling a ‘smiley’ persona and ‘spreading smiles’ with children and their families can have an impact on the emotional climate and subsequent amount of

	comedy, leading to jokes and more complex instances as a child develops. Adults working with children can utilise a cycle of providing a new or challenging task, respond to children's cues in terms of what makes them laugh, or what ignites their curiosity which eventually relaxes the children and elicits smiles and laughter in their learning. Adults can also tune into the 'wow moment' where skills are mastered, confidence boosted and children are empowered by their learning. Whilst life circumstances and personality preferences are diverse, adults can still use their relationships with the family and children to acknowledge nature/nurture variations and elicit HOT and satisfaction in all children regardless of their temperament and circumstances. Adults subconsciously watch for cues (such as 'faces lighting up') for validation of the practice and how to respond.	smiles shared. The happier children are, the more likely they'll be to smile and enjoy learning. This has been particularly important due to mask wearing, social distancing and lost opportunities to create bonds through smiling. Some activities elicit 'group glee' where all children will 'join in' with the pleasure of others. In contrast, some children can simply copy or use a smile as a coping strategy, therefore important that staff look for genuine cues via their learning and other observable factors coming from the child's mind and body.
School Nursery CS2	Purposefully eliciting HOT and pleasure simultaneously is possible, a key cognitive process in this, is memory and recall, activities that require children to be inquisitive and use what they already know is significant in eliciting both smiles, laughter and HOT concurrently. Adults working with children need to form thorough relationships and draw from their experience to be conscious about subtle cues in a child's face. Smiles are used for many reasons, such as mask or neutralise emotions, influence others and simply to imitate. Therefore, adults do need to be aware of 'genuine' smile indicators to be sure satisfaction and learning are indeed occurring. Adults in the home also influence this, their sense of humour and mindset are equally influential on a child's expression of	Often comes as a result of sensory play, activities with props and opportunity for imagination as well expressionist play. Stories mixed with opportunities for children to apply what they know of the story with their friends such as tuff trays, role play and games. Communication, language and literacy embedded activities for example, Noisy Neighbour game whereby children identify a sound that may wake up a sleeping neighbour.

	emotion and learning.	
School Nursery CS3	Purposefully eliciting HOT and pleasure simultaneously is possible, especially when children are encouraged to think about abstract concepts, such as things that are not there, things that they need to use their memory for, or experiences they need to recall/re-enact. Adults working with children need to be mindful of their own mindsets, and expressions of thinking and humour for children to model and feel safe to express themselves around. It is important that adults in the setting attempt to elicit smiles, laughter and HOT concurrently as this maybe the only opportunity a child has within the circumstances of their life to enjoy positivity, enjoyment and learning. Children are sensitive to an emotional climate, therefore the emotional environment when learning needs to be positive and it is the adults that determine this, so must take responsibility.	Often comes as a result of role play – especially when adults get involved and take on a role. Outdoor play and expressionist play also see large instances of learning and pleasure simultaneously. Letters and sounds activities have the capacity to elicit both smiles and HOT, especially when puppets are involved.
School Nursery CS4	Yes, but relationships are the prerequisite for this being possible. Once a relationship is established, silliness, incongruity and visual/oral jokes are understood during learning and activities Adults can support humour development (which in itself is complex thinking) and this can be done via differentiating language, tone, expressions and can be done effectively during non-play learning opportunities, such as snack time. It is important that adults in the setting put effort into attempting to elicit smiles, laughter and HOT concurrently as all children have different backgrounds (not all positive). Therefore, being at the setting is the opportunity for fun, motivation in learning and excitement in life.	Music, instruments and expressive/performance play are attention grabbers and can be used in complicated thinking. Letters and sounds activities have the capacity to elicit both smiles and HOT, especially when puppets are involved. The puppets and role play activities, (or any with stories involved) can all be funny whilst furthering development and milestones. Expressive relationships during non-play tasks, making the most of every interaction.