Article title: Caregiver mentalizing and child emotional regulation: A novel approach to preliminary examination of bidirectional impact

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Abstract

Mentalization theory suggest bidirectional links between a caregiver's capacity to mentalize their child and emotional regulation in their children. However, there has been little empirical investigation to verify this theory. The bidirectional relationship between caregiver mentalizing and child emotional regulation may be especially important to understand in caregiving contexts where there is greater risk of relationship breakdown or child emotional dysregulation, such as in fostering relationships. This study used a novel time-sequence analysis approach to explore the putative bidirectional relationship between caregiver mentalizing and child emotional regulation in the context of long-term foster care. Existing theories about caregiver mentalizing and child emotional regulation were evaluated and developed by looking at moment-by-moment interactions between a foster carer and a child in her care. The findings of this study gave mixed support for bidirectional relationships between foster carer mentalizing, and child emotional regulation predicted by existing theoretical models. These findings have implications for refining and applying mentalization theory broadly and more specifically in the context of foster care. Furthermore, this study provides a useful example of how time-sequence analysis may be useful for exploring the links between phenomena, such as caregiver mentalizing and child emotional dysregulation, occurring over time in observational data.

Introduction

Mentalizing is the ability of an individual to identify and reflect on their own mental states, those of others, and the interactions between these mental states (Bateman & Fonagy, 2013). Developmental theory and research have established parental mentalizing, often operationalised as parental reflective functioning, as playing a key role in supporting multiple areas of children's development (Bateman & Fonagy, 2013; Camoriano, 2017; Fonagy et al., 2004; Sleed et al., 2018). Mentalization theory suggests that caregivers are better able to regulate their child's emotions through sensitive parenting when they can identify and understand their child's mental states (Fonagy et al., 2004). Caregiver mentalizing is also thought to be crucial in supporting children to learn how to make sense of their own mental states through developing self-mentalizing capacities, ultimately leading to better self-regulation (Fonagy & Target, 1997). There is good empirical evidence, particularly for

younger children, that higher levels of caregiver mentalizing are linked to better child emotional regulation (for systematic review see Camoirano, 2017). While there is good evidence that mentalization-based interventions improve children's emotional regulation (e.g., Midgley, Sprecher, & Sleed, 2021), we know little about how direct the relationship between caregiver mentalizing and child emotional regulation is.

Mentalization theory suggests that mentalization is a social and transactional process (Fonagy & Target, 1997). Mentalizing is not only a trait-like capacity of an individual caregiver, but also specific to particular relationships and contexts (Luyten & Fonagy, 2015). For example, there is evidence that caregivers are better able to mentalize when thinking about their own child compared to when thinking about other figures (Meins et al., 2014). An individual's capacity to mentalize is highly dependent on context, with very high or very low arousal being associated with a decreased ability to engage in mentalizing (Luyten et al., 2012; Luyten & Fonagy, 2015). Attachment relationships, such as those between caregivers and young people, in particular can elicit strong emotions that can affect the ability of caregivers to engage in mentalizing (Luyten et al., 2012; Luyten & Fonagy, 2015). There is empirical evidence that caregivers and children mutually influence one another's emotional regulation (Cole et al., 2003). Therefore, when children struggle with emotional dysregulation this theoretically may have a powerful negative impact on caregivers' own emotional regulation and, therefore, make it harder for them to engage in mentalizing (Luyten et al., 2012; Luyten & Fonagy, 2015). A decrease in caregivers' mentalizing is also likely to have a detrimental impact on their ability to parent sensitively, potentially contributing to children becoming even more emotionally dysregulated. Therefore, mentalization theory hypothesises bidirectional links between caregiver mentalizing and child emotional dysregulation (summarised in Figure 1).

[Insert Figure 1 around here]

Despite the growing body of work investigating bidirectionality in caregiver-child relationships (Pettit et al. 2008), little research has empirically explored bidirectional associations between caregiver mentalizing and child emotional dysregulation. Borelli and colleagues (2021) investigated this association, finding complex interactions between parental mentalizing, operationalised as reflective functioning, parental empathy and a physiological measure of child regulation. This study found that

higher parental empathy was associated with lower cortisol increases for school-aged children engaged in a stressor task, while greater parental reflective functioning was linked to higher cortisol increases. This suggests that, while parental empathy may have a regulating effect for children during stressful moments, the link may not be so clear for parental reflective functioning. It may be that parents of more emotionally reactive children learn to engage in more sophisticated mentalizing, explaining this surprising finding (Borelli et al., 2021). Such research highlights the need for further investigation into possible bidirectional links between child emotional regulation and caregiver mentalizing.

The necessity of understanding bidirectional links between caregiver mentalizing and child emotional regulation is especially pressing in fostering relationships. While relationships in foster care may be long-lasting and stable, they are much more likely, for many reasons, to be disrupted than biological relationships between birth parents and children (Lindsey, 2006).

The very real possibility of disruption in fostering relationships increases the stakes of understanding how bidirectional links between caregiver and child characteristics to better identify and disrupt vicious cycles of interaction and encourage virtuous cycles of relationship growth. In fostering relationships, children's complex and often challenging personal histories may play a role in how caregivers and children interact. For example, there is a greater prevalence of difficulties in emotional regulation for children living in foster care (Labella et al., 2020). The behaviours associated with children's emotional dysregulation may be difficult for foster carers to manage or understand, leading to greater placement instability (Baldwin et al., 2019). Fearnley and Howe (2003) have theorised that children's early relational trauma impacts upon their attachment patterns, leading to children engaging in behaviours that foster carers may find difficult to manage and distressing. It is hypothesised that this begins a cycle where foster carers' difficulty in managing these behaviours further perpetuates children's disrupted attachment patterns, producing emotional distress and future behavioural difficulties (Fearnley & Howe, 2003). Therefore, bidirectional models of parenting may be especially relevant to the context of fostering relationships where the impacts of early adversity may be kept alive by the ways foster carer and young people interact (Fearnley & Howe, 2003). However, we know little about the dynamic interactions between the emotional regulation of children living in foster care and the characteristics of their caregivers, such as their mentalizing capacities (Goemans et al. 2018).

Foster carer mentalizing may be an important target for promoting positive fostering relationships and improving young people's emotional regulation and wellbeing. Evaluations of interventions targeting foster carer mentalizing have shown a favourable impact on outcomes such as children's emotional regulation, placement stability and relationship quality (Byrne et al. 2020; Midgley et al. 2021). Developing our understanding of the relationship between foster carer mentalizing and child emotional regulation has the potential to inform interventions to promote improved placement stability and ultimately positive child outcomes.

In summary, the importance of caregiver mentalizing to child development has been well established by developmental theory and research (Bateman & Fonagy, 2013). While caregiver mentalizing is theorised as having bidirectional links to child emotional dysregulation (see Figure 1 for prototype theory) there has been little empirical investigation to support this. Questions of bidirectionality may be especially critical in the context of foster care, where relationship disruption is common and children are more likely to have difficulties with their emotional dysregulation (Lindsey, 2006; Baldwin et al. 2019). This exploratory study aimed to develop conceptual understandings of the relationship between caregiver mentalizing and child emotional dysregulation in the context of long-term fostering. The study particularly aimed to test whether the patterns outlined in the prototype theory (Figure 1) were observable in moment-by-moment foster carer-child interactions. This preliminary examination was conducted using a novel time-sequence analysis design that examined data from an observational carer-child interaction task. The three specific research questions of this study were: 1. Is there evidence that more effective foster carer mentalizing is associated with reduced child emotional dysregulation? 2. Is there evidence that ineffective or an absence of foster carer mentalizing is associated with increased child emotional dysregulation? 3. Is there evidence that child emotional dysregulation is associated with decreases in foster carer mentalizing?

Methods

Design

This study was a preliminary examination of the links between caregiver mentalizing and child emotional dysregulation that utilised a novel time-sequence analysis design. The time-sequence analysis

approach provided a framework for systematically examining carer-child interaction data with the aim of testing existing theoretical models of possible bidirectional relationships between caregiver mentalizing and child emotional dysregulation.

In this study, caregiver mentalizing was operationalised as parental reflective functioning: the ability of a caregiver to identify and reflect upon their own mental states, those of a child in their care, and the interactions between these (Slade, 2005). Child emotional dysregulation was operationalised as emotional volatility, unpredictable, non-contingent, disorganised or misattuned affect sometimes manifesting as sustained, extreme, or non-contingent negative affect.

Setting and Recruitment

The data utilised in this study was collected as part of the Relationship Stories study, an ancillary study to the Reflective Fostering Study, a randomised-controlled trial of a group intervention for foster carers in the UK (for protocol see Midgley, Irvine, et al., 2021). The Relationship Stories study focuses on understanding the process by which the Reflective Fostering Programme, a group mentalization-informed intervention for foster carers, impacted upon foster carers from the study's intervention arm, and the children in their care, via the hypothesised mechanism of improved foster carer mentalizing.

For the current study, a dyad was purposively sampled from the Relationship Stories sample based on the child's history of difficulties with emotional dysregulation, as reported by their caregiver. Given this study's focus on building understanding of the interactions between children's emotional dysregulation and foster carer mentalizing this dyad was selected because it would offer a rich understanding of the relationships between these characteristics.

Participants

The participants in this study were a foster care dyad of one foster carer ("Ruth") and a 10-year-old child living in her care ("Alex"). At the time of this study, Ruth had been caring for Alex for nine months and the placement plan was for Alex to stay with Ruth in the long term.

Ruth was a single, female, middle-aged foster carer who identified as White British and was living in England. Ruth was new to fostering, having only begun fostering one year ago and was caring for a sibling group, including Alex. Two measures of parental reflective functioning were administered as part of the wider study: the Parental Reflective Functioning Questionnaire (PRFQ; Luyten et al.

2017) and the Parent Development Interview which was coded for parental reflective functioning (PDI-RF-R; Slade, 2005). Both these "offline" measures of mentalizing showed that Ruth demonstrated moderate mentalizing capacity in relation to caring for Alex overall, although the scores were somewhat variable during the interview measure when discussing different events.

Alex was a ten-year-old male child of White British heritage. Before coming to live with Ruth, Alex had lived in several different fostering households after coming into care. Ruth completed the Emotional Regulation Checklist (ERC; Shields & Cicchetti, 1997) which showed Alex to be in the clinical range for the emotional dysregulation and lability-negative expressed emotion scales. In identifying challenges, she faced in her care of Alex, Ruth highlighted concerns with Alex's emotional dysregulation, explaining that Alex struggled with 'screaming tantrums and not being able to self-regulate' describing 'meltdowns that can last a long time'. Ruth also reflected on the impact of Alex's difficulties with emotional dysregulation affecting him getting ready for school explaining Alex would 'throw himself on the floor and refuse, scream and throw items close to him'.

Ethics

Ethical approval for the Relationship Stories study was provided by the University of Hertfordshire (ethics number acLMS/SF/UH/04557(4)). To preserve their anonymity both Ruth and Alex have been given pseudonyms and some case details have been changed to further protect their anonymity.

Data

As part of the Relationship Stories Study, Ruth completed an in-depth assessment after finishing attending the ten sessions of the Reflective Fostering Programme, approximately four months after joining the study. This assessment involved a home visit in which she and Alex participated in a carer-child interaction task. The Carer-Child Interaction Task is a novel paradigm involving a caregiver and child working together to build a series of Lego figures from paper instructions, each becoming more challenging over the 30-minute task period. This activity is designed to involve sufficient ambiguity and difficulty to elicit rich carer-child interactive sequences, and possibly give insight into caregiver mentalizing or parenting strategies much like the Squiggle Paradigm (Ensink et al., 2017). This task was conducted in Ruth's home and video recorded by members of the research team. The observational

video data from this interaction task was coded to capture both child emotional dysregulation and caregiver mentalizing.

A bespoke coding system of child emotional dysregulation was developed for this study as no existing age- and task-appropriate measures were available. This child emotional dysregulation coding system was developed informed by existing emotional dysregulation measures (Hagstrøm et al., 2019; Matias et al., 2014; Morelen et al., 2014; Shields & Cicchetti, 1997).

The coding system used 5-second interval coding of the interaction task between child and carer, awarding a score from 1 (extremely/highly well-regulated) to 5 (extremely/highly dysregulated) to characterise the child's emotional dysregulation. Sequences were double coded to achieve consensus and enhance reliability. The full manual is available upon request from the corresponding author.

A novel caregiver mentalizing coding system was developed for this study due to the lack of available measures that captured moment-by-moment, verbal, and non-verbal caregiver mentalizing in a way appropriate for caregivers of school-aged children. This caregiver mentalizing coding system was informed by existing measures of caregiver mentalizing including the Squiggle Paradigm for assessing reflective parenting (Ensink et al., 2017), the PDI-RF manual (Slade, 2005), observational coding for parent-adolescent mentalizing (Vanwoerden, 2020), and the parental embodied mentalizing scale (Shai & Belsky, 2016). Coding involved first identifying child cues during carer-child interactions including verbal or non-verbal utterances, or changes to facial expression, gaze, or posture. For each child cue identified the caregiver's response is observed and a binary rating (0 or 1) provided. Caregiver responses were scored 1 where explicit evidence of caregiver verbal or non-verbal mentalizing was demonstrated in response to child cues or scored 0 where there was not sufficient evidence of caregiver mentalizing. Sequences were double coded to achieve consensus and enhance reliability. The full manual is available upon request from the corresponding author.

Data Analysis

The time-sequence analysis for this study was conducted to explore the bidirectional impact of carer mentalization and child emotional dysregulation within the carer-child interaction. The observational data allowed examination of the moment-by-moment sequences of interaction between Ruth's verbal and non-verbal mentalizing and Alex's emotional dysregulation. Using the emotional dysregulation

coding manual, moments when Alex showed increased emotional dysregulation were identified. Next, 1-minute sequences either side of these instances were coded for both child emotional dysregulation and caregiver mentalizing using the manuals described. As findings regarding these sequences and patterns between caregiver mentalizing and child emotional dysregulation emerged, new sequences were purposively sampled and analysed. This allowed for the systematic processing of the observational data to ensure instances that did not align with theory predictions were identified, and to avoid selection bias in the data points. These methods of analysis are not able to identify causal links between child emotional dysregulation and caregiver mentalizing. However, they do allow for inquiry into patterns of association that may suggest something about how carer mentalizing and child dysregulation influence one another.

Trustworthiness and Credibility

Several strategies were used to enhance the trustworthiness and credibility of this study's findings. As previously described, the use of second coders and a consensus building approach enhanced the credibility of findings. This allowed interpretations to be challenged and alternative explanations to be considered for observed patterns in the data. The outlined time-sequence analysis approach ensured a systematic approach and rigorous approach to data analysis. The use of coding manuals provided a systematic approach to guiding later qualitative analyses and step-by-step data analysis prevented 'cherry-picking' of data and ensured transparency in how the process of data analysis led to theoretical interpretations.

Findings

The aim of this study was to develop conceptual understandings of the relationship between caregiver mentalizing and child emotional dysregulation in the context of long-term fostering. These findings report on the observational data of foster carer-child interactions between Ruth and Alex to evaluate key assertions of the prototype theory presented in Figure 1. The findings of the study are presented in the following sections corresponding to the predictions of the prototype theory:

1 Effect of foster carer mentalizing on child emotional dysregulation

1.1 Evidence contradicting the prototype theory

2 Effect of child emotional dysregulation on foster carer mentalizing

2.1 Evidence contradicting the prototype theory

***1** – Effect of foster carer mentalizing on child emotional dysregulation*

The observational data from the Lego carer-child interaction task provided mixed evidence as to the impact of Ruth's caregiver mentalizing, or lack thereof, on Alex's emotional dysregulation.

Firstly, when Alex was emotionally dysregulated and Ruth was able to offer contingent and appropriate mentalizing responses, Alex's emotional dysregulation often reduced. A characteristic example of this is illustrated in Figure 2. This typical sequence began with Alex showing low emotional dysregulation and a serious expression as he quietly searched through the Lego (00:04:15). Ruth supported Alex's autonomous engagement in the Lego task through downregulating her own affect from an excitable to more serious tone, matching Alex's, and sensitively responding to his cues (00:04:15-00:04:25). Alex's emotional dysregulation then increased as he exclaimed, 'you forgot that step' in a loud, whiney voice, reprimanding Ruth for missing one of the Lego task instructions (00:04:30). Ruth responded in a mentalizing manner, pausing while looking at the instructions before showing an impressed facial expression and vocal tone and saying, 'you're right, I did!' with an impressed tone (00:04:35). Ruth's non-defensive, mentalizing response to Alex's frustration appeared to have a regulating effect on Alex whose emotional dysregulation quickly reduced. This was evidenced by a small smile, relaxing of facial muscles and then gradual return to a serious expression re-focusing on the Lego task (00:04:35-00:04:40). In this sequence, consistent and effective caregiver mentalizing did not prevent a moment of child emotional dysregulation, but it allowed for a quick recovery from this. While Ruth's mentalizing was consistent and contingent throughout this segment, what this looked like varied from playful and lively to quiet and reflective in response to Alex's cues.

[Insert Figure 2 here]

There were other sequences illustrating a similar rhythm of interaction between Alex and Ruth during the task. In these moments, Alex would become dysregulated, triggered either by frustration with Ruth or other triggers such as the task being difficult. Ruth's mentalizing responses, including non-defensive recognition of Alex's frustration with her, marked mirroring of Alex's negative affect or

curiosity in Alex's mental states were quickly followed by a decrease in Alex's emotional dysregulation. Furthermore, there were times when, even though the Lego task was very difficult for him, Alex maintained good emotional regulation. This may have resulted from Ruth's consistent mentalizing, for example investing in Alex's autonomous engagement in the task, supporting Alex to remain regulated even when facing a challenging moment.

There were also instances where Ruth's non-mentalizing responses appeared to precipitate increases in Alex's emotional dysregulation. In one instance, Ruth failed to respond in a mentalizing manner to Alex's cues that he wanted to stop the Lego task, shown in Figure 3. In this sequence, Alex initially showed low emotional dysregulation, saying to Ruth playfully 'let's put them back in the bag' signalling to Ruth he wished to discontinue the task (00:22:05-00:22:15). Ruth initially responded in a curious and mentalizing manner, asking Alex 'what do you think?' (00:22:05). Alex maintained low emotional dysregulation, reaffirming his wish to stop the task by saying quietly but firmly, 'because I want to, please' (00:22:10). However, instead of engaging in a mentalizing manner with Alex's clear desire to stop the activity, Ruth responded in a non-mentalizing manner, ignoring Alex's cues, and trying to distract him by asking about the Lego, saying, 'what do you think of your cow?' (00:22:10). This appeared to lead to an increase in Alex's emotional dysregulation where he showed signs of withdrawal and frustration by responding with a monosyllabic 'good' delivered in a flat, disinterested tone with eyes averted and posture hunched (00:22:15). Ruth continued to disregard Alex's negative affect and signs of dysregulation by encouraging Alex to look at the next instruction for the task (00:22:20). This led to a more extreme escalation of Alex's emotional dysregulation where he frowned and exclaimed in frustration 'What!?' in a loud, angry, and almost tearful voice (00:22:20).

[Insert Figure 3 here]

Typically, on occasions where Ruth's ineffective mentalizing preceded Alex's emotional dysregulation, Ruth remained warm and attentive but missed some crucial aspect of Alex's experience (e.g., Figure 3). For example, at times Ruth missed Alex's cues that he wanted to tackle parts of the Lego task alone and her intervention appeared to dysregulate Alex, leading to frustrated outbursts. However, after such moments, Ruth tended to reengage in mentalizing, precipitating a return of Alex's emotional dysregulation to low level.

1.1 *– Evidence contradicting the prototype theory*

The sequences described thus far support the predictions of the prototype theory that foster carer mentalizing can have an emotionally regulating effect on children, and that when caregivers mentalize less well this can have an emotionally dysregulating effect for children. However, instances were also identified in this case where, contrary to the theory's predictions, Ruth's mentalizing of Alex appeared to trigger an escalation in Alex's emotional dysregulation.

One example, presented in Figure 4, was a sequence where Ruth's mentalizing attempt to engage in pretend play with Alex triggered him to become emotionally dysregulated. Alex began the sequence showing low emotional dysregulation while he engaged in pretend play by himself, creating a scenario with a Lego cow looking at other Lego figures (00:22:35). Ruth responded sensitively to Alex's cues by sharing in Alex's joy playing, smiling, and laughing along with him (00:22:35). Alex's emotional dysregulation increased as he became overexcited, shouting suddenly with exuberance and agitation while playing (00:22:40). Throughout Alex's play, Ruth displayed marked mirroring in her mentalizing responses, showing excitement, interest, and shared joy, but at a lower level in a more predictable pattern (00:22:35-00:22:40). Demonstrating her mentalizing of the world Alex has created, Ruth curiously asked about one aspect of Alex's play, 'what would the cow see through the door?' (00:22:45). This explicit mentalizing response from Ruth appeared to trigger Alex to unpredictably and suddenly display flattened affect and withdraw from the play, a sign of emotional dysregulation (00:22:50). This was demonstrated as, responding to Ruth's question, Alex said 'nothing' in a flat tone while dropping from a wide smile immediately to a disinterested expression and averting his gaze from Ruth and the cow (00:22:50). Following Alex's affective withdrawal, Ruth responded non-contingently, persisting with her previous joyful tone, asking 'nothing?' in a surprised and playful tone, in stark contrast to Alex's withdrawn state, potentially indicating an ineffective mentalizing response (00:22:50). Despite Ruth's non-contingent response (00:22:50), Alex's emotional dysregulation did appear to decrease as he became less withdrawn, and his expression lost its flat quality (00:22:55). Therefore, contrary to the predictions of the prototype theory, Ruth's non-mentalizing response did not precipitate an increase in Alex's dysregulation, though some residual emotional dysregulation remained.

[Insert Figure 4 here]

There were many other instances when Ruth's non-mentalizing responses were not followed by an escalation in Alex's observed emotional dysregulation. Often these occurred when Ruth responded in a mentalizing manner to Alex's next cue, or when Alex's missed cues were more subtle, such as small glances, quiet non-verbal sounds or slight changes to expression or posture.

To summarise, there was some evidence that Ruth's mentalizing responses as a foster carer reduced Alex's emotional dysregulation in some instances and that sustained lapses in her mentalizing precipitated an increase in Alex's emotional dysregulation. However, there were also several exceptions to these findings. Sometimes, Ruth's mentalizing responses were met with an increase in Alex's emotional dysregulation. Furthermore, a non-mentalizing response did not always precipitate an increase in Alex's dysregulation. Therefore, while Ruth's mentalizing or non-mentalizing responses did seem to be linked to Alex's emotional dysregulation at times, this was not a consistent pattern.

2 *– Effect of child emotional dysregulation on foster carer mentalizing*

There was mixed evidence that Alex's emotional dysregulation may have precipitated non-mentalizing responding from Ruth. One example supporting the prototype theory that child emotional dysregulation reduces foster carer mentalizing is illustrated in Figure 5. Alex attempted to work independently on the Lego task, showing no emotional dysregulation, while Ruth responded in a mentalizing manner offering motivational comments (00:04:35-00:04:40). Alex then reached a difficult moment in the task, struggling to fit two pieces together, triggering a frustrated outburst and sharp increase in emotional dysregulation (00:04:45). Ruth responded initially in a mentalizing manner, detecting Alex's distress, and offering support on the task asking, 'do you want me to hold it?' (00:04:45). Alex signalled he wanted to complete the task by himself, muttering 'no, no' under his breath (00:04:50). However, Ruth did not respond sensitively to this cue, continuing to offer to intervene (00:04:50). This non-mentalizing response appeared to precipitate an escalation of Alex's emotional dysregulation as he insisted on attempting the task alone, forcefully saying with irritation 'no, no! I'm going to do it by myself' and shaking his head vigorously. Ruth did not appear to acknowledge or reflect Alex's frustration in her response (00:04:55). In this sequence, it appears that Ruth's focus on responding sensitively to Alex's distress may have led her to miss Alex's cues about wanting to attempt the task autonomously,

ultimately leading to Ruth providing a non-mentalizing response. It may be that Alex's emotional dysregulation and distress detrimentally affected Ruth's ability to pick up on other mental state cues from Alex, leading to somewhat invasive caregiving responding. While there was no other external evidence of Ruth becoming dysregulated by Alex's emotional response, it is highly likely that Ruth's need to intervene was an indicator of her need to manage a situation that would be difficult for both of them. There were other instances, supporting the prototype theory, where an increase in Alex's emotional dysregulation appeared to precipitate non-mentalizing responses from Ruth (e.g., Figure 3 discussed above).

[Insert Figure 5 here]

2.1 *– Evidence contradicting the prototype theory*

However, there were also instances contradicting the prototype theory. One example sequence illustrated in Figure 6 shows Ruth maintaining a mentalizing stance despite Alex's heightened dysregulation. This sequence began with Alex looking for a Lego piece, showing low emotional dysregulation (00:02:00). Ruth encouraged Alex to autonomously engage in the task, an example of mentalizing, by asking him questions about what they needed to do next (00:02:00-00:02:05). These questions appeared to precipitate an increase in Alex's emotional dysregulation, as he became frustrated, accusing Ruth of being lazy and grabbing the Lego pieces from her (00:02:05). Ruth responded in a mentalizing manner, showing marked mirroring of Alex's outrage, and behaving in a playful and regulating manner, explaining she needed Alex's help (00:02:10). Alex then showed a small decrease in his emotional dysregulation making a joke about Ruth's laziness (00:02:15). Ruth did not respond explicitly to this cue, disengaging and looking away from Alex, meaning her response was coded as non-mentalizing having apparently missed Alex's cue (00:02:15). However, following this non-mentalizing response Alex's emotional dysregulation returned to baseline, as he engaged in the Lego task (00:02:20).

[Insert Figure 6 here]

This sequence is complex to interpret but demonstrated several surprising findings in relation to the prototype theory. Firstly, it evidences Ruth's ability to continue to offer mentalizing responses in moments of dysregulation for Alex. It may be that because Alex's emotional dysregulation was not

acute or distressed, and Ruth was able to remain emotionally regulated, it was easier for Ruth to maintain her mentalizing stance. Secondly, like Figure 3, it illustrates that Ruth's mentalizing responses at times precipitated an increase in Alex's emotional dysregulation at the start of the sequence. Finally, once Alex's dysregulation begun to decrease Ruth missed one of Alex's cues, responding in a not explicitly mentalizing manner. Ultimately, despite this missed cue, Alex's emotional dysregulation did continue to decrease. This sequence shows evidence of high levels of complexity in the associations between foster carer mentalizing and child emotional dysregulation.

There were other moments in the task where Ruth was able to continue mentalizing despite Alex's emotional dysregulation (e.g., Figure 2 discussed above). In these instances, even though Alex was emotionally dysregulated, this dysregulation often appeared to remain at a 'good enough' level of on the emotional dysregulation scale or was accompanied by positive child affect. It may be that Ruth struggled to continue to mentalize in more acute or distressed moments of dysregulation for Alex compared to lower-level emotional dysregulation accompanied by positive affect, such as a moment of over-excitement about the task.

To summarise, there was some evidence of a detrimental impact of Alex's emotional dysregulation on Ruth's mentalizing. However, this evidence was not straightforward as there were many moments when Ruth continued mentalizing despite Alex's emotional dysregulation, especially when this was at a low level or where Alex was not distressed.

Discussion

In this study, a novel time-sequence analysis approach was used with the exploratory aim of developing conceptual understandings of the relationship between caregiver mentalizing and child emotional dysregulation in the context of long-term fostering. The study particularly aimed to test whether the patterns outlined in the prototype theory (Figure 1) were observable in moment-by-moment foster carer-child interactions**.** The time-sequence analysis approach provided a framework for exploring potential bidirectional interactions between caregiver mentalizing and child emotional dysregulation in data from a carer-child interaction task.

Analysis of sequences of carer-child interaction from observational data showed mixed and inconsistent support for the patterns of association between carer mentalizing and child emotional dysregulation predicted by the prototype theory. For example, Ruth's mentalizing responses did not always precipitate a reduction in Alex's emotional dysregulation, and Alex's emotional dysregulation did not always have a detrimental impact on Ruth's mentalizing responses. These findings do not uniformly support the predictions of the prototype theory that caregiver mentalizing and child emotional dysregulation influence and determine one another (Cole et al., 2003; Fonagy & Target, 1997; Luyten et al., 2012; Luyten & Fonagy, 2015). These findings suggest that, at least in the context of long-term foster care, existing models regarding bidirectional links between carer mentalizing and child emotional dysregulation may need to be refined. Indeed, given the novelty of this study's focus on bidirectional links between caregiver mentalizing and child emotional dysregulation, it will be critical to explore whether existing mentalizing theories are supported outside the context of foster care.

It may be that the presented protype theory of the bidirectional relationship between caregiver mentalizing and child emotional dysregulation is too simple. Instead of a simple reciprocal relationship, it may be important to consider whether these two phenomena have an asymmetrical influence on each other, how consistent this relationship might be through developmental stages, and whether this association remains consistent across all contexts and sub-groups (Pettit et al., 2008). It may also be important to move beyond considering caregiver mentalizing and child emotional dysregulation in isolation, and to acknowledge the dynamic contribution of wider factors, such as child attachment style (Sameroff, 2009). Child emotional dysregulation and foster carer mentalizing may not always be associated in a straightforward bidirectional manner and future research needs to focus on developing more nuanced transactional models to better fit evidence from caregiver-child dyads.

The findings of this study do not discount the importance of mentalizing in determining child emotional dysregulation. There were moments in the observational data when Ruth's mentalizing responses did precipitate a reduction in Alex's emotional dysregulation. These findings fit with the predictions of mentalization theory that caregiver mentalizing allows parents to parent sensitively and better regulate their children's emotions (Fonagy et al., 2004; Sleed et al., 2018). This also fits with findings from intervention studies with foster carers and birth parents that demonstrate the effectiveness

of mentalization-based caregiver support on reducing of child emotional dysregulation (e.g., Midgley, Sprecher, & Sleed, 2021). While there may not be a consistent association between caregiver mentalizing and child emotional dysregulation, it may be one pathway towards supporting children to better regulate their own emotions. It may be helpful to consider caregiver mentalizing as a tool rather than a rule for reducing children's emotional dysregulation. It is important for caregivers, including foster carers, to understand that even offering consistent mentalizing might not always have the regulating effect they hope for with the young people they care for, and at times may even seem detrimental. In the fostering context, professionals supporting fostering relationships may be advised to encourage and support foster carers in developing their capacity to mentalize while recognising the limitations of mentalization's effects.

In this study, there was also some evidence that at times Alex's emotional dysregulation detrimentally impacted on Ruth's caregiver mentalizing. Mentalization theory predicts that caregivers' attachment systems are activated by children's emotional dysregulation, and when caregiver arousal is too high or too low caregivers struggle to effectively maintain their mentalizing capacities (Fonagy & Target, 1997; Luyten & Fonagy, 2015; Fonagy & Luyten, 2009). However, if caregivers can regulate their own emotions, even when their children are highly dysregulated, there may not be such a negative impact on caregiver's ability to continue mentalizing. Future research may explore variations in caregivers', including foster carers', ability to continue to offer consistent mentalizing even when thinking about or confronted by young people's emotional dysregulation. Furthermore, it may be helpful for professionals to support caregivers to identify triggers for mentalizing or non-mentalizing moments, particularly understanding the impact of young people's emotional dysregulation on their own affect. Mapping caregivers mentalizing profile may be an important exercise for supporting them to maintain a mentalizing stance in difficult moments and to reduce their own risk of burn out, especially in the fostering context where burnout is common (Ottaway & Selwyn, 2016).

One interpretation of these findings is that the lack of evidence for the predicted association between child emotional dysregulation and caregiver mentalizing is related to the unique characteristics of long-term foster care. Children bring rich, often complex, relational histories to fostering relationships developed independent of their foster carer rather than co-developing these histories with

parents as typical in birth families. This may explain why other research with fostering dyads also has failed to find the bidirectional associations between caregiver and child characteristics seen in birth family relationships (Goemans et al., 2018). Young people living in foster care are likely to have experienced poor or lacking mentalizing in their families of origin, given their frequent histories of maltreatment (Asen & Fonagy, 2017). Young people who have experienced long periods of lacking, ineffective, or hostile mentalizing may develop psychological structures that do not rely upon or respond to caregiver mentalizing in the same way as those who have experienced 'good enough' mentalizing in their early years (Asen & Fonagy, 2017; Fonagy & Target, 1997). Therefore, young people may find being consistently mentalized by a foster carer a new and possibly invasive and distressing experience. It may take considerable time and experience for young people to adapt their expectation of other's minds as hostile and unsafe, as perhaps supported by evidence of lower mentalizing in children with experience of trauma (Ensink et al., 2016). This, combined with the known higher rates of emotional dysregulation amongst young people living in foster care, may mean that links between caregiver mentalizing and child emotional regulation are different in the context of fostering relationships. Understanding this may help guide those working with young people and their foster carers. For example, it may be helpful for foster carers to understand why their well-intentioned efforts to understand the internal worlds of the young people in their care may not be met in the way they expect. Future research may explore whether there are certain caregiving relationships were these bidirectional associations are more straightforwardly evidenced.

This study's failure to find a straightforward relationship between foster carer mentalizing and child emotional dysregulation may have implications for our definitions of 'good enough' mentalizing. For example, sometimes Alex remained emotionally regulated despite Ruth missing his cues in the interaction task. Other observational studies have shown that in most non-clinical birth parent-infant dyads, mothers only synchronously respond to the cues of their infants a small proportion of the time and suggested that mismatches may be important for driving infant development (Tronick, 2017). Moments where caregivers do not mentalize or respond sensitively allow space for children to become frustrated, learn coping strategies and develop communication skills to elicit support, all essential especially as young people move into greater independence through middle childhood (Tronick, 2017).

Furthermore, Midgely and colleagues (2017, p. 142-3) reflect that explicit mentalizing about a child's mental states may not always have a regulating effect and may even trigger further dysregulation if they are not appropriately responsive to the child's mentalizing capacities at that moment. There may sometimes be a need for the caregiver to focus on recognition, validation, or acceptance of the child's experience, before engaging in more explicit mentalizing.

The findings of this study may refreshingly contradict assumptions that explicitly mentalizing at all times is the best approach to sensitive parenting. This study's findings may be in line with theorising that mentalization if often only triggered when there is a certain amount of stress present in the social environment, and that too much stress or arousal leads to a collapse in mentalizing (Luyten & Fonagy, 2015). It may be more important for caregivers to respond in, potentially implicit, mentalizing ways in critical moments such as when children express distress (Leerkes et al., 2009). Therefore, understanding the strategies caregivers use to regulate themselves and how this links both to their mentalizing capacity and children's emotional regulation are important future research directions. Future research may also seek to explore what optimal mentalizing of repair of mentalizing breakdowns looks like across children's developmental trajectories and difference caregiving contexts. Finally, the present study focused on the moment-by-moment impacts of caregiver mentalizing, however, it may be that caregivers' using a mentalizing stance to characterise general relational pattern, rather than in every micro-interaction with their children, is more important in promoting child emotional regulation.

Strengths and Limitations

A strength of this study was its use of a rigorous novel approach to analysing observational data, using a time-sequence analysis which enhanced study trustworthiness and credibility. This study makes a significant novel contribution to understanding the bidirectional relationships between caregiver mentalizing and other factors, such as child emotional dysregulation, and is the first to explore these issues in the context of foster care. Double coding observational data analysis allowed greater trust in the validity of interpretations. This case study used data from a single fostering dyad and findings are not intended to characterise or generalise to all caregiving or fostering relationships. While the findings of this study may resonate with some other long-term fostering relationships, these factors may not have the same function in other fostering or caregiving relationships.

This study made use of two novel coding measures developed for the purposes of this study, to capture child emotional dysregulation and caregiver mentalizing during an interaction task. These measures guided qualitative analyses and were not used for statistical or quantitative insight. However, future validation of these measures and replication of these patterns may be important for future research. Furthermore, the observational measure of caregiver mentalizing could only capture observable mentalizing, which may not reflect internal work being done by Ruth to mentalize herself or Alex. Furthermore, the definition of emotional dysregulation used included instances of unregulated, non-contingent and labile expressions of positive affect, such as unpredictable, over-exuberant outbursts. However, it can be difficult to distinguish such instances from appropriate excitement of a child in a task, risking confounding emotional dysregulation and emotional arousal. Lastly, this study was able to analyse associations or temporal sequences between the factors under examination, but it was not possible to evaluate potential causal links between these variables.

Conclusions

To conclude, this exploratory study using a time-sequence analysis approach aimed to develop conceptual understandings of the relationship between caregiver mentalizing and child emotional dysregulation in the context of long-term fostering. The findings of this study gave only mixed support for bidirectional relationships between foster carer mentalizing and child emotional dysregulation as predicted by mentalization theory. It did appear that in some moments foster carer mentalizing could be associated with reduced child emotional dysregulation but there were many exceptions to this pattern. It may be that the relationship between caregiver mentalizing and child emotional dysregulation is less co-determined in the context of fostering relationships. This study also raises questions about the nature of 'good enough' mentalizing and what this looks like in at different developmental stages or in different relational contexts.

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Research]. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care. The Funder has no involvement in the design of the study or collection, analysis, and interpretation of data. This study is adapted from the first author's PhD thesis.

Declaration of interest statement – No conflicts of interest to declare.

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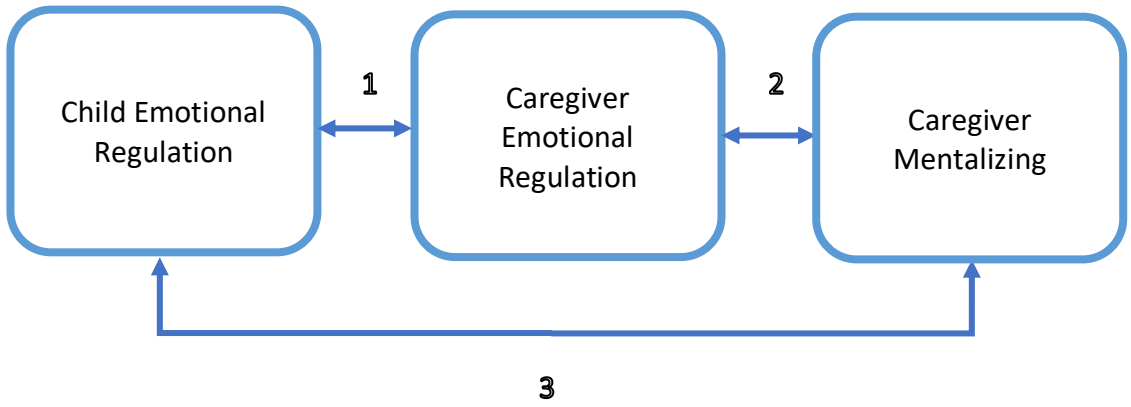
Figures



Negative cycle:

1. An increase in a child's emotional dysregulation has a dysregulating impact upon caregiver emotional regulation. Caregiver emotional dysregulation may in turn increase children's emotional dysregulation (Cole et al. 2003).
2. Caregiver's emotional dysregulation leads to a reduction in caregiver's ability to mentalize effectively. This reduction in effective mentalizing may in turn increase caregiver emotional dysregulation further (Luyten et al. 2012).
3. Ineffective caregiver mentalizing has a negative impact on child's emotional regulation. An increase in children's emotional dysregulation may negatively impact on caregiver's ability to mentalize effectively both directly and through the routes described in stage 1 and 2 of this cycle.

A positive cycle of relationship between child emotional regulation and caregiver mentalizing is also hypothesised by existing theories as the inverse of the negative cycle presented.

Figure 1 *Prototype theory of caregiver mentalizing and child emotional dysregulation*

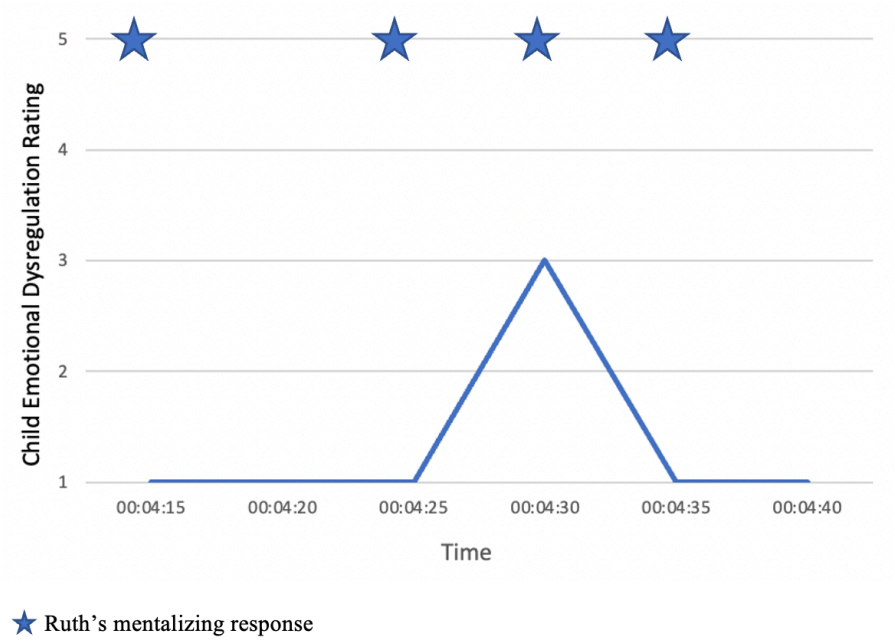


Figure 2 *Sequence of Alex's emotional dysregulation and Ruth's mentalizing responses*

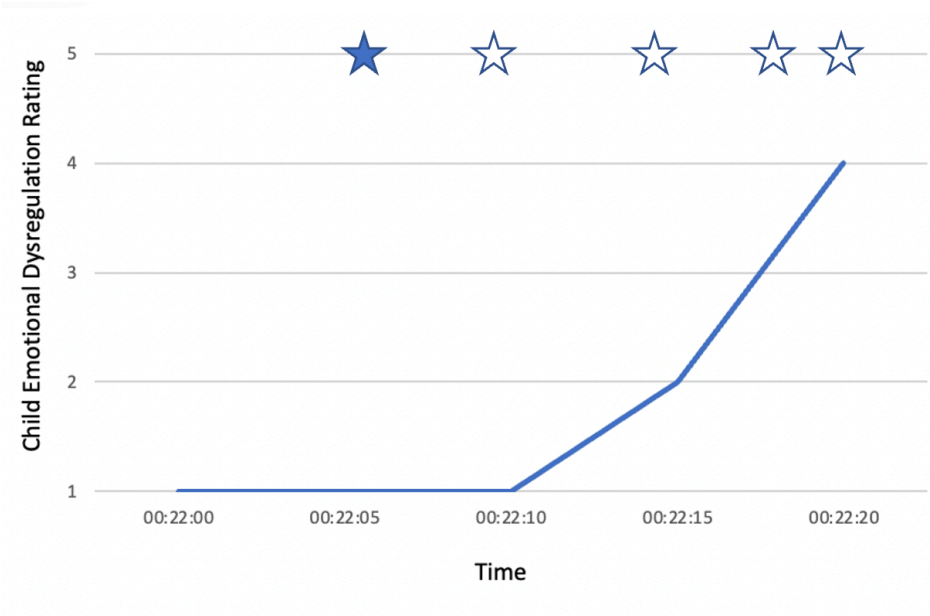


Figure 3 *Sequence of Alex's emotional dysregulation and Ruth's non-mentalizing responses*

Figure 4 *Sequence of Alex's emotional dysregulation and Ruth's mentalizing responses*

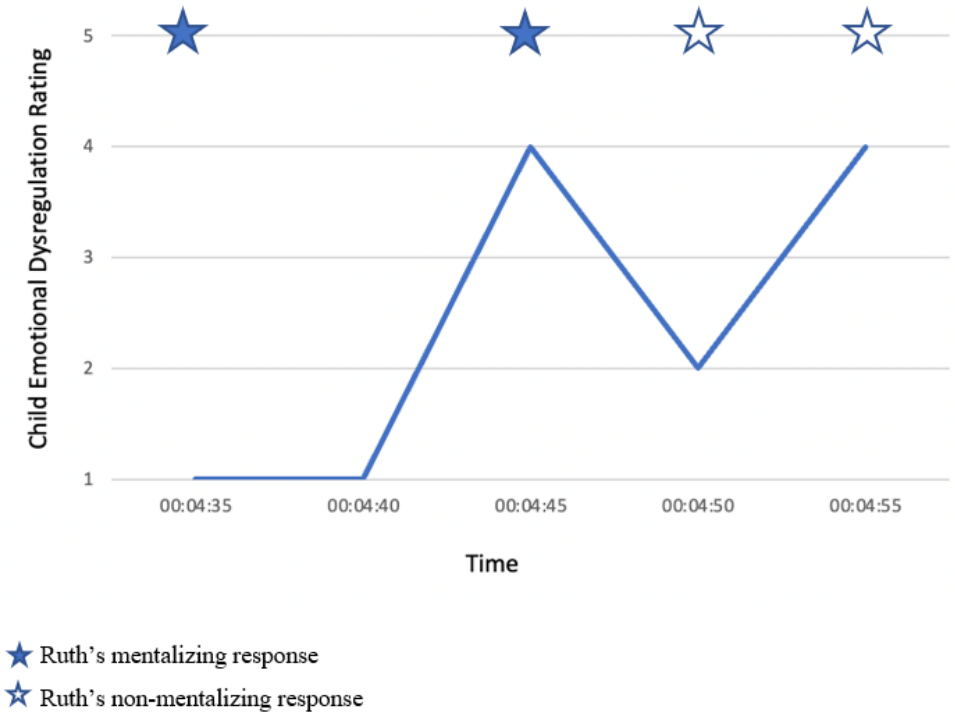


Figure 5 *Sequence of Alex's emotional dysregulation and Ruth's non-mentalizing responses*

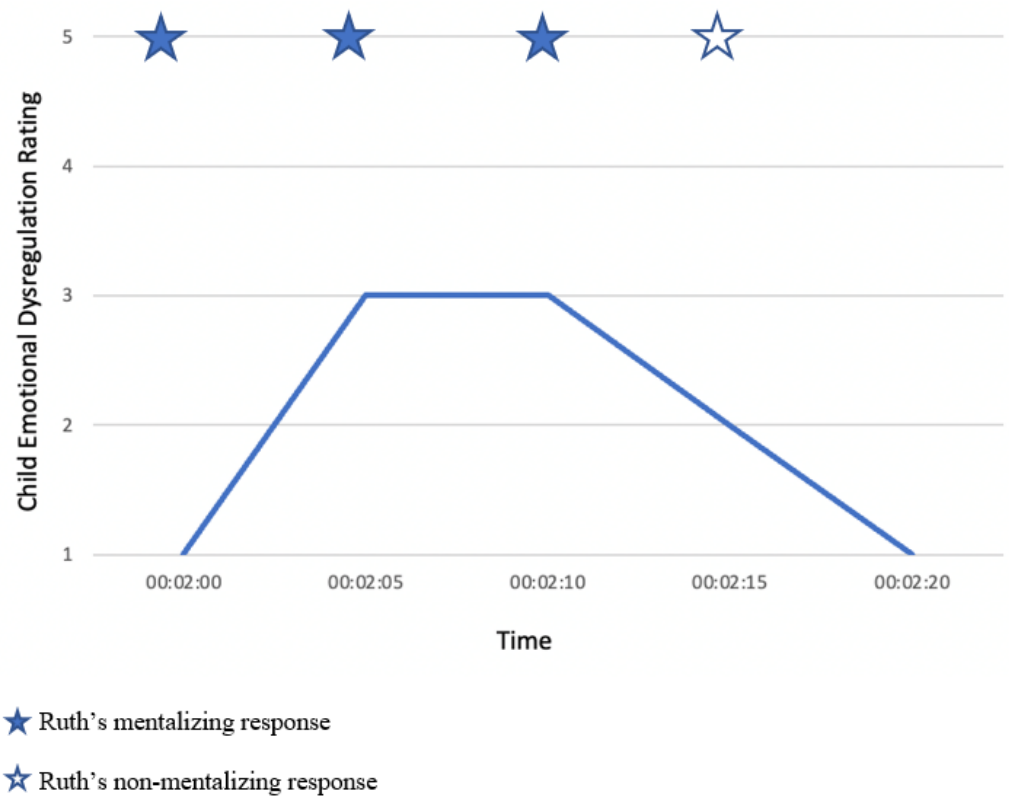


Figure 6 *Sequence of Alex's emotional dysregulation and Ruth's mentalizing responses*