Ostensive Cueing, Epistemic Trust, and Reflective Functioning:

A Conceptual Review and Exploration of a Quantitative Paradigm

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

Part 1 is a conceptual introduction to the literature attempting to explain the process of social learning in humans. Social-cognitive and behavioural models of infant learning are examined, alongside the use of ostensive communicative signals within the frameworks. Literature from mentalization and epistemic trust is examined as an alternative framework for social learning, and this is linked to concepts from attachment theory and psychoanalytic work. With a clearer narrative in mind, the paper then discusses the concepts from the perspective of adult learning, alongside clinical implications when disruptions occur. There is an identified knowledge gap when quantitatively measuring epistemic trust, and this sets out the foundation for the empirical paper in Part 2.

Part 2, the empirical paper, describes an experimental paradigm to assess how implicit social learning (a word recall paradigm) is affected by ostensive cues, epistemic trust, and individual difference measures (including measures of attachment, psychopathology, and mentalizing). This is a joint project with another UCL DClinPsy trainee who focussed on how individual differences in childhood abuse and neglect impacts mentalizing and learning (Raymont, 2021). Results indicated those receiving computerised ostensive cues recalled significantly less words than those receiving ostensive cues from the researcher, or no such communicative cues at all. The individual difference measures were not predictive of word recall.

Part 3 consists of a critical appraisal and personal reflections of the research process. Topics covered include the circumstances of conducting empirical research during the COVID-19 pandemic, the influence of prior experience, writing a conceptual introduction, recruitment and software difficulties, and a final reflection on what could have been done differently.

Impact Statement

This research has important impacts both within and outside of academia. Within academia, the conceptual introduction attempts to synthesize the various conceptualisations investigating social learning into a clearer and more cohesive narrative. This can then be used as a theoretical foundation for the development of further theories and empirical research. The results from the empirical study have highlighted possible areas of future research in the aid of developing a robust quantitative measure of epistemic trust. The findings highlight possible detrimental effects of computerised ostensive cues on implicit social learning, which sets the stage for researchers to investigate this further. The limitations discussed also bring into academic awareness the effectiveness of ostensive cues through a virtual platform, which highlights the need for further research on ostensive cues in different contexts. Additionally, through reflections discussed in the critical appraisal, researchers attending to similar tasks can learn from the experience gained by the author of this paper.

Outside of academia, the results have a wide range of different impacts. Firstly, the possible detrimental effect found from computerised ostensive cues on social learning directly relates to online self-help programmes. This suggests that individuals may benefit more from having no ostensive cues utilised within the programme, as opposed to, for example, the programme addressing a participant directly (e.g., by their name). Secondly, given the COVID-19 pandemic, which has resulted in an increase in the use of teletherapy and decrease of treating patients in person, this research comes at an important time. With the expected rise in online therapy experiences, it is vital that researchers and clinicians thoughtfully consider the role of ostensive cues in the development of epistemic trust and social learning. This relates to both the possible benefits identified in previous literature (e.g., Fillingham, 2018), and the detrimental effect identified in this paper.

To ensure the results from this paper reach their full potential, they will be prepared for publication in academic journals. However, the author of this paper is aware this does not always reach non-academic circles and will therefore actively search out opportunities to present these results in a wider and more easily accessible setting, such as in talks, workshops, and consultations.

Table of Contents

List of Figures

List of Tables

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Part 1: Literature Review

Epistemic Trust, Ostensive Cues, and Adult Learning

Abstract

Learning within a social context is a key feature of human development and communication, and there are numerous different theories attempting to explain the processes and mechanisms by which it occurs. This conceptual introduction intends to synthesize the varying concepts and frameworks within the social learning literature into a clearer narrative which further empirical research could use as a foundation. It will review frameworks from social-cognitive and behavioural models that explain social learning mechanisms in infants, before exploring mentalization and epistemic trust as a new framework. This will include a review of the attachment theory literature and how this relates to epistemic trust and learning. The roots of epistemic trust will also be explored through psychoanalytic literature. Ostensive cues are noted to be of importance across the models, and their definition and role is critically examined. These fields will then be linked to the process of learning in adults, alongside an explanation of clinical implications for when these processes are disrupted throughout development and adult life. The field lacks a quantitative measure of epistemic trust, and this conceptual introduction will conclude by setting out research aims for the empirical paper to investigate this.

Keywords: Epistemic trust, ostensive cueing, social learning, mentalization

Introduction

As humans, we are all born into a social world defined by varying cultural contexts and norms which are not easily understood through perception alone. In the context of evolutionary theory, the ability to understand ourselves and others in terms of intentional mental states (coined as *mentalizing*, or *reflective functioning*; Fonagy et al., 2016), is seen as advantageous as it promotes the ability to function cohesively in social groups, and in the social world more widely (Fonagy et al., 2017). Linked to mentalization is the development of *epistemic trust*, an individual's ability to appraise information as accurate and personally relevant to them. Given that much of our learning occurs in a social context, epistemic trust can be seen to underly the openness to most social communication.

Epistemic trust however is not viewed as the default position from which humans operate. Evolutionary theory again suggests that we position ourselves within a protective state of epistemic vigilance, so as not to believe everything communicated to us unquestioningly. The process of lowering our innate state of epistemic vigilance to that of trust allows us to learn from others as we have appraised the incoming information as personally relevant to us; it matters (Sperber et al., 2010). Finding the appropriate balance between epistemic vigilance and trust in the interpersonal realm has important implications on social learning and all of its consequences. It is easy to imagine how an individual whose developmental experience has resulted in the disruption of this balance, such as in the face of early maltreatment, may find it difficult to operate appropriately in the social world they arrived into. Given the overarching impact on learning as a whole, Fonagy and Allison (2014) therefore suggest that many types of psychopathology can be defined by a breakdown in this process, and retrieving an equilibrium is central to positive therapeutic outcomes.

With social learning being linked to pathology and therapy processes, it has become clear that a coherent and integrative developmental model that accounts for this is needed. This

conceptual review intends to digest the varying conceptualisations of social learning into a clearer narrative through critically examining the input from the fields of cognitive neuroscience and behavioural science. The review will then synthesise these ideas under the alternative framework of mentalization and epistemic trust. This new theory will be laid out and critically examined. The psychoanalytic roots of epistemic trust will also be considered, and how this links to social learning. After clarifying the new mentalisation and epistemic trust framework, this paper will move to exploring how this has been researched beyond infant learning and into adult phenomena, alongside an outline of clinical implications. The need for empirical assessment will be discussed, and this understanding will set the groundwork for an empirical social learning experiment in adults.

With the aim to expand on the development of a quantitative measure of epistemic trust in adults, the empirical paper will mostly be an adaption of Fillingham's (2018) existing paradigm. This is an experimental manipulation that allows for the assessment of varying amounts and styles of ostensive cues before being given an implicit learning task. Fillingham found that ostensive cues led to better results on the learning task, however she noted a lack of power and possible confounding effects which we aim to ameliorate in the present project. As previous research indicates varying degrees of correlation between epistemic trust, learning, and reflective functioning, this project will also explore the link between implicit learning and reflective functioning of individuals. The importance of this research lies not only in understanding how humans learn in a social context, but also in the clinical implications of treating those with difficulties in achieving typical levels of epistemic trust. However, the field is currently unclear due to concepts from a range of different theoretical backgrounds not having a clear narrative or framework to bind them together.

Social Learning Mechanisms

Gaze following, the ability of an infant to line up their gaze with another person's in order to share attention on the same objects or events (Butterworth & Cochran, 1980), is viewed as a vital social skill that supports the infant in learning language, cultural values and norms, and environment-specific behaviour (Brooks & Meltzoff, 2015; Morales et al., 2000). Within the literature, there are two main accounts for how the process of gaze following is initiated and leads to learning: a 'social-cognitive' theory, which is split into two parts, and a more behavioural 'reinforcement learning' framework.

Framework 1.1. Social-cognitive - Natural Pedagogy

Csibra and Gergely (2009) argue that humans have a unique capacity to transmit culturally relevant and generalisable knowledge to younger generations, who are concurrently able to receive and process this information, which leads to new learning. This capacity, known as *Natural Pedagogy*, relies on an adult indicating the beginning of their intention to transmit relevant knowledge to an infant through Ostensive Cues, such as direct eye-contact, child-directed speech (including name-calling), and facial expressions. At the same time, this theory suggests that infants are able to innately and automatically identify these cues as a precursor to communication. The process of ostensive communication requires two parts (Gallagher, 2013) (1) there is an indication that the act is communicative (and not just an accident), and (2) there is something to identify who is being addressed. An important aspect of this theory is that the learning, in an ostensive context, is generalizable to other settings. Csibra and Gergely (2009) provide the following example: in showing an infant that two airplanes are capable of flight, they learn generalisable knowledge about all airplanes that is not limited to the two used in the example. Additionally, they stress that this knowledge does not require verbal communication and can instead be demonstrative (e.g., opening a milk carton leads to generalizable knowledge of how to open similar types of objects). These ostensive cues that lead to an ostensive context

are argued to be a pre-requisite to effective gaze following; so much so that gaze following and learning cannot occur without the use of at least one ostensive cue prior to this.

This process has been empirically researched in a variety of different studies, leading to some support for the theory. In one research paper, experimenters found that six-month-old infants engaged in gaze following when the adult used one of two ostensive cues (direct eye-contact or infant-directed speech), but were unable to when the adult's face was covered by attention-grabbing stimuli such as a nonsocial animation prior to moving their gaze (Senju & Csibra, 2008).

Framework 1.2. Social-cognitive - Attention

Criticism towards the Natural Pedagogy theory usually entails a debate around the cognitive ability of attention. They argue that infant-directed speech and direct eye contact are both highly attention-grabbing. Although this does not demonstrate an inherent flaw within the theory, it does highlight that attention may not have been adequately controlled for in the studies reporting the vital role of ostensive communication (de Bordes et al., 2013; Szufnarowska et al., 2014). Taking the aforementioned study by Senju & Csibra (2008) as an example, it is not clear whether the non-social animation is capturing the attention of the infant in a way that makes the ostensive cues of direct eye-contact and infant-direct speech redundant to the process of the gaze following.

Two studies have examined this problem in an experimental paradigm. In the first, by Szufnarowska et al. (2014), six-month-old infants were presented with three different conditions aimed at differentiating the importance of attention and ostensive communication. The first condition was classified as high attention-grabbing and an ostensive cue (a woman makes direct gaze with the infant before shifting her gaze towards a toy), the second as high-attention grabbing but non-ostensive (a woman shivering before shifting her gaze towards a toy), and the third as low-attention grabbing and nonostensive (a woman did not do anything

before shifting her gaze towards a toy). There were a number of actors performing in the experiment, and they were counterbalanced across conditions. The results indicated that the infants followed the actor's gaze in the first two conditions (direct eye-gaze and the shiver) but not when there was no cue prior to the gaze shift. Natural Pedagogy theory posits that gaze following only occurs following an ostensive cue, whereas in this study it occurred during the "shiver" condition, providing evidence against Natural Pedagogy theory, whilst highlighting the importance of highly attention-grabbing stimuli.

A more in-depth study of this article reveals the possibility of some methodological flaws, however. The authors assume the shivering condition led to gaze following as it is highly-attention grabbing, but the within-subjects design resulted in some nonostensive conditions being preceded by the ostensive one (e.g., the direct-gaze condition could be followed by the shivering condition). This contextual difference makes it hard to separate the impact of ostensive cues in comparison to attention. Additionally, the statistical analyses conducted were brought into question in a critical appraisal of the work (Csibra et al., 2014). The authors suggest that the original effect sizes reported are overestimated as they have been incorrectly calculated using the formula for two-sample t-tests whereas the study conducted single-sample tests.

The second study (Gredebäck et al., 2018) aimed to attend to these criticisms by replicating the three conditions with a large sample of six-month-old infants but using a between-subjects design instead. The sample size was increased from 22 in Szufnarowska et al's study (2014) to 94, resulting in enough power to run two-tailed statistical analyses, which are argued to be more stringent in their criteria for accepting statistical significance (Csibra et al., 2014). In this conceptual replication, researchers found that infants engaged in gaze following regardless of the condition, but most commonly in the shivering (high attention)

condition. This provides further evidence against Natural Pedagogy's notion of infants requiring an ostensive cue to engage in gaze following.

Framework 2. Behavioural - Reinforcement learning

An alternate theory to describe how infants develop the ability to follow gaze comes in the form of Reinforcement Learning. This theoretical framework discounts the idea that gaze following is an innate ability, but instead is developed through gradual learning over time (Deák et al., 2014). This progression has been noted to start when the infant is aged three or four months as they respond to a shift in an adult's gaze if the object is close to the adult's head, whereas by 12 months they can follow gaze to objects further from the adult, and even behind them (Deák et al., 2000; D'Entremont, 2000; Flom et al., 2004; Gredebäck et al., 2010). Moving away from the social-cognitive explanations, reinforcement learning is used as a framework to capture higher-level planning abilities alongside classical and instrumental conditioning in adults (Deák et al., 2014). The agent, an infant in this case, attaches a value to an action in a given circumstance. Learning follows adaption of actions based on the previous outcomes in specific circumstances, resulting in the development of new actions. In gaze following, gaze shifts aligned with the caregiver's gaze is likely to lead to interesting sights, and this reward could lead to a strengthened tendency to look in the same direction as the caregiver in future (Triesch et al., 2006).

There have been a number of studies exploring the plausibility of this framework through computer simulations (Jasso et al., 2012; Lewis et al., 2010; Triesch et al., 2006, 2007). Studies investigating this in behavioural paradigms are rarer, however one study aimed to address this through micro-behavioural ethnographic methods (Deák et al., 2014). The researchers documented types, rates, durations, and sequences of caregiver behaviours in a naturalistic play situation at home between caregivers and infants. Through analysing the interactions between the caregiver-infant dyads, they report that infants could learn gaze

following through the naturally occurring event sequences in the interactions; without the need for innate knowledge of mental states such as intention or attention. This conclusion is based on three findings that were drawn from the study: the natural events contained multiple gaze states; the learning was supported by infant looking preferences; and the caregiver looking patterns provided a teaching signal for gaze following for the infants (Deák et al., 2014). These findings are in line with simulation studies from Lewis et al. (2010).

Although the reinforcement learning framework does not disprove the social-cognitive framework, the researchers argue that it demonstrates the social-cognitive framework adds superfluous assumptions yet fails to accurately predict results. Additionally, the social-cognitive frameworks are unable to relate the learning predictions to neural learning processes; for example, the reinforcement learning framework predicts the existence of mirror neurons (Triesch et al., 2007), which has been experimentally confirmed (Shepherd et al., 2009). This argument appears to be a variant of Occam's Razor, the explanation with the fewest assumptions is most likely the right one.

A Combination

Both frameworks have empirical support to indicate their role in the development of gaze following, suggesting they are not mutually exclusive and may both be at work by the end of the first year of a child's life (Gredebäck et al., 2010). However, the question remains as to which mechanism allows the process to begin, when the infant is around three or four months old. Gredebäck et al. (2010) set out to answer this question by examining how gaze following differs depending on the identity of the infant's interaction partner. They argue that manipulating the identity of the partner would allow the derivation of predictions that could differentiate the two frameworks.

According to Gredebäck et al. (2010), the reinforcement learning framework would predict gaze following is more frequently seen in mother-infant interactions than stranger-

infant interactions due to the difference in frequency of the stimuli and consequent learning periods (i.e., infant's see their mother's face more often, giving them more opportunity to learn through reinforcement). The reinforcement learning literature evidences generalisation of learning across stimuli, however the response would be of smaller magnitude (Ghirlanda & Enquist, 2003) in strangers than mothers.

Turning to the social cognitive framework, it makes no predictions regarding mothers or strangers. However, if gaze following relies on social-cognitive abilities such as attention, then the novelty of a stranger's face may be more attention-grabbing than the infant's mother's. There is some evidence for this in 5-, 7-, and 9-month-old infants during free play (Striano & Bertin, 2005), but less so when examining joint-attention activities such as gaze following.

Gredebäck et al. (2010) took these possibilities and studied 2- to 8-month-old infants through a prospective longitudinal eye-tracking study. They found that infants demonstrated a preference for following the gaze of a stranger more than their mothers, emerging between four and six months of age. These results are interpreted as disproving the possibility of reinforcement learning being at the core of gaze following as infants should demonstrate a mother preference.

In their aforementioned paper, Deák et al (2014) argue that Gredebäck's interpretation is based on the assumption that more reinforcement learning occurs when infants attend to their caregiver than a stranger, which is not empirically validated. They go on to argue that the opposite prediction could be made, and the novelty of a stranger's face leading to further reinforcement can be explained through the 'temperature parameter' concept within reinforcement learning models (Sutton & Barto, 1998).

The research suggests both frameworks play a role in the development of gaze following in infants, and it remains unclear which, if any, is solely at the core of this process.

Mentalization and Epistemic Trust: The we-mode

An alternative concept to explain social learning can be seen through mentalization theory. The concept of mentalization is becoming increasingly popular within research, ranging from under 100 publications by the end of the 1990s to well into the thousands by 2019 (Luyten et al., 2020). It encapsulates the uniquely human ability to understand the self and others in terms of intentional mental states (e.g., feelings, desires, attitudes, goals; Luyten et al., 2020), and has not been found in other animal species, with the exception of an elementary variant in some primates (Tomasello, 2018a, 2018b). It can be seen as an umbrella term containing a range of features of social cognition such as Theory of Mind, insightfulness, alexithymia, empathy, and mindfulness (Choi-Kain & Gunderson, 2008), all of which could play a role in social learning.

Although it may be an innate ability, mentalization remains something to be developed over time and in the correct contexts. Fonagy et al. (2021) describe how social learning relies on "thinking together", which draws on the concepts of joint-attention and collaboration from the social-cognitive conceptualisations (Tomasello, 2020). This idea of understanding the communicative intention of another is found in the gaze following research that highlights children showing joint attention and shared intentionality from 3-4 months of age (Csibra & Gergely, 2009). The development of mentalizing relies upon this joint attention as it is the start of an infant and its partner to experience the same thing at the same time from different perspectives (Tomasello, 2018c). What is unique to humans is the ability to compare and coordinate these different perspectives (Tomasello, 2019; Colle et al., 2020).

This experience of shared cognition and collaboration is characterized by a move into the *we-mode*, also termed relational mentalizing (Gallotti & Frith, 2013; Higgins, 2020; Fonagy et al., 2021). Adopting this we-mode allows a collaboration of resources towards the

accomplishment of an outcome, however it requires mutual respect and trust that each participant has a role to play in the collaboration (Tomasello, 2016).

Taking the perspective of mentalization as a transtheoretical model, the idea from Natural Pedagogy that infants are able to identify knowledge that is personally relevant to them and generalisable is relabelled to epistemic trust. Ostensive cues, viewed through this lens, all share a commonality that allow the recipient to be recognised as a subjective agent, a self (which is separate from an other); that they are being mentalized. The cues (such as eye-contact or using the infant's name) are seen as generators of epistemic trust which then opens the channel for the sharing of knowledge.

It is worth noting that this framework for explaining the transmission of knowledge and learning assumes a default position of epistemic vigilance whereby these channels for sharing knowledge are typically closed and are only opened through the mechanism of ostensive cues and epistemic trust. This is viewed as adaptive and evolutionally protective as it defends against false and inaccurate information being transmitted and incorporated by the receiver (Sperber et al., 2010). Experimental studies have confirmed this finding that infants engage in appropriate levels of uncertainty and suspicion towards knowledge from others (Fonagy et al., 2017).

Fonagy et al (2021) argue that social learning, moderated by epistemic trust, is reliant on the establishment of the we-mode. They describe relational mentalizing as key; the communicator of knowledge must be able to mentalize the recipient in a way that the recipient feels is accurate to their experience. This we-mode thinking, the researchers posit, reduces epistemic vigilance, and allows free-flowing communicative channels to open and be utilised for learning. They succinctly summarise this process as:

if I feel that I am understood, I will be disposed to learn from the person who understood me, who I feel is a trustworthy potential collaborator. This will include learning about myself but also learning about others and about the world I live in (Fonagy et al., 2021, p. 7).

Attachment and Reflective Functioning

Given that mentalizing, or reflective functioning, is a skill developed over time, it is important to consider the contexts whereby this process can occur as it has lasting implications with epistemic trust. The theory posits that developing a capacity to mentalize requires an attachment relationship (Luyten et al., 2020). Within this attachment context, the parent's reflective functioning is seen as a vital component in fostering the child's ability to mentalize by conveying to the child a sense that they are being treated as an intentional agent with their own mind (Luyten et al., 2017; Sharp & Fonagy, 2008; Slade, 2005). This specific form of parental reflective functioning (PRF) is considered to be strongly associated with the child's attachment style, their own reflective functioning ability, and interpersonal functioning and emotion regulation. Antenatal PRF predicted the attachment style of children aged 12 and 18 months in a study of 200 mothers (Fonagy et al., 1991), and continued to predict the reflective functioning ability in those children 17 years later (Steele et al., 2016). In this longitudinal sample, secure attachment was associated with more positive performance on a cognitive-emotion task when the children were five and half years old (Steele & Steele, 2005)

It is worth noting that mentalization is not viewed purely as a constant, but rather it fluctuates depending on the relationship and context. There are some trait and state features (Luyten et al., 2020) and there is evidence showing that as stress or arousal increases, the capacity to mentalize decreases (Luyten et al., 2012). Even in the caregiver-infant attachment relationship, it is expected that the caregivers' mentalizing ability will fluctuate in different scenarios; however, there is a positive correlation between securely-attached individuals and their mentalizing prowess (Sharp & Fonagy, 2008). Relating this specifically to children, most

studies suggest that secure attachment in children leads to a positive development in the more cognitive aspects of mentalizing such as joint attention and gaze following (Claussen et al., 2002), as well as the affective side such as empathy and processing emotions (McQuaid et al., 2008; Troyer & Greitemeyer, 2018).

A New Framework for Understanding Social Learning

Luyten et al. (2020) note that the process of developing epistemic trust goes further than the dyadic attachment relationship. They reference the importance of peers, community, and sociocultural influences such as social media and news which may all influence the development of epistemic trust. They list a number of challenges towards the original attachment theory that limits itself to caregiver and infant: (1) the relationship between attachment style and developmental outcomes is not as strong as expected (Fearon et al., 2010; Groh et al., 2012), (2) the stability of attachment style varies across development (Fraley, 2002), (3) the role and function of the attachment-behavioural system may be influenced by a wider range of factors such as the environment and culture (Verhage et al., 2018), (4) parental sensitivity, and parental mentalizing, explained a smaller proportion of variance in attachment transmission than expected (Verhage et al., 2016; Zeegers et al., 2017), and (5) there is an increase in studies demonstrating the role of genetics within attachment (Fearon et al., 2014).

The researchers visualised these concepts in Figure 1 which demonstrates how parental mentalizing within attachment contexts is seen as within the context of family and neighbourhood, the wider environment, and the broader sociocultural context. This influences the innate epistemic trust in humans which then leads to a virtuous cycle of social learning and improved abilities to mentalize and create secure attachment styles. The combination of these three allow the child to adapt appropriately to challenging situations and thus develop resilience.

Figure 1

Social-evolutionary Communicative Model of the Role of Mentalizing in Development (Luyten

et al., 2020)
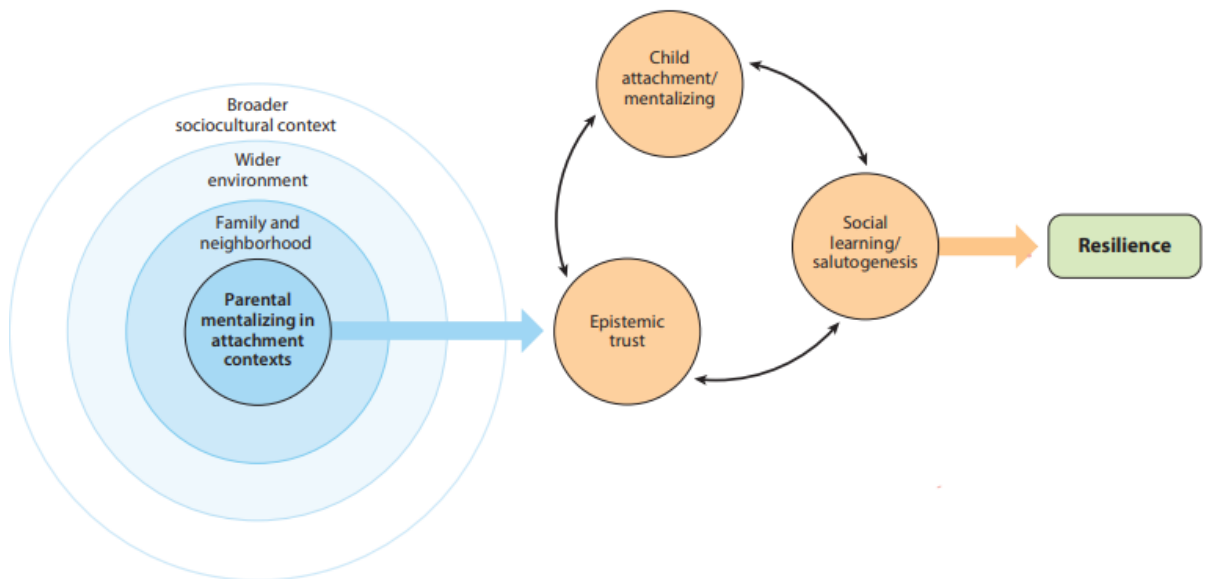
The researchers also see this as a shift in the more widely-accepted view of attachment style being attributed to the individual in question. They consider how, within this framework, attachment styles are developed through promotion in the family environment as being the most useful way to operate in the dominant setting. They argue that from this perspective attachment disturbances and related psychopathology can be viewed as no longer innate, individual-focussed problems, but as "manifestations of communicative strategies underpinning social learning to ensure adequate adaptation to changing social situations" (Luyten et al., 2020, p. 311). For example, a child who is constantly lied to by their caregiver may develop scepticism to the honesty and inherent worth in social communication in order to not be continually fooled or taken advantage of.

Linked to social learning in Luyten et al's (2020) model is the term *salutogenesis* which they define as the "capacity to benefit from positive influences in one's environment" (p. 300). They highlight that this capacity, and the linked epistemic trust, is not the default mode of

25

functioning in humans; but instead the epistemic vigilance must be overcome through time and positive experiences. To summarise, the researchers take these concepts together to argue that epistemic trust is most easily developed in the context of a secure attachment experience constituting caregivers who display high levels of mentalizing (e.g., recognising the individual agency of the child, and displaying genuine interest in their mind), which leads to the establishment of the aforementioned we-mode. As seen in Figure 1, this process is intertwined with the broader contexts in which the infant finds themselves. This allows the consideration of cultural norms, making the framework more easily generalisable to differing cultures and backgrounds.

Psychoanalytic Roots

Thus far we have discussed learning from cognitive, attachment, and developmental perspectives. The new mentalization and epistemic trust model combines aspects of these frameworks however it would be an inaccurate portrayal of the concept if its psychoanalytic roots were not also considered. When referencing mentalization, Bateman and Fonagy (2004) describe it as a new word for old concepts. In his well-considered review of the intellectual origins of mentalization, Holmes (2008) identifies variants and precursors of mentalization in both the work of Bion, and what he terms *francophone psychoanalysis.*

Bion (1967, 1994) developed a mathematical equation on the origins of thinking, starting from the Freudian idea of thinking coming into being as a response to absence. To use the breast as a symbol of "good", the absence necessitates an imagined breast. Absence is viewed as a loss and therefore "bad" and intolerable, so the infant projects it from the "all-good" inner world. Bion then highlights the difference between thoughts and what thinks the thoughts (thinking). He described, as Holmes (2008) points out, how thoughts must be contained within a thinker who thinks them, and this capacity is known as alpha function.

Alpha function turns thoughts without a thinker (beta elements) into alpha elements which allows them to be thought about; namely, mentalization.

Holmes (2008) goes on to argue that the absence or loss of a containing mother, someone who is able to think thoughts, could lead to disproportionate projective identification and therefore a possible deficit in mentalization capacity as the infant grows up. According to Bion, a "contact barrier" is formed following the appropriate change of beta elements into alpha, which differentiates conscious and unconscious thoughts. This ability to separate what is real from what is fantasy, and to think about each, is a vital aspect of mentalization.

The Francophone perspective speaks to mentalization much more explicitly as this psychoanalysis roots its theory in Freud's early work (1895) which encapsulates thought as the natural result of unrestricted drive-energies. If these drive-energies are obstructed, the result can be an energy discharge in the form of action, or a move to somatization. Holmes (2008) highlights French analysts (namely Luquet, 1981 and Marty, 1991) as seeing somatization as equivalent to an inability to vocalise feelings as words (alexithymia). The converse of this somatization is therefore mentalization as it describes the ability to turn drives into feelings which can be reflected on, spoken about and thought about. The Francophone psychoanalysis seems to place this capacity on a spectrum from somatization to mentalization.

Although there are similarities, there are some subtle differences which make the more recent Fonagy model of mentalization unique. Bion speaks of sustenance (the breast, the nipple, the mouth) whereas Fonagy, and the underpinning research, speaks of visual engagement (facial and eye contact, gaze following). The Fonagy model also has more focus on environmental deficits (a child being deprived due to lacklustre or ill-intentioned parenting), however this has been adapted in their change to a more resilience-focussed model.

Erikson (1964) argued that psychosocial development occurs over eight predetermined phases, with the first being a crisis (an internal psychic conflict) between trust and mistrust.

This crisis occurs between birth and around 18 months of age, and is described by the infant being uncertain about the world they inhabit. Through stable, predictable, and reliable care, the infant goes on to learn the virtue of hope; or epistemic trust. This has similarities to attachment research which suggests the importance of stable caregiving, and also includes how an infant will learn to operate from a position of epistemic hypervigilance if this care is not given appropriately. This theory has been revised and seen as more fluid than Erikson first proposed, however it highlights the concepts that Fonagy uses to describe the makeup of mentalization have been within psychoanalytic literature previously.

The development of concepts such as epistemic trust and mentalization are inherently intertwined with the development of a sense of self. Without the ability to separate "me" from "not-me", it is impossible to consider the thoughts, feelings, or intentions of others. This sense of self is seen in children using and understanding self-referential language after around 2 years of age (Lewis & Brooks-Gunn, 1979), but begins to develop before this. Object Relations Theory, most commonly attributed to Klein (1921, 1923), highlights the way in which people relate to others in their adult lives is moulded by their infant experiences. Interpersonal experiences in infancy are turned into internal objects within the psyche that the self uses in adulthood as a template for future behaviours. The theory comments on the intense relationship between the mother and infant whereby the infant sees the mother (the breast) as either "all-good" or "all-bad"; giving or denying. Initially the infant's psyche contains only individuality, or a sense of omnipotence, and Klein describes a psychic change as the infant learns that the mother is both good and bad at the same time; the "all-good" breast is also the "all-bad" breast. This move into what Klein calls the *depressive position* signals a newly formed ability in the infant to see their self as different from an other.

Klein also discusses the role of curiosity, which she terms the *epistemophilic instinct*, as central to cognitive development and social learning (1948). She theorised that a child's

initial curiosity is closely linked to the mother and what is inside her. Questions such as "What is mother like?", "what am I like?", "was I pushed out of mother?", "did she not want me?", "is there another baby inside her?" are not explicitly vocalised by the infant, but can be seen in expressions of emotions and play (Klauber, 2009). Klein sees this as the child discovering their relationship with the world, and their position within it. This initial curiosity is how the beginning of a sense of self may arise. In line with the later work on attachment theory, Klein describes the importance of good physical care in the development of a sense of security and safety in the infant. The importance of this is two-fold. Firstly, Klein argues that this sense of security can result in a reduction in the hostile impulses present in all infants, which is linked to improved mental wellbeing (Klauber, 2009). Secondly, a child who feels secure can confidently explore and interact with the world without extreme anxiety taking over their mind. This appears to directly relate to the idea of epistemic hypervigilance in social learning, where an individual may feel too anxious to confidently engage with the interpersonal world and receive information transferred from others.

Moving to Adult Learning

The importance of gaze following in infant learning is clear, and taking a mentalization perspective allows us to see how ostensive cues lead to epistemic trust whereby infants can learn in a social context through the we-mode. However, there is a scarcity of research expanding this link to adult learning. To our knowledge, based on a meta-analysis conducted by Fillingham (2018), we are aware of only four studies conducted in this area.

The first, by Marno et al. (2014), investigated whether the social context of an object influences how it is encoded. Specifically, they distinguished objects' intrinsic features (e.g., shape) from extrinsic features (e.g., location) in how they are processed and encoded. In a communicative context (i.e. one where ostensive cues are used before an object-directed action like pointing) they found that participants' ability to remember intrinsic features of an object

increased whilst their ability to remember extrinsic features decreased. This bidirectional effect was not found in a non-communicate context. This effect has also been demonstrated in child research (Yoon et al., 2008), and was explained by limited memory capacities in infant children. In adults, the finding suggests it is not due to age-related memory resources, but instead may be a fundamental aspect of human communication and might support the process of gaining generic knowledge from others (Prasada, 2000); in line with the Natural Pedagogy theory.

The second study, by Oláh et al. (2016) found largely consistent results with Marno et al. (2014) when separating participants into groups receiving intensive social stimulation (eye gaze and physical contact) or not, followed by a change-detection task. They argue the stimulation acts as a primer to the pedagogic stance by eliciting changes in the neurohormonal system which have a carry-over effect into the following task. However, the authors comment that they cannot be certain that the effects observed are due to the same underlying mechanism without further research.

In the third study, Redcay et al. (2016) demonstrated that participants performed better in a recognition memory task when they experienced direct gaze from an actress prior to the task than those who received no gaze. The researchers also found no effect from the type of object-directed action performed (pointing vs reaching), further signifying the importance of ostensive cues, as opposed to pure attention, in learning.

The fourth study by Fillingham (2018) used an experimental paradigm adapted from the 'self-referent incidental recall task'. Participants decide whether a list of positive or negative personality attributes apply to them and are then given a surprise recall memory task on the words, a measure of implicit learning. In Fillingham's (2018) study, participants are randomised to one of four groups prior to completing the task: no ostensive cues (they do not receive any ostensive cueing), computerised ostensive cues (they receive ostensive cues

through a computer character), person ostensive cues (the researcher provides in-person ostensive cues), or combined ostensive cues (they receive both computerised and in-person ostensive cues). Fillingham also used their recall accuracy as a proxy measure for attention, allowing it to be controlled for in the analysis. Results indicated a significant positive effect of ostensive cues on incidental learning, independent of attention as measured by the accuracy proxy. Fillingham's results support the Natural Pedagogy theory as well as the predictions from the mentalisation framework that ostensive cues enable learning (Fonagy & Allison, 2014).

To date, Fillingham's (2018) study is the most well-constructed paradigm we have sourced that also explores a more complex form of learning than simple object-recognition. However, there are a number of limitations. First, the reported effect sizes (η_p^2 = .059 to .066) are noticeably smaller than those reported in Marno et al's (2014) study (η^2 = .244). Fillingham locates this difference in the within-subjects design utilised by Marno, versus between-subjects, which would remove any individual differences between participants that may increase variance, such as psychopathology. The researchers suggest either increasing the sample size and power within the study to account for this, and the possibility of including measures of individual differences independent of ostensive cues as a control variable.

Combined, these four studies illustrate the importance of ostensive cues, outside of pure attention, to learning in adults. The fourth study by Fillingham even goes as far as to uniquely demonstrate that computerised characters may be able to provide the ostensive cues, albeit in a less intense form, leading to improved implicit learning.

Clinical Implications

Within the developmental triad of mentalization, attachment, and epistemic trust, Fonagy et al. (2017) argue that the most significant impact on psychopathology stems from a breakdown in epistemic trust. They see most psychopathology as a transient or permanent

interruption in epistemic trust, leading to an inability to engage in social learning. Mentalization is seen as a generic way to establish this epistemic trust within therapy.

A deficit in mentalizing capacity and epistemic trust has been linked to a range of cognitive and socioemotional problems such as academic achievement, interpersonal difficulties, attentional control (Fonagy & Luyten, 2018). Additionally, there have been numerous links between epistemic trust and psychopathology, including common mental disorders and rarer personality disorders. Mentalization-based therapy has been recommended as a treatment for borderline personality disorder (BPD) given the tendency for those with this disorder to be overly simplistic or overly analytic when describing their own (and others') mental states (Fonagy & Luyten, 2009). There have been implicit links to epistemic trust within the structure of BPD as these patients tend to show high levels of distrust, expect others will act negatively towards them (e.g., rejecting, abandoning, neglectful), and have a more general bias towards perceiving others as hostile (Fertuck et al., 2018). These results are indicative of epistemic hypervigilance, which may suggest a difficulty in learning as they are less likely to utilise ostensive cues to open up communication routes.

Similarly, recent work has examined the links between mentalizing and other personality disorders such as antisocial (ASPD) and narcissistic and avoidant (Bateman & Fonagy, 2019). Evidence suggests there are two developmental pathways involved in the onset of ASPD, one being a quick switch to affect-dominated and highly affective mentalizing in individuals who show hypervigilance to emotions (Fonagy & Luyten, 2018), and the other is characterised by those with callous-unemotional traits such as a lack of affective mentalization and an increased ability to use manipulation for instrumental gain (Viding et al., 2014). The authors view the development of ASPD as adaptive within adverse social contexts (alongside biological predispositions). For example, in a context defined by violence and abuse, a quick

and automatic ability to shift attention to others' mental states may be protective, and fostering epistemic trust may be dangerous and impede survival and safety (Luyten et al., 2020).

Expanding epistemic trust and mentalizing outside of personality disorders, its role has also been explored in more common mental disorders such as depression and anxiety. Attachment disruptions have been evidenced to negatively impact a person's mentalizing capacity and consequent abilities in stress regulation (Nolte et al., 2011). Deficits in mentalizing have also been studied in depression remittance and were found to increase the possibility of relapse in patients (Luyten & Fonagy, 2018). Within the realm of anxiety disorders, researchers point out the importance of the patients' ability to reflect on how the symptoms of anxiety relate to interpersonal events (Luyten et al., 2020). The effect of anxiety and panic taking over reflective functioning capacity has been explored in both cognitive behavioural and psychodynamic therapy, with an importance demonstrated on in-the-room attendance to emotions and the therapeutic alliance leading to improved outcomes (Keefe et al., 2019; Solomonov et al., 2020).

Given the widespread impact of epistemic trust disturbances across personality difficulties and more general psychopathology, Caspi et al. (2014) have suggested the existence of what they call a *general psychopathology factor* or a *p factor*. They argue that the relationship between psychiatric disorders can be explained by a three-level structure consisting of: 1. A p factor; 2. Clusters of symptoms; 3. Individual disorders. This p factor is a statistical idea without vast amounts of empirical research supporting it, but Fonagy et al (2017) suggest it may be a proxy for deficits in epistemic trust. In other words, an individual with a high p factor is one with high levels of epistemic vigilance and a reduced capacity to engage in social learning. If this is the case, then a major goal across effective therapeutic models would be to encourage the re-emergence of robust mentalizing and consequent social learning through epistemic trust.

Taking this research together, it suggests that epistemic trust may help to explain both the normal and abnormal development of shared attention, eye-gaze, learning, emotional stability, and overall psychological wellbeing. Its role appears to be across both the social-cognitive domain and the more affective domains of human functioning.

Knowledge Gap

As mentioned by Fillingham (2018), the field lacks a quantitative measure for epistemic trust in adults. This lack of a quantitative measure results in a lack of cohesion in the field around terms, frameworks, and narratives of what facilitates learning and the consequent framework explaining this. Fillingham (2018) took the first step towards developing this in a systematic manner, but highlighted some limitations to the research around power, sample size, and individual differences. There is therefore reason to replicate this experimental paradigm whilst attending to these limitations by increasing the number of participants recruited and adding individual difference measures such as measures of psychopathology. The increased sample size will also allow a more thorough exploration into the effects of individual differences through the between-subjects design.

Within these adult learning tasks there has not been a measure of reflective functioning, or mentalisation, inherent in the design. Given the links between reflective functioning, epistemic trust, and ostensive cueing, we feel this is a missed opportunity that deserves further exploration.

Summary and Thesis Aims

Summary

In summary, learning within a social context can be understood from a variety of different conceptual frameworks. Natural pedagogy theory (Csibra & Gergely, 2009) argues that infants learn generalisable and personally-relevant information to them following the use of ostensive cues such as direct eye-contact and facial expressions. Reinforcement learning and

attention may also play a role, and it is unclear exactly which process, if it is simply one, fundamentally underpins the learning. Mentalization sees the ostensive cues as generators of epistemic trust, the individual's ability to see new knowledge and relevant to them and trustworthy (Fonagy et al., 2016), which opens up a channel for the sharing of knowledge in the we-mode (Fonagy et al., 2021). Under this framework, learning relies on the development of epistemic trust which could be fostered through a combination of the aforementioned processes. The process of mentalizing, or reflective functioning, is developed within a secure attachment and relies on the caregivers' own reflective functioning abilities to foster the infant's development. Deficits in this area have been linked to clinical implications such as depression, anxiety, personality disorders, and more general cognitive functioning. The importance of the caregiver is also found in the psychoanalytic literature where Bion (2013) comments on the importance of a "containing mother". Without this, the infant can go on to struggle with differentiating between reality and fantasy, differentiating their sense of self from another, and ultimately struggle to mentalize as they remain in a state of epistemic hypervigilance. In adults, research has suggested the use of ostensive cues may lead to improved implicit learning outcomes (Fillingham, 2018). It is unclear if this is linked to the adults' reflective functioning abilities, as the epistemic trust theory would suggest, or if the study results would be different with increased power and with individual differences accounted for.

Aims

This thesis aims to take Fillingham's (2018) initial research paradigm exploring the link between implicit learning and ostensive cues, address the methodological limitations such as power and individual differences, and examine the conceptual link discussed in the introduction of reflective functioning and learning in adults. The following key research questions were developed:

1. How does ostensive cueing impact adult implicit learning?

2. How do reflective functioning abilities predict adult implicit learning?

3. What roles do individual differences play in implicit learning?

These research questions were addressed in the following ways:

Research question 1: Participants were randomised into one of four groups: No Ostensive Cueing, Person Ostensive Cueing, Computer Ostensive Cueing, Combined Ostensive Cueing. They were all asked to complete demographics, and received varying levels and types of ostenive cues based on their assigned groups, before completing an unexpected implicit learning task. This allowed an exploration of how the ostensive cues impact the results of the learning task.

Research question 2: All participants in the experiment were asked to complete the Reflective Functioning Questionnaire (Fonagy et al., 2016) which was compared with the results from the learning task in order to examine the overlap between ostensive cueing conditions, reflective functioning, and individual scores on the implicit learning task

Research question 3: Participant demographics (age, gender, socioeconomic details, ethnicity) were entered into the regression model alongside individual difference scores on a range of psychopathology questionnaire data in order to determine whether any of these factors predict scores on the implicit learning task.

Advancing understanding of how learning is linked with ostensive cues, reflective functioning, and individual differences could have important theoretical and clinical implications. This could help clinicians treat psychopathology associated with mentalisation deficits, whilst also broadening a more general understanding of learning in a social context for adults.

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Paper 2: Empirical Paper

Towards the Development of a Quantitative Measure of

Epistemic Trust

Abstract

Aims. The purpose of this study was to evaluate how implicit learning is linked to ostensive cues, epistemic trust, and a range of individual differences through a performance-based learning task. The impact of specific ostensive cueing forms (e.g., person vs computer) on implicit learning was also explored.

Method. Participants were invited to complete demographics and individual difference questionnaires that included measures of attachment, Borderline Personality Disorder traits, reflective functioning, childhood trauma, and general mental wellbeing. They then completed an implicit learning task involving a mix of ostensive cues that came from the computer, a researcher, both, or neither.

Results. Participants in the computer ostensive cueing condition recalled significantly less words, specifically fewer negative words, than those receiving no ostensive cueing or person ostensive cueing. There was no significant difference in accuracy scores. Individual difference measures did not significantly predict the total words recalled by participants when entered into the regression model.

Conclusions. The findings from this study suggest a possible negative effect of computer ostensive cues on social learning. This does not align with results from previous research (Fillingham, 2018), and it casts some doubt on the effectiveness of the paradigm as a measure of epistemic trust. However, there are several limitations that require further research.

Introduction

The use of *ostensive cues*, signals by which individuals indicate the beginning of their intention to share relevant knowledge with another (Csibra & Gergely, 2009), have been empirically linked to social learning in multiple infant studies. Examples of these cues include direct eye-contact, engaged facial expressions, and use of an individual's name. These cues have been found to facilitate gaze following in infants (Senju & Csibra, 2008), which is viewed as a vital skill in learning language, cultural values and norms, and other developmentally appropriate behaviours (Brooks & Meltzoff, 2015; Morales et al., 2000). This capacity to transmit culturally relevant and generalisable knowledge, known as *Natural Pedagogy* theory (Csibra & Gergely, 2009), is not the sole explanation for social learning within the literature. One such alternative theory argues that the ostensive cues (e.g., directed speech and eye contact) are simply highly attention-grabbing, suggesting the process is much simpler than Natural Pedagogy describes (Gredebäck et al., 2018; Szufnarowska et al., 2014). A second views the process from a behavioural perspective and suggests social learning occurs through a process of reinforcement, arguing that abilities such as gaze following are not innate, but are gradually developed over time (Deák et al., 2014). These frameworks do not attempt to disprove one another, however the researchers promoting the behavioural reinforcement model suggest that more social-cognitive models add additional assumptions without adding extra explanatory or predictive power. Both frameworks have empirical support, and there has been research suggesting they play a combined function rather than a mutually exclusive one (Gredebäck et al., 2010); but the debate in the literature is ongoing.

A different framework for understanding social learning comes from the theory of mentalization, which is a unique ability of humans to understand ourselves and others in terms of intentional mental states (Luyten et al., 2020). With typically functioning mentalizing abilities, the theory posits that an individual can mentalize if they are being recognised as a

subjective agent, a self, and consequently identify knowledge that may be personally relevant and generalisable (Fonagy & Allison, 2014). Taking this new perspective, the ability from Natural Pedagogy to identify personally relevant and generalisable knowledge is termed *epistemic trust*. The aforementioned ostensive cues are viewed as promoting epistemic trust and therefore opening up the pathway for the sharing of knowledge by placing both parties into the we-mode of thinking; relational mentalizing.

Epistemic trust is seen as a skill developed over time, and healthy development requires a healthy attachment relationship (Luyten et al., 2020). Although it is not viewed as a constant, instead having both state and trait features that can fluctuate in different contexts, most research indicates a strong positive correlation between security in the attachment relationship and mentalizing abilities (Sharp & Fonagy, 2008). This relationship between caregiver and child also comes within larger contexts such as family and neighbourhoods, the wider environment, and a broader sociocultural context (Luyten et al., 2020).

The theory posits that epistemic trust is not the default mode of operation, but most individuals operate with a healthy level of *epistemic vigilance*, to defend against false or inaccurate information being unquestioningly accepted (Sperber et al., 2010). Individuals who experience disruptions in the development of their mentalizing capacity, and operate in a state of epistemic hypervigilance will find social learning difficult (Fonagy & Luyten, 2018). This has important clinical implications as deficits in mentalizing have been linked to personality disorders (Bateman & Fonagy, 2019), trouble with stress regulation (Nolte et al., 2011), depression, and a range of cognitive and socioemotional difficulties (Luyten & Fonagy, 2018).

However, within the literature there is a lack of empirical data assessing these clinical implications due to there being no clearly defined quantitative measure of epistemic trust. Additionally, most of the research around epistemic trust and ostensive cues are centred around infant development. Fillingham (2018) conducted a meta-analysis and found only three

relevant studies within the area of adult learning, ostensive cues, and epistemic trust. Two of the studies explored how a communicative context (one where ostensive cues are used) differed from a non-communicative context in terms of how individuals process and encode intrinsic (e.g., shape) and extrinsic (e.g., location) features of an object (Marno et al., 2014; Oláh et al., 2016). They found that individual's memory for intrinsic features increased whilst their memory for extrinsic features decreased when ostensive cues were utilised, but not in a context without them. Although this highlights the importance of ostensive cueing in adults, it lacks a measure of epistemic trust. The third study (Redcay et al., 2016) involved remembering objects following an experience of direct gaze, or no gaze (i.e. ostensive cueing vs none). They found that individuals who experienced direct gaze remembered more objects than those who did not.

Fillingham (2018) took these studies one step further and created an experimental paradigm adapted from the 'self-referent incidental recall task'. This involved participants sorting a list of positive or negative and then being given a surprise recall task on these words as a measure of implicit learning. In this study, participants were sorted into one of four groups that varied on the degree of ostensive cueing they received prior to completing the recall task: no ostensive cues, computerised ostensive cues (participants receive ostensive cues through the computer survey), person ostensive cues (the researcher provide ostensive cues at an in-person meeting), and combined ostensive cues (the participants receive the same cues from both the computerised and person ostensive cueing conditions). Given that attention was referenced in previous literature as an alternative explanation, Fillingham also recorded participants' accuracy on the word sorting task as a proxy for attention. Fillingham found a significant positive effect of ostensive cues on individuals' performance on the recall task, supporting the Natural Pedagogy theory and providing further evidence towards the mentalization framework which posits ostensive cues lead to epistemic trust and social learning (Fonagy & Allison, 2014).

Fillingham (2018) found a positive effect, but a number of methodological issues and limitations were described. Notably, the sample size was too small to adequately explore individual differences, nor was there a measure of mentalizing capacity explored in relation to the positive effect of ostensive cueing. There was also no exploration of the difference in recall between positive and negative words. There has been some research into negativity bias, where individuals remember negative events more vividly than positive ones (Kensinger, 2009), and relating this specifically to word recall, research has demonstrated negative words are more vividly remembered than neutral ones (Kensginer & Corkin, 2003). Although the words used in the word list were said to be of equal emotional valence (words that evoke an emotion without labelling it, for example, "murder" has negative valence whilst "dancing" has positive valence), it is unclear if this negativity bias occurred as it was not reported.

Additionally, although individual differences were not taken into account in the performance-based study, Fillingham (2018) did report on constructs hypothesised to be related to epistemic trust: anxious and avoidant attachment, borderline personality symptomology, and general psychopathology. Fillingham found significant negative correlations between epistemic trust and all of the above measures. It was recommended that these individual difference measures are therefore used in a study with a larger sample to determine how they may or may not predict performance in the recall task.

The empirical study in this paper aims to develop on Fillingham's initial steps in creating a performance-based measure of epistemic trust by addressing the methodological limitations such as sample size and power, alongside exploring the conceptual link of mentalization to ostensive cueing and learning by examining the role of individual differences. It was hypothesised that:

1. those in the ostensive cueing conditions would demonstrate significantly greater word recall on the implicit learning task than those in the no ostensive cueing condition.

1.1 participants would not recall significantly more negative or positive words as they were matched on valence.

2. an individual's level of mentalizing capacity would be predictive of word recall in the ostensive cueing conditions.

3. an individual's scores on the individual difference measures would be predictive of word recall; with those scoring higher recalling less words.

Methods

Ethical Approval

Ethical approval for this study was obtained through the UCL Research Ethics Committee (Project ID: 19367/001 Ostensive Cueing and Implicit Learning; Appendix A). An amendment was later approved to recruit participants through social media (Appendix B). This is a joint project with another UCL DClinPsy trainee (Raymont, 2021), and ethical approval was granted for both researchers to work on the project.

Power Analysis

Data from Fillingham (2018) was used to complete a power analysis as this is the most recent and well-constructed paradigm to explore more complex learning within the context of ostensive cues. Fillingham reported an overall ostensive cueing effect on recall with $\eta_p^2 = .059$. This corresponds to an effect size (f) of .25. Putting this effect size into G*Power 3 (Faul et al., 2007) with an α level of .0125 and power (1 – β error) of .8 results in a minimum sample size of 244 participants. This equates to approximately 61 participants in each group.

Design

The 249 participants were randomly assigned across the four experimental conditions prior to performing a performance-based word recall task. Sixty-three were assigned to the No Ostensive Cueing condition, 66 to the Computer Ostensive Cueing condition, 61 to the Person Ostensive Cueing condition, and 59 to the Combined Ostensive Cueing Condition. Each

participant viewed an information sheet and completed an informed consent form prior to engaging in the research project (see Appendix C).

Ostensive Cueing (OC) Conditions

  Computer OC. Participants in the Computer Ostensive Cueing condition were greeted with their name in email correspondence but did not have an MS Teams meeting with a researcher prior to completing the online experiment. They were invited to enter their name during the online experiment, and this was used as an ostensive cue by the computer character throughout the process. For example, the computer character would say "I'm rooting for you, [First Name]!". They were also given the sense of free choice within the online experiment regarding explanation length and practice trials.

  Person OC. Participants in the Person Ostensive Cueing condition only received ostensive cues from the researcher and not within the online experiment. Participants were sent an initial email using their first name ("Hello [First Name],") thanking them for agreeing to take part. This email also included the information sheet and informed consent form, and participants were given instructions on how to sign and return this.

  Once this was returned, the participant received a second email, again greeting them with their first name, which specified the date and time of their meeting on MS Teams alongside a link to the meeting.

  Within the MS Teams meeting the participant was informed they would be given a brief walkthrough of the experimental task and would receive a link to the survey platform in the chat. The researcher used a semi-structured script (Appendix E) within this meeting to ensure similar ostensive cueing between participants. In the meeting, the researcher used the participant's name five times, smiled and engaged in eye-contact at regular intervals, and asked follow-up questions based on participant answers. For example, each participant was asked where they were in the world, and this was followed up by asking "[Place?]? Ah okay. Are you

studying or working there, or?" and then a further question such as "Oh studying, how are you finding it?". If the participant was neither working nor studying, then a comment was made in line with their response, such as "Yeah job hunting is hard, particularly in this pandemic!". Appropriate follow-up conversation was engaged in; however, the researchers kept this brief in an attempt to achieve similar ostensive cueing conditions across participants.

After being given a brief explanation of the study process, participants were sent a link to the survey platform in the chat, were thanked for their time, and wished good luck (e.g., "Okay, thanks for your time, I hope it goes well [First Name]"). Throughout the meeting, eye contact (as much as is possible through webcams) and engaged facial expressions were maintained in an effort to display interest in the participant.

Participants met with either a male or female researcher in the MS Teams meeting, and they were given a corresponding link to ensure that the character image within the survey matched the researcher (for example, if a participant met with the male researcher, they would be encouraged within the experiment by a picture of the same male researcher, and vice versa if they met the female researcher).

Combined OC. Participants in the Combined Ostensive Cueing condition received ostensive cues from both the researcher in an MS teams meeting, and from within the online experiment through the computer character.

No OC. Participants in the No Ostensive Cueing condition did not receive ostensive cues from the researcher or from within the online experiment. They received generic emails that were not personalised with their name, were not acknowledged by name within the online experiment, and did not meet the researchers on MS Teams prior to completing the experiment.

Word Sorting Task

The word sorting task used within the survey is an adaption of Fillingham's (2018) paradigm which was adapted from the word classification incidental memory test used in

previous studies. The instructions for the task were presented by a character (either a picture of the male or female researcher; Chris or Sophie). A headshot of either researcher was placed in the top right corner of each screen alongside first-person text to represent the character speaking. Fillingham used a stock image of a character, "Jess", however this was not rated as "real" by participants. Using real images of the researchers was thought to increase the realism and ostensive cueing as the participants (in the person-OC and combined-OC conditions) will have seen the researchers within the MS Teams meeting. The pictures also introduced themselves with the researcher's names (Chris or Sophie), which are the same names used in the email signoffs.

Online Ostensive Cueing

Participants in two of the conditions, Combined and Computer Ostensive Cueing, received ostensive cues throughout the online experiment. Participants were initially asked by the character (Chris or Sophie) what they would like to be called, and their name was used throughout the remainder of the experiment. Participants were asked if they would like the short or long version of the instructions (both sets contained all necessary information about the task, so as not to influence performance). Participants were also asked if they understood the instructions (yes/no) and were given practice trials regardless of their answer, although these were framed slightly differently (e.g., pressing no – "Okay [First Name]. Let's start with some practice trials then.". Pressing yes – "Great, let's carry on then [First Name]. Let's try some practice trials.").

Screenshots of the Ostensive Cueing instructions within the Qualtrics survey, and the non-Ostensive Cueing instructions, can be found in Appendices D and E.

Word Task

The same word list used by Fillingham (2018) was utilised within this study. Fillingham (2018) selected 55 personality-trait words (28 positive and 27 negative) that were matched for

length and magnitude of valence rating. In this study, the word order was randomised and then displayed in that same order to each participant. We noted some possible errors in Fillingham's published word list as "unselfish" was labelled as negative, "thoughtless" as positive, and these were swapped in the present study (for the full word list, see Appendix H).

The researcher's face was displayed in the top right corner of the screen alongside one of the 55 words for 2 seconds (see Appendix I). A new screen was then presented with the word "Positive (A)" on the left-hand side and "Negative (L)" on the right (see Appendix J). Participants sorted the word using the A or L key on their keyboard, as indicated in the instructions. This process was repeated for all 55 words, with the first five being used as practice trials. As in Fillingham's (2018) study, participants were told they were moving from practice trials to the real task with a screen saying, "And now for the rest of the words".

Accuracy

Participants sorted the positive and negative words into their corresponding positive or negative category, and their accuracy was used as a proxy for attention throughout the task. Classifying a word correctly gave a score of '1', and incorrectly gave a score of '0'. The first five practice trials were not included in this accuracy score, whereas Fillingham (2018) included these. Taking the mean of these 50 scores gave an accuracy rating between 0 and 1 for each participant. Scores below .85 were excluded from the data analysis on the basis that they the individuals did not pay adequate attention to the task.

Word Recall

After sorting the 55 personality-trait words into positive or negative categories, a recall screen was displayed where participants were asked to type in as many of the words as they could remember within a two-minute period (see Appendix K).

Individual Difference Measures

Regardless of the assigned ostensive cueing condition, all participants completed demographics alongside five other questionnaires.

Demographics. Participants were asked to provide demographic details regarding their age, gender, education level, employment status, and ethnicity.

Brief Symptom Inventory (BSI; Derogatis, 1993**).** This questionnaire contains 53 items assessing how distressed an individual has been by a range of symptoms over the previous seven days across a five-point Likert scale. The five possible responses range from 'Not at all' to 'Extremely'. Nine symptom dimensions are covered: Somatization, Obsession-Compulsion, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid ideation, and Psychoticism. There are three further global indices: Positive Symptom Total, Positive Symptom Distress Index, and Global Severity Index (GSI). The author suggests the GSI is the most sensitive indicator of the individual's distress level and is therefore used throughout the analyses in this study. The authors report good internal consistency across the subscales ($\alpha = .71$ to $.85$), which has also been evidenced in supporting studies (Sereda & Dembitskyi, 2016). The GSI in particular was found to have a cronbach alpha of .097 (Sereda & Dembitskyi, 2016). Test-retest reliability was noted at .90 for the GSI. The BSI demonstrated excellent internal consistency within the current study ($\alpha > .942$ on all subscales). The overall consistency of the instrument was, similar to previous studies, found to be excellent ($\alpha = .967$). The mean on the GSI in the current sample was .873, and the standard deviation was .652.

Personality Assessment Inventory – Borderline Subscale (PAI-BOR; Morey, 1991**).** The PAI-BOR contains a total of 24 items that are split into four subscales with the intention of capturing four aspects of borderline personality traits: affective instability, identity problems, negative relationships, and self-harm. Individuals respond to statements about themselves on a four-point Likert scale from "False, not at all true" to "Very True". A total

value (PAI Total) is also calculated by summing the four subscale totals. The PAI-BOR has been found to have a test-retest reliability of .73, and a high level of internal consistency (α = .84; Trull, 1995). Within the present study, overall internal consistency of the instrument was found to be excellent (α = .879), and all subscales demonstrated α > .813. The total PAI score was used in this study (mean = 1.14, SD = .49).

Maltreatment and Abuse Chronology of Exposure (MACE-52; Teicher & Parigger, 2015)**.** The MACE-52 aims to record severity of exposure to ten types of maltreatment: sexual abuse, witnessing interpersonal violence, witnessing violence to siblings, emotional neglect, non-verbal emotional abuse, parental physical maltreatment, physical neglect, peer emotional abuse, and peer physical bullying. Respondents are asked if they have ever been exposed to examples of these types of maltreatment, and then asked to specify what years this occurred during childhood. This measure was not analysed in this study due it being a joint project (Raymont, 2021); but all participants still completed it. For more details on contributions by each researcher, see Appendix D.

Experiences in Close Relationships – Revised (ECR-R; Fraley et al., 2000)**.** The ECR-R consists of 36 items that are equally split into two subscales that capture avoidant attachment behaviour and anxious attachment behaviour. The questionnaire order is presented randomly to individuals who rate statements about themselves on a seven-point Likert scale from "strongly disagree" to "strongly agree". Previous studies have indicated excellent internal consistency (α = .93; Sibley et al., 2005) and this was also found in the current study (α = .936). The mean score on the anxiety subscale was 3.47 with a standard deviation of 1.39, and 2.96 and 1.24 on the avoidance subscale, respectively.

Reflective Functioning Questionnaire (RFQ-8; Fonagy et al., 2016)**.** The RFQ-8 was developed as a brief screening measure of reflective functioning, or mentalizing. Respondents are presented with eight statements about themselves to which they respond on a seven-point

Likert scale ranging from "do not agree at all" to "agree completely". The questionnaire is split into two measures, uncertainty about mental states (RFQu) and certainty about mental states (RFQc) by recoding items and double scoring half of the items. After the rescoring, the eight items take the following form (RFQc: 3, 2 ,1 0, 0, 0, 0 and RFQu: 0, 0, 0, 0, 1, 2, 3). Therefore, for example, a participant who strongly agrees with an item would be scored as indicative of low certainty on the RFQc scale, and high uncertainty on the RFQu scale. The authors note good levels of internal consistency ($\alpha > .70$). A further study with a non-clinical sample found the RFQc α to be .78, and RFQu α to be .76 (Anis et al., 2020). The current study found similar results, with the RFQ demonstrating an internal consistency of $\alpha = .715$.

Data Analysis Strategy

Analyses were conducted using IBM SPSS Statistics (v26.0) and RStudio (v1.4.1106). Data was initially examined to find missing values, which were handled through mean imputation.

Normality and homogeneity of variance was tested across the variables, both before and after combining the data sets. Demographics and individual differences measures were initially explored descriptively before correlations and Chi-Sqaure tests were run to detect differences between the samples.

An independent samples t-test was conducted to explore the difference between the two groups on the dependent variable (total words recalled) and another was conducted to assess the difference in accuracy (the proxy for attention). Further mean difference explorations were conducted across the individual difference measures using the Mann-Whitney Test.

Multiple simple linear regressions were conducted to assess the effects of individual difference variables on the total words recalled. Bonferroni corrections were applied due to completing multiple comparisons.

A multiple linear regression (using the enter input method) was then performed to determine the relationship between the demographics, individual differences measures, and performance on the word recall task. This had the aim of identifying covariates for subsequent analyses.

An Analysis of Variance (ANOVA) was then performed, with Bonferroni corrections, to determine how the four OC conditions predicted performance on the word recall task. The conditions were then combined in a second ANOVA to compare OC more generally (Person + Computer + Combined) to No OC on word recall performance.

The dependent variable, total words recalled, was then split into positive and negative words recalled in order to narrow down where the differences may lie. Two further ANOVAs were conducted with the dependent variable being changed to total positive words recalled, and total negative words recalled, accordingly.

Results

Missing Data

Five participants had one missing item on the ECR, six had one missing item on the PAI, and 12 had one item missing on the BSI. One participant missed one item on the BSI and on the RFQ, another missed three items on the BSI, and a third missed five items on the ECR. Given the high level of internal consistency in the scales, mean replacement was used to impute missing data. The mean scores were derived from other completed items within the appropriate subscale. For example, a missing data point on the BSI somatization subscale would be imputed from the mean of the other values within that subscale.

Descriptives

In total, 249 participants completed the study: 137 were recruited from Prolific (an online survey platform) and 112 from Subject Pool (a pool of UCL students). Six participants (all from the Prolific sample) were removed due to scoring below the accuracy threshold

discussed in the methods section, resulting in the final sample consisting of 243 participants in total. The descriptives are reported separately from each recruitment stream (Prolific and Subject Pool) and then as a combined sample.

Sociodemographics

The two samples did not appear to differ greatly around age (see table 1). When combined, the vast majority of participants fell within the 19-29 age bracket (68%).

A noticeable disparity appeared when examining the gender of participants. In the combined sample, 63% of participants were female compared to the 37% of males. There was a further difference when looking at the two samples independently. In the Prolific sample, the females accounted for 44% of the sample, and the males the remaining 56%. In the Subject Pool sample, 86% of the participants were female, and 14% were male.

It appears there were more individuals who finished education at "High school or equivalent" level in the Prolific sample than the Subject Pool sample. This was expected as the Subject Pool sample consists of University students. There was a range of education levels across the sample with the highest percentage of people having completed high school (27%) or an undergraduate degree (32%).

There were more participants in the Prolific sample looking for work than in the Subject Pool sample. All entries into the "Not working (other)" section were offered a text box to enter their employment status, and all wrote "student". Employment was therefore mostly split into either being a paid employee (41%) or a student (35%).

Ethnicity data is not presented within the table due to legibility issues, as participants were offered a choice of 17 different ethnicities. Most participants identified as either White (62%) or Chinese (11.5%). There was a noticeable difference between the two samples with 28 participants in Subject Pool describing themselves as "Chinese" whereas there were none on the Prolific sample who describes themselves as such.

Table 1

Sociodemographic Characteristics of Participants

Sample	Prolific		Subject Pool		Full Sample	
	n	*%*	*n*	*%*	*n*	*%*
Gender						
Female	57	43.5	96	85.7	153	63.0
Male	74	56.5	16	14.3	90	37.0
Age						
18 or younger	9	6.9	16	14.3	25	10.3
19-29	91	69.5	75	67	166	68.3
30-30	22	16.8	17	15.2	39	16.0
40-49	8	6.1	1	0.9	9	3.7
50-59	1	0.8	3	2.7	4	1.6
Education						
Less than high school	2	1.5	0	0	2	0.8
High school	46	35.1	20	17.9	66	27.2
College	24	18.3	17	15.2	41	16.9
Undergraduate	35	26.7	42	37.5	77	31.7
Postgraduate	21	16	24	21.4	45	18.5
Doctorate	3	2.3	9	8	12	4.9
Employment						
Not working (disabled)	1	0.8	0	0	1	0.4
Not working (looking)	26	19.8	9	8	35	14.4
Not working (other)	39	29.8	47	42	86	35.4
Not working (layoff)	4	3.1	1	0.9	5	2.1
Working (employee)	51	38.9	48	42.9	99	40.7
Working (self-employed)	10	7.6	6	5.4	16	6.6
Prefer not to answer	0	0	1	0.9	1	0.4

Note. $N = 243$ ($n = 131$ for Prolific, $n = 112$ for Subject Pool)

Individual Difference Measures

When looking at the scores from the questionnaire measures on individual differences (BSI, PAI, ECR, and RFQ), there did not appear to be any extreme differences between the samples (table 2). The mean scores on the BSI GSI between the samples have a difference of 0.28, however this is well within one standard deviation. All means fall below clinical thresholds, where they are reported in the literature.

Table 2

Means and Standard Deviations of Questionnaire Measures

Sample	Prolific		Subject Pool		Full Sample	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
BSI GSI	1.00	0.72	0.72	0.52	0.87	0.65
PAI Total	1.16	0.51	1.11	0.46	1.14	0.49
ECR Anxiety	3.50	1.40	3.43	1.38	3.47	1.39
ECR Avoidant	2.98	1.19	2.95	1.31	2.96	1.24
RFQc	0.95	0.79	1.10	0.81	1.02	0.80
RFQu	0.72	0.67	0.62	0.60	0.67	0.64

Note. $N = 243$ ($n = 131$ for Prolific, $n = 112$ for Subject Pool)

Analysing the Two Samples Separately

In order to determine if the samples should be kept separate or combined for the final analysis, we explored statistically significant differences in demographics, word recall, and individual differences measures.

Demographics

Given the preliminary disparities noticed between the two samples, Chi-Square tests were conducted to determine if any of these associations were statistically significant. These tests indicated there was a significant association between sample and education (X^2 (5, $N = 243$) = 15.89, $p = .007$), ethnicity (X^2 (19, $N = 243$) = 64.67, $p < .001$), and gender (X^2 (1, $N = 243$) = 46.12, $p < .001$). There was no significant association in terms of employment (X^2 (6, $N = 243$) = 12.48, $p = .052$), age (X^2 (4, $N = 243$) = 9.16, $p = .057$), or assigned OC condition (X^2 (3, $N = 243$) = 7.12, $p = .068$).

Examining Word Recall Difference between SP and Prolific

Correlational analyses were conducted on the individual difference measures and total words recalled between the two samples. There was no significant correlation between total words recalled and any individual difference measure within either sample (see table 3). The next step of the analysis was to determine if there was a significant mean difference in the total words recalled between the samples. An independent samples t-test reported a significant difference in the total words recalled for the Subject Pool ($M = 11.94$, $SD = 3.73$) and Prolific sample ($M = 10.05$, $SD = 3.74$); $t(241)=3.92$, $p < .001$. This suggests that those in the Subject Pool sample recalled more words on average than those in the Prolific sample.

Table 3

Spearman's Rank Correlations for Individual Differences and Total Words Recalled – Prolific/Subject Pool

Variable	1	2	3	4	5	6	7
1. Total Words Recalled	—						
2. GSI	-.07/-.08	—					
3. ECR_Anx	-.02/-.04	.56**/.35**	—				
4. ECR_Avo	.07/.02	.35**/.01	.34**/.28**	—			
5. PAI_Total	-.01/-.12	.80**/.72**	.57**/.47**	.36**/.08	—		
6. RFQc	.09/.15	-.46**/-.34**	-.35**/-.18	-.23**/-.01	-.53**/-.44**	—	
7. RFQu	-.04/-.10	.60**/.50**	.56**/33**	.32**/-.04	.67**/.64**	-.69**/-.71**	—

*p < .05. **p < .01.

Note. Correlations are displayed in the format of *x/y* where *x* refers to the Prolific sample, and *y* to the Subject Pool sample.

Were the Individual Differences Significant between the Samples?

Given that most individual difference measures were not normally distributed, Mann-Whitney U tests were conducted to determine any significant mean differences in these measures between the two samples. This analysis reported a significant mean difference between the two samples on the GSI (see table 4), but not on any other individual difference measure. There was also no significant difference in the accuracy scores between the samples, indicating this difference was not simply due to varying degrees of attention paid to the task.

Table 4

Summary of Mann-Whitney U Tests Comparing Mean Differences Between Samples (N = 243)

	GSI	PAI Total	ECR anxious	ECR avoidant	RFQc	RFQu	Accuracy
Mann-Whitney U	5727**	7066	7099.5	7116.5	6504	6743.5	6528.5
p value	.003	.622	.665	.688	.126	.274	.131

$*p < .05. **p < .01$

Combining the Samples

Although there appeared to be differences between the two samples, with some demographics, and overall psychopathology (as measured by the GSI) being highlighted in the preliminary analysis, there was no inherent difference in the experimental paradigm between the two samples or how they engaged with the task. Additionally, there was no correlation between GSI and total words recalled in either sample. Given that demographics and overall psychopathology could be controlled for in further analyses, the two samples were combined to explore an overall type of ostensive cueing effect, alongside possible covariates.

Normality of Words Recalled and Accuracy Scores

Across all conditions of OC, the dependent variable (total words recalled) met normality assumptions when analysing appropriate graphical data (histograms, scatterplots etc.; Field, 2013; see Appendix L). For the dependent variable (total words recalled), the assumptions to run multiple regressions were met. There was no multicollinearity in the data as Variance Inflation Factors were well below 10, and tolerance scores above 0.2. The Durbin-Watson statistic demonstrated the values of the residuals were independent as the obtained value was close to 2 (Durbin-Watson = 1.87), the Q-Q plot for the model suggested the residuals are normally distributed (see Appendix M), and all Cook's Distance values were under 1 suggesting individual cases were not significantly influencing the model. There was one participant in the computer OC condition who scored substantially higher than others, see Figure 1, however this was included in the model as the Cook's Distance value was .025 and their words recalled (19) was within normal limits (i.e. it was not a data entry mistake).

Figure 1

Boxplot of Total Words Recalled in Each OC Group

Boxplot of Total Words Recalled by OC condition
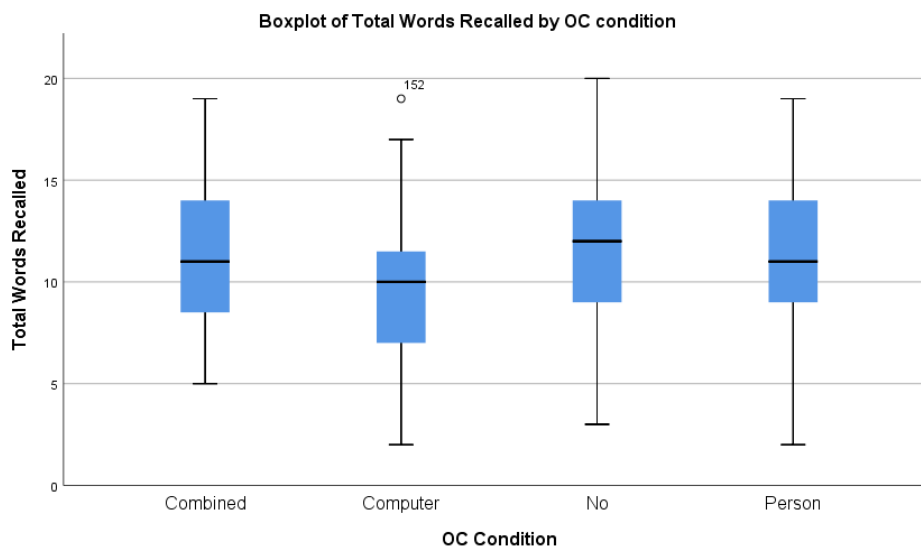
The accuracy scores, a proxy for attention paid to the task, were not normally distributed and non-parametric tests were therefore used when this was a dependent variable.

Correlational Analyses on Individual Difference Measures and Words Recalled

Correlational analyses were also run on the individual difference measures compared to total word recall when the two samples were combined. There was a significant correlation between total words recalled and RFQc (r_s = .134, p = .037). No other correlations with total words recalled were statistically significant (table 5).

Table 5

Spearman's Rank Correlations for Individual Differences and Total Words Recalled –

Combined Sample

Variable	1	2	3	4	5	6	7
1. Words Recalled	—						
2. GSI	-.12	—					
3. ECR_Anx	-.04	.46**	—				
4. ECR_Avo	.02	.20**	.31**	—			
5. PAI_Total	-.07	.76**	.53**	.22**	—		
6. RFQc	.13**	-.42**	-.27**	-.12	-.48**	—	
7. RFQu	-.08	.55**	.45**	.15*	.65**	-.71**	—

$^*p < .05.$ $^{**}p < .01.$

Do Individual Differences Predict Words Recalled?

Linear regressions were explored with the individual difference variables (6 in total) predicting word recall, before moving on to a multiple regression model. One model came back statistically significant, with GSI as the predictor $F(1,241) = 4.613$, $p = .03$. After Bonferonni corrections for running 6 linear regressions on the same dependent variable, the p value required for significance was .0083, resulting in the model containing GSI being non-significant.

A multiple linear regression (using the enter method) was conducted using all individual difference measures and sociodemographics (Gender, Age, Employment, Ethnicity, Education, PAI total, ECR, GSI, RFQ) to predict word recall. The overall model was non-significant (F(41,201) = 1.055, p = .39) and none of the individual variables were significant predictors of words recalled. This suggests that none of the measures needed to be included as covariates, in line with the results from the linear regressions.

Does Ostensive Cueing Impact Word Recall?

A one-way ANOVA showed a significant effect of Type of Ostensive Cueing on Word Recall (F(3,239) = 3.485, p = .02) with a small-medium effect size, η_p^2 = .042. Post-hoc pairwise comparisons (using Bonferroni corrections) indicated a significant mean difference in words recalled between those in the Computer OC and No OC conditions (MD = -1.818, p = .047) and a difference between participants in the Computer OC and Person OC conditions (MD = -1.936, p = .03). This suggests that those in the Computer OC condition recalled significantly less words than those in the No OC or Person OC conditions. There were no significant differences between any other OC condition comparisons (see table 6). When looking at the combined samples, those in the Combined OC recalled an average of 11.10 words, No OC was 11.46 words, Person OC was 11.58 words, and Computer OC was a lower 9.64 words.

Table 6

Post-hoc Pairwise Comparisons of Mean Difference in Words Recalled Between OC Conditions

				95% Confidence Interval	
OC Conditions Compared		Mean Difference	Standard Error	Lower Bound	Upper Bound
Combined	Computer	1.461	.683	-.357	3.279
	No	-.357	.691	-2.196	1.482
	Person	-.475	.697	-3.279	1.380
Computer	No	-1.818*	.677	-3.621	-.016
	Person	-1.936*	.683	-3.753	-.118
No	Person	-.117	.691	-1.956	1.722

*$p < .05$. **$p < .01$.

A second one-way ANOVA was conducted to examine an overall effect of Ostensive Cueing (Person, Computer, and Combined) on word recall. The model was non-significant ($F(1,242) = 1.595$, $p = .208$).

The previous Mann-Whitney test indicated no significant difference in accuracy paid to the task between samples, but it was not explored between OC groups. An independent-samples Kruskal-Wallis test was therefore run to explore any difference in accuracy, a proxy for attention, between the OC groups when the data was combined from the two samples. The test indicated no significant median differences between the OC groups on accuracy scores ($H(3) = 1.75$, $p = .626$).

Were Positive Words Recalled at a Different Rate to Negative Words?

The dependent variable, total words recalled, was split into positive words recalled and negative words recalled to explore any differences. Two multiple linear regressions (using the enter input method) were conducted using all individual difference measures (Gender, Age, Employment, Ethnicity, Education, PAI total, ECR, GSI, RFQ) to predict positive word recall, and negative word recall.

For positive word recall, the overall model was non-significant, F(41, 201) = 0.83, p = .76. Repeating the multiple regression for negative words, the overall model was again non-significant ($F(41,201) = 0.98$, $p = .51$). This suggests none of the individual difference measures were to be added as covariates.

A one-way ANOVA showed a non-significant effect of Type of Ostensive Cueing on Positive Word Recall ($F(3,239) = .835$, $p = .476$). A separate one-way ANOVA showed a significant effect of Type of Ostensive Cueing on Negative Word Recall ($F(3,239) = 3.961$, $p = .009$, $\eta_p^2 = .047$. This is classified as a small-medium effect size. Post-hoc pairwise comparisons (using Bonferroni corrections) indicated a significant mean difference in negative words recalled between participants in the Computer OC condition and the No OC condition (MD = -1.408, p = .01), and Computer OC and Person OC (MD = -1.351, p = .02). There were no other significant differences between the other OC conditions.

Discussion

This study explored the effect of ostensive cueing across four conditions (from a researcher, from a computer, none at all, and a combination of researcher and computer) on implicit word recall after a word classification exercise. Many aspects were a replication of Fillingham's (2018) experimental paradigm, however some adjustments were made for conducting the study virtually and limitations identified in the original study. This study also explored the effect of individual difference measures (demographics, psychopathology, and mentalizing ability) on word recall performance across the OC conditions. Results from the ANOVA suggested a significant small-to-medium effect of type of ostensive cueing on word recall. Although the theory, and Fillingham's paper, suggest this should be predominately driven by the difference between no ostensive cueing and the other three conditions, the difference in this study was driven by the difference in computer ostensive cueing and person/no ostensive cueing. Whereas Fillingham found a significant medium-sized effect of

ostensive cueing when computer, combined, and person were combined into one group, no significant effect was found in this study.

When the total word recall was split into positive and negative words, no significant effect was found of type of ostensive cueing on positive word recall, but a significant small-to-medium effect was found on negative word recall. This again was driven by the difference between the computer and person/no ostensive cueing groups. There was no statistically significant association found between the individual difference measures and word recall, nor did they improve the predictive powers of the regression model when added.

Taken together, the interpretation is that those in the computer OC condition recalled less negative words (and consequently less words overall) on average than those in the person and no OC conditions, regardless of individual differences in demographics, psychopathology, and mentalizing ability. There was no evidence of a negativity bias which suggested individuals may remember more negative words than positive.

This is an unexpected finding and does not align itself easily with the epistemic trust theory posited earlier in the paper. One possible explanation could be linked to the COVID-19 pandemic and the increased amount of time people have spent on their computers alongside decreased in-person social contact. Perhaps participants receiving ostensive cues from the computer experienced this as a reminder of their lack of social contact over the past year, or perhaps they were so accustomed to similar computer-based settings over the past year that they had grown fatigued by this context. It is interesting to note that the number of words recalled did not significantly differ from those in the combined group, which contained both computer and person OC, suggesting this effect was not as pronounced when participants interacted with a person. It could also be hypothesised that interacting with a computer providing ostensive cues raised the epistemic vigilance of participants as this study was not linked to any real person or experience for them. It was an anonymous online study that they

signed up to without having any interaction that would ease them into the process and assure them on a personal level; or looking at the mentalizing theory, perhaps this was not enough for them to experience someone seeing their individual agency.

The effect sizes being slightly smaller than those in Fillingham's study ($\eta_p^2 = .042$ to .047 compared with .059 to .066), alongside the different findings overall, casts some doubt on the paradigm as an effective performance-based measure of the effect of epistemic trust. However, it is hard to separate out the differences due to the limitations within the study, and the virtual adaptations related to COVID-19.

It also goes against our initial hypothesis that there was no significant association found between mentalizing capacity (as assessed by the RFQ-8) and words recalled across any of the OC conditions. This could be explained by the limitations within the scale itself, which is discussed further below in the limitations section, or perhaps it was due to the possible ineffectiveness of virtual ostensive cues, again discussed in the limitations below.

Limitations

Virtual Ostensive Cues

It was initially intended for the researchers to meet with participants in person, but this was not possible due to the COVID-19 pandemic. The paradigm was adapted so those in the Person and Combined OC conditions could meet with the researcher on MS Teams and still complete the initial introduction to the study that provided the necessary ostensive cues. It is possible that the theorised effect of in-person ostensive cueing was diluted through the use of computers and webcams as the overall experience could have felt less personal and more distant. Some initial research has highlighted the difficulty of using ostensive cues in remote sessions (Fisher et al., 2020). For example, eye-contact is particularly difficult when both individuals must choose between looking directly into the camera or at the video displayed on their screen. This was not directly explored in the present study, however it was felt by both

researchers that ostensive cueing would have been easier during face-to-face interactions. Given there was no significant difference found between the OC conditions using MS teams and the no OC condition, this is something that could be researched in future studies. It does not explain the significant difference found with Computer OC, but an in-person paradigm could theoretically lead to an increase in words recalled by those in the Person and Combined OC conditions.

Efficacy and Accuracy of the Task

Much of the theory underpinning the task relates to social learning, and it has been framed as a possible quantitative measure of epistemic trust. However, it is worth noting that the implicit learning task itself does not involve one person learning from another. There is no information being passed from the researcher to the participant; it is instead more of an interaction between a computer screen and the participant. The theory also suggests the ostensive cues could lead participants into the aforementioned pedagogic stance, making them more receptive to social learning as they become less epistemically hypervigilant, but the question remains if this word learning task actually measured social learning outcomes as opposed to more general implicit learning. The studies that laid the way for this implicit recall task, as outlined in Fillingham's meta-analysis (2018), focussed on object recall following ostensive cues. Again, these lack a specific social learning element, so the present study is not dissimilar in that regard. However, they argue that the ostensive cues, leading to the pedagogic stance, improve learning more generally; whereas the paradigm set out by Fillingham is more heavily weighted towards social learning and epistemic trust. Future research would benefit from narrowing down this uncertainty by having an explicit social learning task inherent in the paradigm, rather than the current word recall task. For example, and with some adaptations, the participants could be given the words verbally by the researcher.

Survey Length, Content, and Location

One criticism could be made regarding the number of questionnaires participants were required to complete, their content, and a possible impact on word recall. Before reaching the word sorting task, participants were asked to complete over 150 questions about themselves, which may have left them feeling drained before going onto the word sorting and recall tasks. Although there was no time limit on the survey, participants completed the survey with varying degrees of speed. Some participants took 20-30 minutes (this was more common), while a minority took twice that. This could indicate some participants took a break while completing the survey, or were genuinely slower; this was not recorded by the researchers. The accuracy measure, a proxy for attention, was aimed at alleviating some of these confounding effects but it remains inconclusive if time spent on the survey was linked to word recall. One participant also reached out anonymously to say that completing the MACE-52 brought back unpleasant memories which made it difficult to concentrate on the word recall task. It is unclear what affect completing this difficult questionnaire had on the sample more widely.

Additionally, for those receiving ostensive cues from the MS teams meetings, the questionnaires were completed between this meeting and the word recall task, bringing into question if the theorised ostensive cueing effect would be maintained over this period. This seems to be a key consideration as the effect of ostensive cueing may have been "watered down" by the interspersed questionnaires. A more optimal design to assess this would be to have the performance task follow directly after the ostensive cueing.

Future research could alter the paradigm to have participants complete the questionnaires on a separate occasion to the word sorting task, and ensure the meeting providing ostensive cues was conducted directly before the task. This was considered during the design phase of this study, but was not deemed logistically feasible due to the COVID-19 pandemic and difficulties organising participants virtually.

RFQ-8 Criticism

Although the RFQ-8 is widely used and has been studied to positive effect in numerous studies (Fonagy et al., 2016; Morandotti et al., 2018) it has received some recent criticism. The gold standard of mentalizing assessment is currently the Reflective Functioning Scale (RFS; (Fonagy et al., 1998) which applies expert ratings to the Adult Attachment Interview (George et al., 1985) or the Parental Development Interview (Slade et al., 2004). Three recent studies have explored the convergent relationship between the RFQ-8 and the RFS and found inconclusive results (Anis et al., 2020; Handeland et al., 2019; Malcorps et al., 2021). A recent critical evaluation of the RFQ-8 (Müller et al., 2020) highlighted possible problems with item content (only one item in the RFQ-8 refers to understanding the mental states of others), the scoring procedure (four items on the RFQ-8 are double-scored, meaning RFQc and RFQu are not mutually independent of each other), and associations with psychopathology (some research has found the RFQu to be strongly related to psychopathology whilst the RFQc was been positively associated with mental health). The researchers in their critical evaluation advocate the use of a psychometrically optimized version of the RFQ (the RFQ-6), with a different scoring method. Future research could investigate this new measure, or possibly utilise the RFS to address the RFQ-8 criticisms.

Participant Language

Although the study was advertised as requiring fluency in English, and this was one of the pre-requisites on the Prolific website for participants to sign up, both researchers questioned the language ability of some participants met during the MS Teams meetings. Two participants were not given access to the survey as the researcher was unable to communicate clearly with them in the MS Teams meeting. Although this was noticed in the MS Teams meetings, researchers had no way to determine the language ability of participants who were in the No or Computer OC conditions as they had no contact with each other outside of a simple email. It is

unclear what effect language had on the study, but given the dependent variable was word recall this is something to be considered in future research. As the study was also completed remotely, it is possible that some participants could use the internet to search for words in the word sorting task that they did not understand.

General Implications

The findings from this study add a new layer of complexity to the epistemic trust theory. Given the extensive limitations noted above it is difficult to be conclusive as to why the results differ from those found in previous studies. However, the results from the present study suggest that ostensive cues from a computer may have a detrimental effect on implicit recall. Taking one tentative hypothesis that this may be due to increased epistemic vigilance, this may have an impact on other computer-based tasks that would benefit from a degree of epistemic trust. For example, online self-help therapy programmes may be more effective if the individual does not receive ostensive cues solely from the computer. This seems counter-intuitive, as we could hypothesise that a computer calling an individual by their name may make it feel more personal, but it could be the case that the individuals find this uncomfortable and promotes a need for more in-person communication and engagement. This could also relate to online courses or any context where learning is conducted through a computer without any person-to-person interactions.

Going against our initial hypothesis, individuals' scores on the RFQ-8 did not appear to be predictive of task performance. This suggests three possible implications: 1. the RFQ-8 did not measure reflective functioning as we would expect; 2. the learning task was not an accurate measure of epistemic trust, or; 3. the questionnaire measure of reflective functioning did not predict real-world performance. It is difficult to pinpoint which implication is most accurate given the limitations discussed previously; however these questions can be explored in future research.

Clinical Implications

Not only do these preliminary findings suggest computer OC may have unforeseen detrimental effects on social learning, but the difference in results between this study and other literature suggests the importance of in-person interactions and ostensive cueing. However, this is the first finding of this kind within the literature and therefore replication (alongside work in other populations and contexts) is strongly recommended. Although it was assumed that the person OC condition would be more-or-less equivalent with an in-person interaction, this may not be the case. There has been a significant rise in the use of teletherapy during the COVID-19 pandemic, alongside a rise in therapist burnout (Sampaio et al., 2021). As COVID-19 spread around the world, services were required to forgo their usual face-to-face appointments in favour of remote appointments. It is worth noting that although epidemiological data on COVID-19-specific mental health problems is still in short supply (Ventura Wurman et al., 2020), there has been some research indicating increased levels of anxiety (Wang et al., 2020), and similar social distancing measures increased depressive and post traumatic symptoms following the SARS epidemic (Liu et al., 2012; Inchausti et al., 2020). Although all individuals are capable of moving into epistemic hypervigilance, those with a diagnosis of BPD are particularly vulnerable. Ventura Wurman et al. (2020) discuss the rise in epistemic hypervigilance when working remotely with these individuals during the pandemic. Misunderstandings and miscommunications are more likely to occur in remote therapy settings (Lemma, 2017), leading to higher levels of epistemic vigilance in patients. Researchers have encouraged therapists to find alternative ways of ostension during remote sessions as much of their non-verbal communication is lost (Fisher et al., 2020).

This also has particular clinical implications to the rise of telephone assessments within Improving Access to Psychological Therapies (IAPT) services. In some IAPT services, telephone assessments and sessions may be the main form of contact (Boyden & Dobel-Ober,

2016). Unlike in sessions using webcams where the two parties can see each other, the physical and visual ostensive cues are completely lost in appointments conducted over the phone. There is much ambivalence in the literature around telephone appointments, with some reporting positive patient and therapist experiences, but this is overshadowed by the difficulty in assessing and managing risk (Jones et al., 2014).

If epistemic trust is seen as a core component in promoting positive therapy outcomes, and this is generated through ostensive cues, then it is important for future research to consider how this can be promoted in a teletherapy setting given the rise in use across therapists (Burgoyne & Cohn, 2020). Following the results from this study, it is not accurate to assume remote ostensive cueing is equivalent to an in-person interaction.

Future Research

The findings also suggest multiple areas of interesting future research. Looking at this study in particular, there are a number of important aspects for future research to address in order to provide more conclusive results. Firstly, we recommend ostensive cues are provided directly prior to the word recall task so as not to dilute the theorised effect. Questionnaires can be completed either before or after this, but should ideally not be placed between the two. Secondly, as discussed in the limitations, the use of the RFQ-8 should be carefully considered in future studies. If possible, we recommend researchers use the gold standard RFS to assess reflective functioning, however further research can also explore the use of the newly developed RFQ-6 (Müller et al., 2020). Third, we think future research should think about adapting the word recall task to ensure it has an explicit social learning element. We suggest a paradigm involving the researcher giving the words verbally to the participant, with the ultimate aim of adapting the task to be an exchange of information from the researcher to the participant. Lastly, it will be important for future research to consider how ostensive cues can be most effectively used over virtual settings, and possibly comparing this to person-to-person

interactions. Some research has suggested ostensive cues should be combined and exaggerated within virtual settings (Fisher et al., 2020), which may explain the lack of an effect found within this study as this was not adequately considered.

Research suggests the positive effects of typical ostensive cues may be diminished in some settings (such as over virtual meetings), or are difficult to communicate at all (telephone appointments). Given the links to IAPT and remote therapy, future research could explore the most effective ways to use ostensive cues (perhaps adapted or more exaggerated versions) and how this relates to epistemic trust, therapeutic alliance, and therapy outcomes.

Alongside looking into areas where ostensive cues are beneficial, it may be worth exploring contexts where ostensive cueing may be detrimental to social learning (e.g., in those who have extremely high levels of epistemic hypervigilance due to childhood maltreatment, where eye contact, for example, may be experienced as threatening).

Finally, there is an interesting opportunity to explore epistemic trust and ostensive cueing within the context of a worldwide pandemic. Further research could investigate whether levels of epistemic vigilance have increased alongside increased social isolation and this could then be explored in relation to psychopathology. It is worth considering whether the results from this study were in part due to a general baseline increase in epistemic vigilance following the experience of the COVID-19 pandemic, and whether this results in ostensive cues being less effective in opening up the pathway for social communication and learning.

Conclusions

The current study suggests a possible detrimental effect of ostensive cues given by a computer on social learning. It also casts some doubt on how effective the paradigm is as a performance-based measure of epistemic trust, which was the original idea behind its design (Fillingham, 2018). However, there are a number of limitations that do not allow conclusive conclusions to be drawn. Methods to address these limitations have been described, alongside

areas of future research based on the preliminary results found in this study. The findings have important implications on both clinical (the use of in-person therapy vs teletherapy) and academic (the ongoing creation of a performance-based measure of epistemic trust) research questions.

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Part 3: Critical Appraisal

Introduction

In this critical appraisal I aim to share my reflections on the process of completing a Doctorate in Clinical Psychology (DClinPsy) thesis. I start by addressing the COVID-19 pandemic and its impact on the research, before moving on to some reflections of my previous experience and how that influenced the work. I will then share some thoughts on the conceptual introduction, moving on to recruitment difficulties in the experimental task, and exploring some software-related reflections. I will finish by looking back over the process as a whole and highlighting any changes I would make, before finishing with some conclusions based on my reflections as a whole.

COVID-19

The majority of this research project was completed during the COVID-19 pandemic, which brought a multitude of difficulties and dilemmas that I needed to overcome. Firstly, this research project was intended to be an in-person investigation of how a mother's use of ostensive cues when communicating with her infant would influence infant learning. Previous DClinPsy students had developed a preliminary experimental paradigm and coding mechanism for mother-baby interactions in the context of ostensive cues and social learning, and our intention was to build on this, with my specific role being to validate the coding procedure for ostensive cues. In late 2019/early 2020, we were introduced to the Anna Freud Centre (which included security checks and multiple HR meetings and forms) and completed a trial run of the experiment with a mother-baby pair to familiarise ourselves with the paradigm. As we were organising our recruitment schedule in February/March 2020, the UK went into lockdown due to the spread of COVID-19.

It was incredibly difficult to plan the empirical aspect of this thesis during the following months as the UK went in and out of various degrees of lockdown. We were initially optimistic that we could run the experiment as planned at a later point in the year, and we spent the

summer months organising ourselves and preparing for a September/October 2020 start. When we reached this point in the year, however, it was becoming clearer the UK was heading for another lockdown and it would not be possible to continue with the project as planned.

The next couple of months were spent thinking of ways to adapt the study so it remained within our interests, had academic and clinical implications, but was possible to complete entirely online. In mid-November 2020 we confirmed that we would move from the mother-baby learning paradigm to exploring how ostensive cues impacted implicit learning in adults. We were fortunate to have much of the groundwork set for the experimental paradigm thanks to a previous UCL DClinPsy student (Fillingham, 2018), however almost everything had to be created from scratch again as we were not able to go into UCL to complete any in-person testing. The original MATLAB task had to be adapted into Qualtrics, and neither myself nor my research partner had any experience of using MATLAB or Qualtrics. Before reaching this point however, the change in project resulted in us having to complete a new ethics submission which was approved in mid-February 2021, leaving approximately 4 months to complete and write-up the empirical paper.

Additionally, one of the major reasons in completing a joint project is the sense of working together on a task; but COVID-19 made this difficult as we were housebound for much of the process. Both my partner and I struggled to connect and work together when we were in different parts of the country. I think this is linked in some ways to the worldwide feelings of anxiety and stress that inevitably arise from a pandemic of this scale. I found it difficult to fully engage with the process of research when there were looming questions about much more personal difficulties and decisions. Similarly, I imagine this may have been difficult for participants taking part in the research. We attempted to account for this through psychopathology measures and attention checks, as mentioned in the empirical paper, but it may have been worth asking how COVID-19 was impacting participants' general functioning.

Influence of Previous Experience

I was initially drawn to work with Professor Peter Fonagy and Tobias Nolte MD due to my interest in Mentalisation-Based Therapy. I previously worked in forensic settings co-running MBT-informed groups alongside a psychoanalyst, and a lot of our discussions would involve looking into the MBT model, or viewing the patients from an attachment perspective. We worked with men who were diagnosed with a range of personality disorders and had committed mostly violent offences. The supervisor was quick to encourage me to consider how these individuals were raised, and what attachment experiences they may have had during infant development, so both models were something I was familiar with when exploring possible research topics.

Given the original project was a mother-baby observation, I thought this would be a unique opportunity to witness these theoretical questions around attachment and mentalization in the real world. I also feel quite comfortable with mathematics and statistics, and my role in the project would have been to validate the ostensive cueing measure, so this seemed like a suitable fit to my interests and abilities.

My background also influenced my decision to write a Conceptual Introduction rather than complete something more mathematical like a meta-analysis. I wanted to challenge myself to take on a more theoretical, or conceptual, view of the literature whereas I am typically more inclined towards the statistical side. I thought this would allow me to obtain a depth of knowledge in the literature around mentalization, ostensive cueing, and epistemic trust, as opposed to a broader understanding that, in my mind, may come from a meta-analysis.

Conceptual Introduction

I learned many lessons while preparing for the conceptual introduction, and during the process of writing it. I was surprised by how easy it was to become lost in the vast amount of literature available, or to be diverted down a tangential path only to realise the link to the

original research question was tenuous at best. It was also unclear to me how a researcher finds appropriate literature without completing a systemic search; there was no step-by-step guide. This allowed me to appreciate the freedom in reading for the sake of reading, and exploring paths I thought were interesting, such as the section on psychoanalysis. Most of the paper is linked to cognitive or behavioural frameworks for learning, so it was a joy to weave some psychoanalytic theory into the mix.

I was also struck by the difficulty in synthesizing this wide array of literature into a coherent narrative that balanced structure and conciseness with detail. From speaking to other trainees, there seems to be an impression that conceptual introductions are "easier" or "softer" than more statistics-focussed papers, but I think it is more fair to say they are inherently different and come with their own unique set of advantages and disadvantages.

Recruitment Difficulties

Our initial ethics approval allowed us to recruit via Subject Pool, which is a pool of UCL students who are interested in taking part in research for either money, course credits, or some other form of reimbursement. Over 2-3 weeks we managed to recruit over 100 participants through Subject Pool, but this dried up before we reached the required sample of 244. We completed an ethics amendment, which allowed us to recruit via social media, and received some interest through Facebook and Twitter, but did not have anybody actually complete the study. We were then encouraged to use Prolific, another online platform with a pool of thousands of participants, but the process of getting the research funding into Prolific via POs and invoices was new to me and very time-consuming.

Despite this, when we eventually got the study live on Prolific, I was struck by how quick and easy it was to recruit participants. What took weeks via Subject Pool took less than 10 minutes on Prolific. I reflected on participants being paid to complete surveys and if this would affect their responses; which Prolific had already discovered by encouraging me to add

attention checks within the survey itself. My experience during Undergraduate and Postgraduate studies involved recruitment through volunteers or word-of-mouth, so this was something I had not considered before. For me, it has brought to light the issue of where participants are recruited from when I read other literature within the field, and outside of psychology more broadly. In my experience this is not commonly reported, but may have implications to how the data is analysed and outcomes are interpreted.

Additionally, although I am grateful we reached the amount of participants we did, I did not appreciate how the combined effect of large participant numbers, moving between platforms, switching between two researchers, and multiple testing conditions would make formatting the data into one coherent analysable file very time-consuming and challenging. I have an increased level of respect for researchers who utilise incredibly large data sets derived from multiple inputs.

Software: Qualtrics and RStudio

Completing this project has demonstrated to me the value in being able to code, even as a Clinical Psychologist. The initial word sorting task and recall exercise were programmed in MATLAB and were carried out on computers provided by the researcher. In our adaptation everything had to be completed from the participant's own computer, so the entire paradigm had to be shifted to an online platform. Entering the questionnaires into Qualtrics was time-consuming but simple, but it became much more difficult to implement the ostensive cues and the word sorting task within this software. Most of the work is done using a Graphical User Interface (GUI) within Qualtrics, but I discovered it was not possible to create the word sorting task without learning to code in Javascript as this was the supported language within Qualtrics. This was not something I was familiar with but thought my experience in other coding languages would be sufficient in bridging the gap.

Once the survey was finished and fully coded, but prior to publishing, I realised through some in-house testing that one of the ostensive cues where a participant would enter their name ("What would you like me to call you?") was storing this input in the final survey output. If this went live, this would be an obvious breach in anonymity and data security. This highlighted the limitations inherent within online platforms as there was no way to delete the name variable after it was used in the ostensive cueing instructions due to it being stored server-side. I spent some time asking colleagues and trying to work through the problem myself, before finding a similar question posted on the Qualtrics support forums which advocated a lengthy work-around method that involved rewriting the variable within the survey flow. This therefore allowed the variable to be kept and used within the study, but all names were replaced with "asda" in the output file. This had to be applied to all versions of the study using this name variable, which was time consuming and delicate. Although the limitations of Qualtrics were highlighted to me, it also reminded me that there is often a "workaround", or someone else who has encountered a similar problem and found some degree of a solution.

Using RStudio (R) was also a new experience for me as I have only ever used SPSS to analyse data. One reason for the inclusion of R was the publicly available scoring syntax for some of the questionnaires, and R also allowed me to run analyses without having to manually create multiple dummy variables for the demographics. Although using R was new to me, there was a wide variety of easily accessible resources online and I used some time while waiting on ethical approval to familiarise myself with the language.

I also used R as I thought the coding system was more dynamic than SPSS, and my intention was to have the words recalled by participants to be automatically scored; rather than having to score ~250 participants by hand. Solving this coding problem was quite an enjoyable experience for me, and it helped me consider how this paradigm could be scaled up to much larger samples if the scoring procedure was automated. I gained a new appreciation for the

value of coding as a researcher, and I would encourage those in the field who are hesitant to engage with coding to try it out as it adds a new dimension to research.

Looking Back and Changes

Looking back on the process as a whole, I would probably have reached out sooner for support in creating the survey on Qualtrics, and the coding of words recalled in R. Although I enjoyed the process of learning the two systems, it was incredibly time-consuming and at times frustrating to tackle these systems independently. I think this would have been different without the COVID-19 pandemic as there would have been more in-person meetings and discussions between myself, my thesis partner, colleagues, and supervisors. I am pleased that I managed it, and feel a strong sense of accomplishment, but it would have reduced stress levels if I asked for support.

Regarding COVID-19 and the lockdowns, it is hard to say what I would have done differently as we were genuinely optimistic that the lockdowns would not continue in the fashion they did. We were offered a back-up dataset to analyse, but I wanted to complete a piece of research myself rather than spending my empirical project analysing another researcher's data. There were moments in 2020 where we could have switched to an online paradigm, but we were all hopeful that this would be a last-case resort. I am reminded of the "sunk cost fallacy" where people are more likely to continue with something once an investment (money, time, effort) has been made. After running a practice trial of the mother-baby experiment, I was definitely invested in the process and wanted to see it through to the end; so it was difficult to accept that this was not going to be possible.

Thinking about the limitations of the empirical paper, I will be aware in future studies of language and the possibility of online pre-requisites not being entirely failsafe. I assumed that participants would speak English fluently if I selected this as a requirement on the site, but, as mentioned, I realised this was not the case when speaking to some of the participants through

MS Teams. Additionally, some participants struggled with their internet connection and accessing MS Teams which affected the tight scheduling I had arranged for testing days. In future I will be sure to allow more time after each participant to account for possible delays. Given the delay in swapping projects and consequent submission of another ethics form, I had to organise the testing days by 10-minute blocks to ensure I could submit on time. There is an argument to be made that I should have applied for an extension given the time difficulties, but it was important to me to finish and submit on the deadline.

If I had more time, I would also have given more thought to the booking system for the MS Teams meetings. The setup utilised involved participants choosing a timeslot either through the in-built Subject Pool timetable, or through Calendly. This resulted in a huge number of emails as participants cancelled/rebooked, which became hard to keep track of. The emails also came directly to me, meaning I had to sift through and sort which participants were attending a meeting with me, and which were meeting my research partner. The main aim was to get the study completed with ample time to analyse and write-up, so this practicality was not considered in enough detail prior to going live with the experiment.

I would also have tried to ensure that participants were all recruited using the same method. The split between Prolific and Subject Pool was not only logistically challenging but also raised some questions within the data analysis.

Conclusions

I hope these reflections have added some insight into the behind-the-scenes process of this thesis. I imagine COVID-19 was a major obstacle for the vast majority of research over the past year and a half, and it impacted this study so much so that it had to be completely altered. Despite this, research is still going ahead, which speaks to the creativity and dedication to researchers within academia. I have highlighted how my previous experience in MBT led me to this project, which may also come through in my conceptual introduction as I explored

the psychoanalytic roots behind mentalization. I encourage researchers to consider conceptual introductions as not being "less than" meta-analyses. Recruitment difficulties were highlighted, along with the methods used to overcome the obstacles and reach the required sample size. I gained some new professional abilities through the work with Qualtrics and R, and it deepened my belief that even a rudimentary knowledge of coding is incredibly beneficial to research projects of any size. I also took away some personal lessons on reaching out for support and not being so independent. Finally, looking back through the process as a whole allowed me to consider what I may have done differently, but also highlighted what I could do in future researcher roles. Hopefully some of these reflections will resonate with researchers and more general lessons can be learned to promote higher quality research in the context of unexpected circumstances.

References

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College London)).

Appendices

Appendix A

Ethical Approval

UCL RESEARCH ETHICS COMMITTEE
OFFICE FOR THE VICE PROVOST RESEARCH

16/02/2021

Professor Peter Fonagy
Clinical, Edu & Health Psychology
UCL

Cc: Sophie Raymont, Chris MacGregor

Dear Prof Fonagy,

Notification of Ethics Approval
Project ID/Title: 19367/001 Ostensive Cueing and Implicit Learning

Further to your satisfactory responses to the reviewer's comments, I am pleased to confirm that your study has been ethically approved until **16/02/2022.**

Ethical approval is subject to the following conditions:

Notification of Amendments to the Research
You must seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form'
http://ethics.grad.ucl.ac.uk/responsibilities.php

Adverse Event Reporting – Serious and Non-Serious
It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events the Joint Chairs of the Ethics Committee should again be notified via the Ethics Committee Administrator within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Joint Chairs will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Final Report
At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes in particular issues relating to the ethical implications of the research

Office of the Vice Provost Research, 2 Taviton Street
University College London
Tel: +44 (0)20 7679 8717
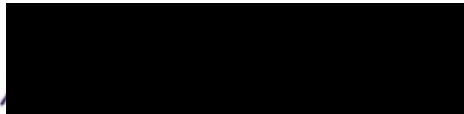Email: ethics@ucl.ac.uk
http://ethics.grad.ucl.ac.uk/

i.e. issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

In addition, please:

- ensure that you follow all relevant guidance as laid out in UCL's Code of Conduct for Research: www.ucl.ac.uk/srs/governance-and-committees/research-governance
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.

Yours sincerely

Professor Michael Heinrich
Joint Chair, UCL Research Ethics Committee

Appendix B

Ethics Amendment

VPRO.Ethics
Thu 18/03/2021 17:17
To: Raymont, Sophie
Cc: Fonagy, Peter; Macgregor, Chris

📄 Project 19367 001. Ethics ame...
451 KB
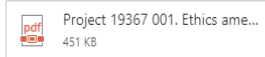
Dear Sophie,

Apologies this took so long. I'm pleased to inform you that the REC has approved your attached amendment request. Please take this email as confirmation of that approval. Please note the following provisos:

- You must obtain permission to post the advertisement from social media groups owners before posting

- You must ensure not to be coercive if recruiting for personal networks, e.g. by emphasising that participation is voluntary etc.

IMPORTANT: For projects collecting personal data only
You should inform the Data Protection Team – data-protection@ucl.ac.uk of your proposed amendments, including requests to extend ethics approval for an additional period.

Best wishes,
Cat

Catherine Collins
Research Ethics Officer
Office of the Vice-Provost (Research)
University College London
2 Taviton Street, London, WC1H 0BT

Website: https://ethics.grad.ucl.ac.uk/
Ethics email: ethics@ucl.ac.uk

Appendix C

Information Sheet and Informed Consent

UCL Research Department of Clinical,
Educational & Health Psychology
1-19 Torrington Place
University College London
London
WC1E 7HB
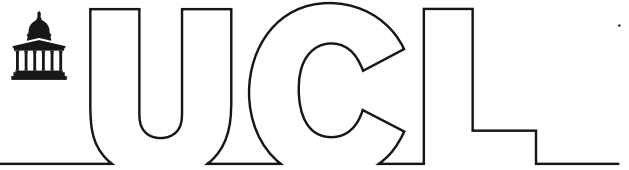
Information Sheet for participation in Research Studies

Research Project Title: Individual differences and word association
Contact details of researchers

Sophie Raymont (Researcher)

Doctorate of Clinical Psychology
Research Department of Clinical, Educational and Health Psychology
University College London
Gower Street
London WC1E 6BT

E-mail:

Christopher MacGregor (Researcher)

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Research Department of Clinical, Educational and Health Psychology
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E-mail:

Professor Peter Fonagy (Principal Investigator)

Psychoanalysis Unit
Research Department of Clinical, Educational and Health Psychology
University College London
Gower Street
London
WC1E 6BT

E-mail: **p.fonagy@ucl.ac.uk**

Invitation

You are being invited to take part in this research project which is being conducted by researchers from the Research Department of Clinical, Educational and Health Psychology at UCL. You should only participate in this research if you want to. Before you decide to take part, it is important for you to fully understand what the research involves. Please carefully read through the following information and discuss it with others if you wish.

If you have any questions about the research or anything in this information sheet is not clear, please contact one of the researchers or the principal investigator whose contact details can be found at the top of this document.

Who has ethically reviewed the project?

This study has been approved by the UCL Research Ethics Committee (Project ID Number: 19367/001).

Do I have to take part?

It is up to you to decide whether to take part or not; choosing not to take part will not disadvantage you in any way. If you do decide to take part you are still free to withdraw at any time during the research procedure without giving a reason by closing your internet browser. It will be difficult to near impossible to withdraw your results after you have completed the task, as we will not be able to link your results to your e-mail address.

Who are we recruiting?

We are recruiting English-speaking adults, aged 18-60.

Background to the research

This is a PhD project for the Doctorate of Clinical Psychology. We are interested in finding out what influences cognitive processes in adulthood.

What will be asked of me if I decide to take part?

Please inform others in your household that you will be taking part in an online study which will require privacy for the duration AND make them aware of this again, directly before the beginning of the study. You will need minimal distractions in order to focus on the study task.

If you agree to participate, one of the researchers will contact you via Microsoft Teams at the beginning of the study session and explain the study. You will then be asked to complete questionnaires about you as a person. Some of the questions ask about mental and emotional wellbeing, and whether you experienced trauma/adverse experiences in childhood.

There is a computer-based word sorting task after this. We want to see how quickly and accurately you can sort word lists.

The study will take place entirely online. It should take no longer than an hour in total.

What are the possible risks of taking part?

There are no major risks in participating. Some of the questionnaires ask about sensitive topics, such as mental and emotional wellbeing, and experiences of maltreatment and abuse during childhood. Some participants may find these questions upsetting or stress-inducing.

If you experience distress during or after taking part in the study and require support for this, please contact either of the researchers whose contact emails are at the top of this document. Additionally, you may wish to contact your GP, or one of the organisations below for support.

Organisation	Contact details
UCL Disability, Mental Health and Wellbeing Team (This service is available to UCL students only) The Disability, Mental Health and Wellbeing team are here to help by providing information and advice on issues around disability, mental health and wellbeing, and in doing so enhance your access to study. We are made up of a team of specialist advisers that sit within the wider Student Support and Wellbeing department, alongside counsellors and other support staff.	Monday – Friday, 9am-5pm Telephone: **020 7679 0100**
NHS direct (This service is available to all participants) NHS 111 are a 24-hour support line. A trained advisor will ask you some questions and direct you to the most helpful service.	24 hours, 7 days a week. Telephone: **111**
Samaritans (This service is available to all participants) Free listening and support service for anyone who needs to talk, no matter how big or small the concern.	24 hours, 365 days a year. Telephone: **116 123**
Mind (This service is available to all participants) A leading UK mental health charity with numerous information and self-help resources on their website. Information line provides mental health information and signposting to relevant services.	Monday – Friday, 9am-6pm. Information line: **0300 123 3393** Text contact: 86463 E-mail: info@mind.org.uk

Nightline (This service is available to London students only) London Nightline is an anonymous listening and information service run by students in London, for students in London. You can talk to us about anything – big or small – in complete confidence.	6pm-8am, open every night of term. Live chat also available online. Telephone: **(+44) 207 631 0101** Website (live chat): https://nightline.org.uk/

What are the potential benefits of taking part?

There are no direct benefits to you as the participant. Each participant will be entered into a draw to win one of 10 Amazon vouchers (2 x £100, 4 x £50, 4 x £25).

Your will participation will help to advance science in the field of individual differences in adult cognition. If you would like to know the overall outcome and impact of our experiment, please contact the researchers or principal investigator whose contact details are at the top of this document.

How will my data be stored?

All information collected about you during the course of the research (including questionnaires and your task data) will be kept strictly confidential and will be securely stored electronically, using a numbered code to ensure pseudo-anonymity so that you cannot be identified. No video or audio-recording data will be collected during this research. Only researchers directly involved in the study will have access to the data. The data will be used only for informing the research question in this study and the results of the research will be disseminated in peer-reviewed scientific journals, but you will in no way be identifiable from such publications. The data will be destroyed after five years.

All data will be stored in accordance with the Data Protection Act 1998.

What will happen to the results of the research project?

Results of this project will be written up and submitted to the UCL Department of Clinical, Educational and Health Psychology as part of the completion of the Doctorate of Clinical Psychology qualification. The results of the research may be disseminated in peer-review scientific journals, but you will in no way be identifiable in such publications. Participants can contact the researchers via-email to obtain anonymised summaries of the results.

Concerns and complaints

If you are concerned about any elements of this study, or wish to make a complaint relating to your experience of taking part in this study, please contact the Principal Investigator, Professor Peter Fonagy (contact details at top of this document) in the first instance.

If you are not satisfied with the response, please contact UCL Research Ethics Committee at ethics@ucl.ac.uk.

Thank you for considering to take part in this study.

UCL Research Department of Clinical,
Educational & Health Psychology
1-19 Torrington Place
University College London
London
WC1E 7HB
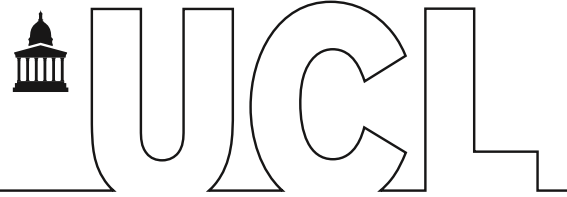
Informed consent form for participation in research studies

Title of Project: Ostensive cueing and implicit learning
Contact details of researchers

Sophie Raymont (Researcher)
Doctorate of Clinical Psychology
Research Department of Clinical, Educational and Health Psychology
University College London
Gower Street
London WC1E 6BT

E-mail:

Christopher MacGregor (Researcher)
Doctorate of Clinical Psychology
Research Department of Clinical, Educational and Health Psychology
University College London
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E-mail:

Professor Peter Fonagy (Principal Investigator)
Psychoanalysis Unit
Research Department of Clinical, Educational and Health Psychology
University College London
Gower Street
London
WC1E 6BT

E-mail: **p.fonagy@ucl.ac.uk**
This study has been approved by the UCL Research Ethics Committee. Project ID
Number: 19367/001.

Data Protection Privacy Notice:
The data controller for this project will be University College London (UCL). The UCL Data Protection Office provides oversight of UCL activities involving the processing of personal data.

UCL data protection officer: Alex Potts
E-mail: data-protection@ucl.ac.uk
Thank you for your interest in taking part in this research. Before you agree to take part, you must have read the information sheet on the previous page.
If you have any questions arising from the Information Sheet or explanation already given to you, please do not continue and contact the researchers via the e-mail addresses provided above before you to decide whether to join in. You may print screen or copy and paste this consent page, if you wish to have a copy to refer back to.

Participant's Statement

Please read each statement below and tick the circle at the start of the statement if you agree.

○ I have read the notes written above and the Information Sheet and understand what the study involves.

○ I understand that if I decide at any time that I no longer wish to take part in the study procedure, I can stop the task and withdraw immediately (by closing my internet browser).

○ I understand that I can withdraw at any time from the study by closing my browser window but that it will be difficult or impossible to withdraw my data once the task has been submitted.

○ I consent to the processing of my personal information (demographic information, information relating to mental health and childhood experiences) for the purposes of this research study.

○ I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

○ I agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.

○ I agree that my non-personal research data may be used by others for future research. I am assured that the confidentiality of my personal data will be upheld through the removal of identifiers.

○ I understand that the information I have submitted will be published as a report and I will be sent a copy if requested. Confidentiality and anonymity will be maintained, and it will not be possible to identify me from any publications.

Print name:

Signed:

Date:

Appendix D

Individual Trainee Contribution to Joint Research

This research was a joint project between the author of this thesis and another UCL DClinPsy Trainee (Raymont, 2021). The development of the paradigm was a joint effort, as was recruitment and participant testing. The ethics forms, information sheet, and consent form were created and edited by Raymont, and reviewed by the author, whereas developing and inputting the study into Qualtrics was completed by the author of this paper. Adapting the study for use on Prolific was also completed by the author. These were both reviewed by Raymont on completion, who also completed digital media work for adverts. Analyses were conducted independently, with Raymont utilising the MACE-52 questionnaire whereas the author of this thesis used the RFQ-8. Where Raymont explored maltreatment and psychopathology, the author focussed more on ostensive cues and reflective functioning. Both papers were written up independently.
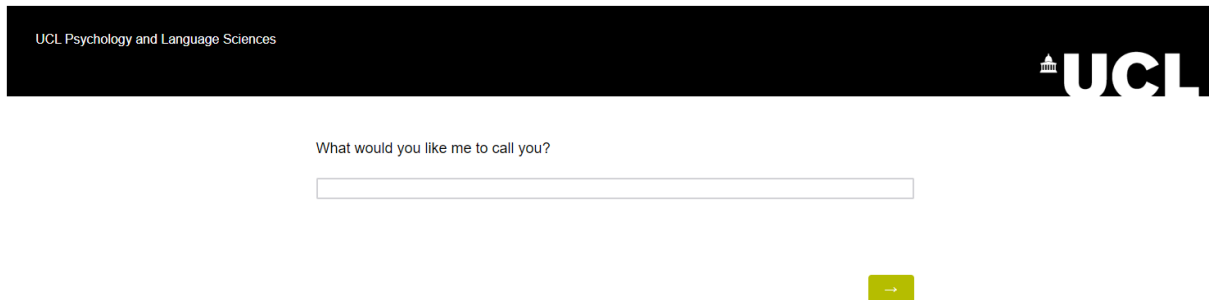
Appendix E

Semi-structured Script for MS Teams Meeting

OC Condition MS Teams Script

- Hi, how are you?
- My name is XXX, I'll be running through the research project with you for about 5-10 minutes, and then I'll give you the link in the chat to access the survey. What would you like me to call you? PARTICIPANT NAME1? Okay, brilliant.
- PARTICIPANT NAME2, where are you in the world? It's strange not being able to meet people in person [smile]!
- PLACE? Ah okay. Are you studying or working there or? [comment on studying/working, how're you finding it?]
- Okay PARTICIPANT NAME3, I'm going to give you a brief rundown of the study now, if that's okay?
- So all of this is in the information sheet we sent out, but I'm going to give you a link in the chat box after we're done to Qualtrics, which is the survey platform we use. Once you open it up, you'll be asked to complete some demographics at the start, so questions like your age and education level, but, PARTICIPANT NAME4, this will all be anonymous – so it's not linked to your name or this meeting.
- You will then have to complete some questionnaires which ask about you as a person, and afterwards there will be a short word sorting task. This will all be explained in the survey once you get there.
- At the end of the survey there will be a debrief form with some further resources and a bit more of an explanation of the study. In total it should take about 30 minutes. How does that sound? Do you have any questions?
- Okay, I'm going to put the link into the chat now and make sure you access it from a computer or laptop. Okay, thanks for your time, hope it goes well PARTICIPANT NAME5!

Appendix F

Screenshots of Ostensive Cueing Instructions

Appendix G

Screenshots of non-Ostensive Cueing Instructions

Appendix H

Word List Used for Word Sorting Task

Positive	Negative
Trial - Self-disciplined	Trial - Underhanded
Trial - Honourable	Malicious
Trial - Earnest	Dislikable
Trial - Wise	Cruel
Brilliant	Rude
Sincere	Cold
Happy	Obnoxious
Dependable	Liar
Kind	Ill-tempered
Thoughtful	Greedy
Kind-hearted	Phony
Trustworthy	Vulgar
Loyal	Nosey
Intelligent	Insolent
Unselfish	Dishonest
Warm	Unkind
Polite	Thoughtless
Mature	Unfriendly
Efficient	Mean
Understanding	Offensive
Honest	Selfish
Admirable	Spiteful
Reliable	Hostile
Likable	Narrow-minded
Good	Abusive
Truthful	Sly
Friendly	Unethical
Gentle	

Appendix I

Screenshot of Word Display

Appendix J

Screenshot of Word Sorting Task

Appendix K

Screenshot of Word Recall Box
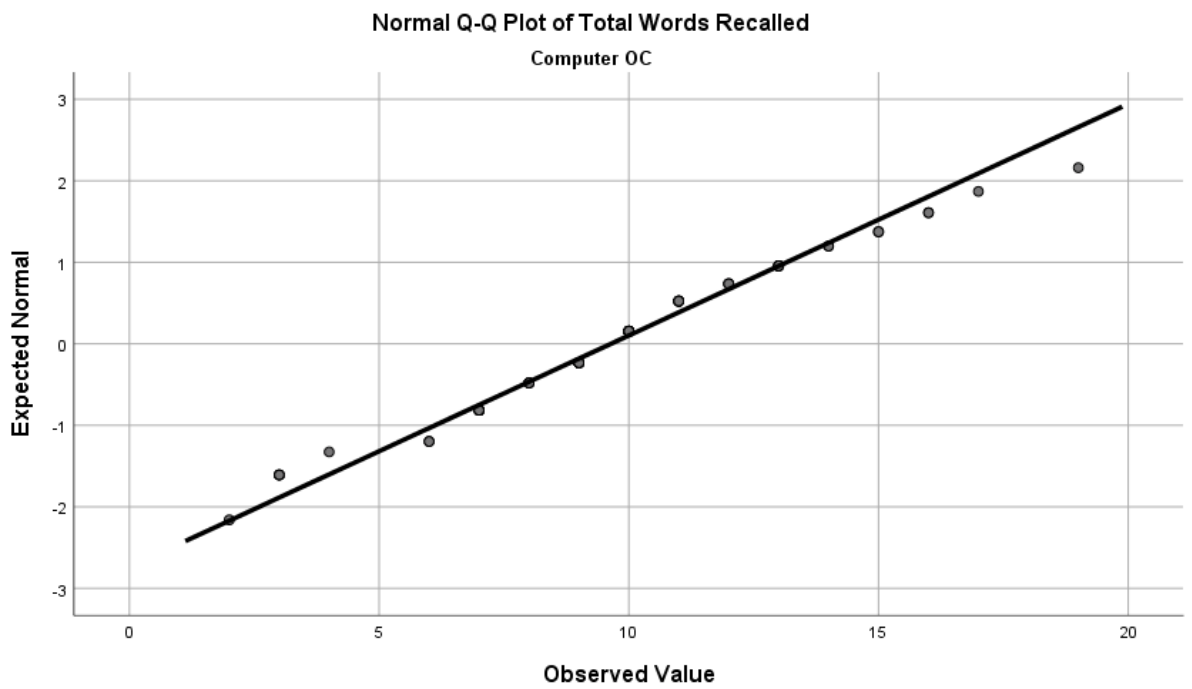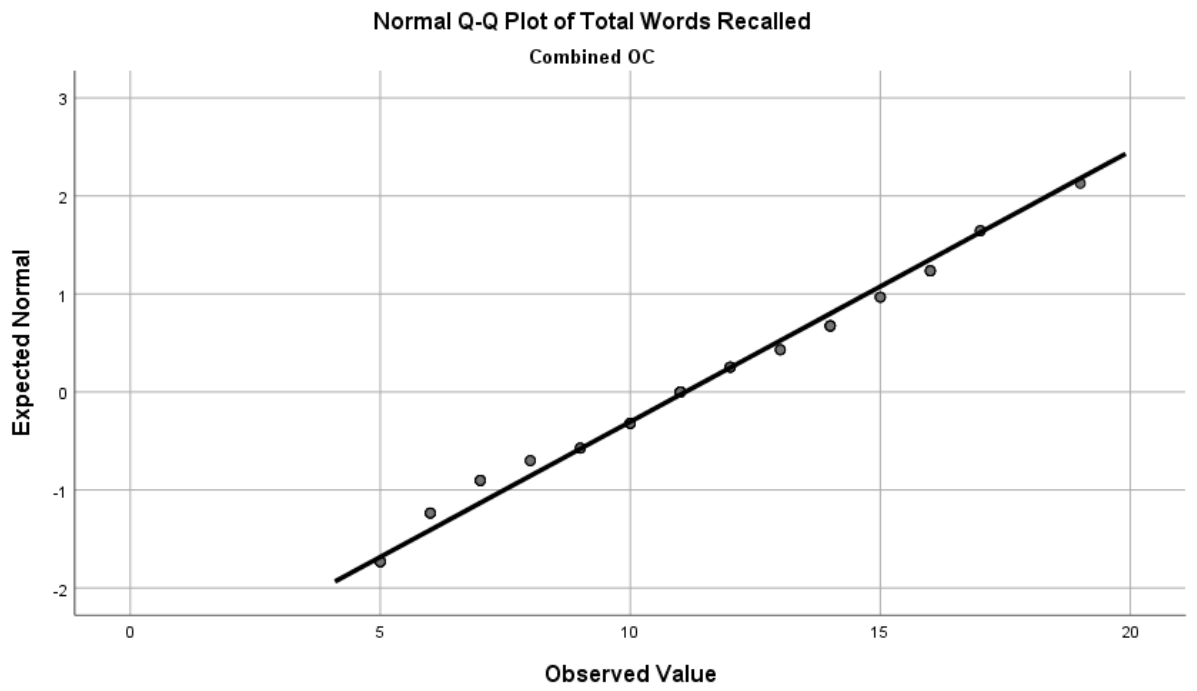

UCL Psychology and Language Sciences

Okay TESTNAME, please type in the box below as many of the attribute words that you classified as positive or negative earlier as you can.
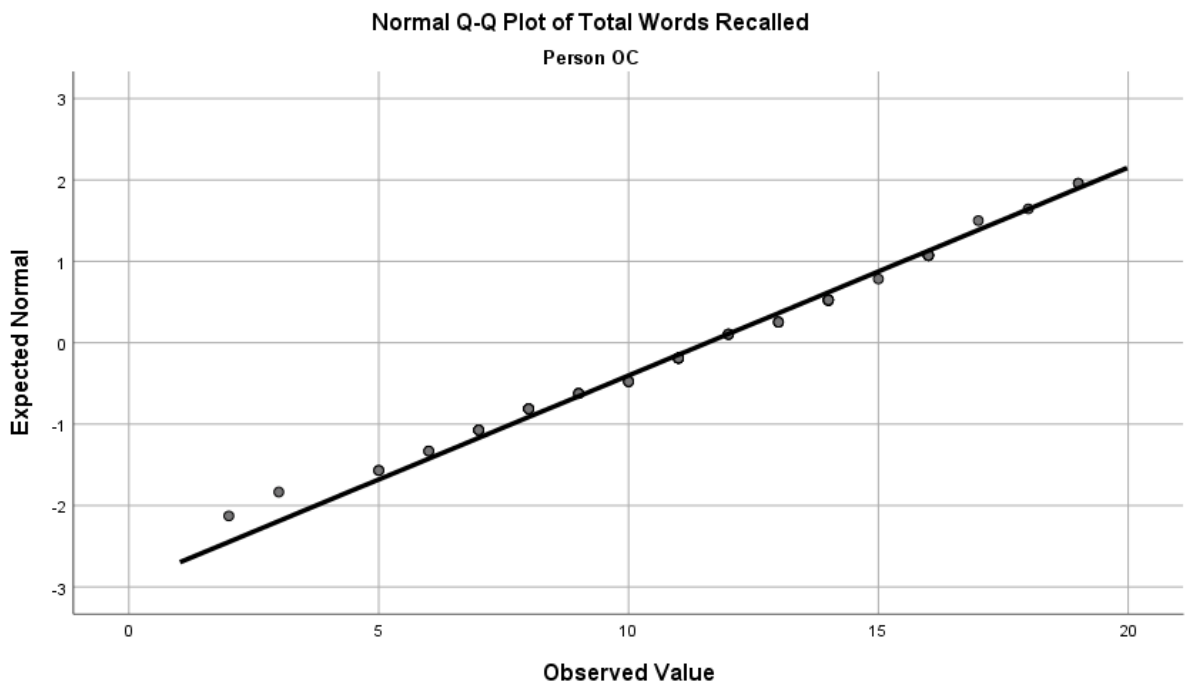
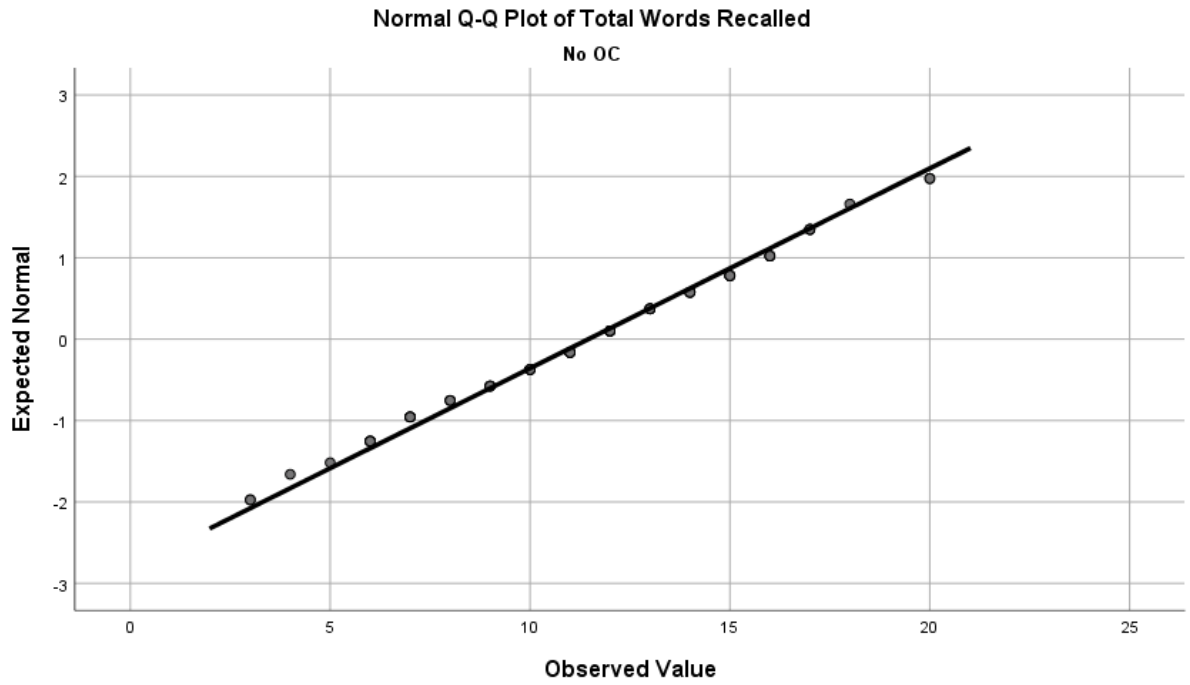You have 2 minutes to type as many as you remember.
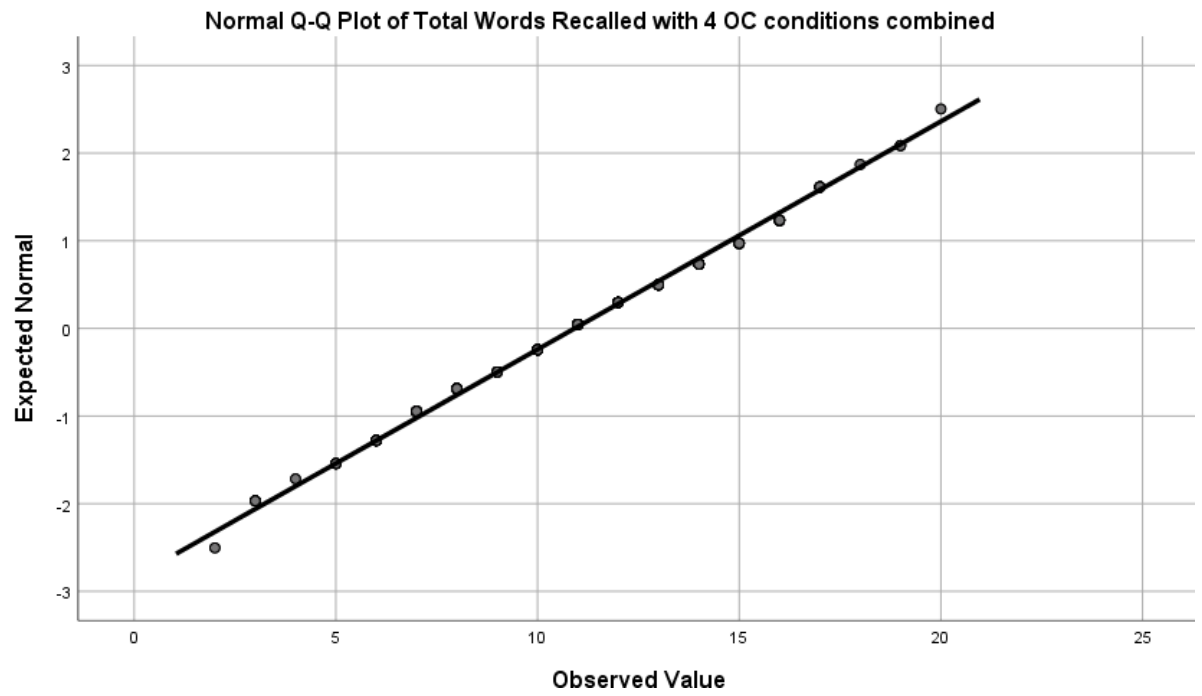
Appendix L

Q-Q Plots of Total Words Recalled for 4 OC Conditions

Normal Q-Q Plot of Total Words Recalled
No OC

Normal Q-Q Plot of Total Words Recalled
Person OC

Normal Q-Q Plot of Total Words Recalled with 4 OC conditions combined

Appendix M

Q-Q Plot Showing Normality of Residuals in Words Recalled