



# A Preliminary Test of a Brief Online Intervention for Enhancing Parental Reflective Function and the Role of Parental Depressive Symptoms

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## Abstract

Parental reflective functioning is a potential target for promoting sensitive caregiving behaviors, particularly for parents at higher risk for difficulties in reflective functioning due to depressive symptomatology. The present study tested the modifiability of parental reflective functioning using a brief online intervention. Parents ( $n = 94$ ; mean age = 34.20 years, SD = 5.20; 60% male; 79% White) living in the U.S. or Canada with at least one child (ages 18–36 months) were recruited through Amazon Mechanical Turk. Participants viewed photos of children engaged in activities and were randomized to instructions to look at the photos, reflect on the child's mental state or reflect on the child's physical state. The study examined whether parents' reflection on their own child's mental state differed as a function of directed reflection, the type of reflection, and in relation to depressive symptoms. The main effect of the intervention on parental reflection on their own child's mental state was not significant. There was a significant interaction between the intervention and parents' depressive symptoms, such that among parents with higher symptoms, directed reflection on mental state or physical state was associated with greater reflection relative to the control (i.e., look) condition. These results indicate that a brief online intervention may provide opportunities for enhanced parental reflective functioning among parents with elevated depressive symptoms.

**Keywords** Parental Reflective Functioning · Online Intervention · Depression · Mental State Reflection · Directed Thinking

## Highlights

- An intervention on directed thinking about children's actions had no main effect on parents' mental state reflection.
- Parents' mental state reflection did not differ when considering motivation or action of children engaging in activities.
- For parents with higher depressive symptoms, directed reflection was associated with greater mental state reflection.

Mentalizing refers to the process by which one makes inferences about the mental states of others (Luyten & Fonagy, 2015). Perhaps no context exhibits the importance of mentalizing more than caring for young children, as young children have not yet developed a full understanding of and ability to communicate their thoughts and feelings. A body of research has investigated mentalizing in the parenting

context, with a focus on parental reflective functioning, which includes parents' capacity to hold their children's mental states and intentions in mind (Slade, 2007). Research suggests parental reflective functioning allows parents to be attuned to the needs of their children and facilitates appropriate behavioral responses to the children's cues (Krink et al., 2018). As a result, responsive and attuned caregiving promotes healthy social and emotional development for children (Fonagy & Target, 1997; Slade et al., 2005).

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## Parental Depressive Symptoms and Reflective Functioning

Parents' abilities to relate to their children's internal states differ across caregivers (Hughes et al., 2017), depending on

a range of factors, including depressive symptoms. For example, some research has found significantly lower reflective functioning in individuals experiencing major depression compared to non-depressed individuals (Fischer-Kern et al., 2013). Perhaps as a result of lower reflective functioning, mothers experiencing depression report significantly lower maternal insightfulness or the capacity to see things from their children's perspective (Coyne et al., 2007; Ramsauer et al., 2014). Taken together, this evidence supports interventions targeting parental reflective functioning; these interventions may improve the caregiving received by children of parents with elevated depressive symptoms.

## **Mentalizing-Based Interventions and Caregiving**

Research indicates that mentalizing-based interventions are effective in improving parents' abilities to mentalize about their children and their quality of caregiving (Camoirano, 2017). A recent study used one session to enhance the extent to which caregivers hospitalized for severe mental illness were able to interpret their children's behavior (Schacht et al., 2017). Mothers were filmed interacting with their children and were provided tailored individual video feedback. The treatment focused on increasing appropriate mind-related comments and decreasing non-attuned mind-related comments. Children, whose mothers participated in the treatment, were more likely to be securely attached to their mothers at approximately 15 months of age in comparison to a control group. The brief nature of the Schacht et al. (2017) intervention makes the development of a short intervention promising for promoting parental reflective functioning in caregivers. However, providing tailored feedback to families is labor- and time-intensive for clinicians. This raises the question of whether an online program could be developed to enhance parental reflective functioning without the need for a trained clinician.

Although computer tasks have been developed to probe mentalizing abilities in adults more broadly, the Spunt et al. (2011) task offers potential as a method to enhance mentalizing. Specifically, in this task, participants viewed images of adults completing various actions and were then asked to reflect on either how or why the depicted individual completed the action. This task was based on action identification theory, which posits that the same action can be identified in several ways (Vallacher & Wegner, 1987). For example, riding a bicycle can be conceptually represented as either the concrete mechanics (i.e., reflecting on someone's physical state as they move the bicycle pedals) or the abstract mental states that may explain an action (i.e., reflecting on someone's mental state for riding the bicycle; Vallacher & Wegner, 1987). In using action identification theory, researchers assume higher levels of

identification focus on the mental states that explain an action (i.e., reflecting on why an action is being performed) while lower levels of identification focus on the observable motor action (i.e., reflecting on how an action is performed). Although the Spunt et al. (2011) task has been validated to measure activity in neural structures associated with mentalizing, the task has yet to be administered as a preliminary method to enhance mentalizing. Used as a method to enhance mentalizing, this task may serve as the means to influence parental reflective functioning in online platforms.

## **Online Platforms for Delivering Interventions**

Prior research indicates that online platforms have many advantages over face-to-face methods for delivering interventions (Barak et al., 2009; Sander et al., 2016). For example, interventions delivered through online platforms can be administered remotely, which reduces transportation barriers for participants (Barak et al., 2009), as well as asynchronously, which may be advantageous for participants with limited schedules (Sander et al., 2016). The anonymity of interventions through online platforms may also be appealing to those fearing stigmatization (Cuijpers et al., 2010). These interventions also have low marginal costs per additional user (Hedman et al., 2011; Hedman et al., 2013). In addition, other interventions applied on online platforms have returned similar outcomes as interventions administered in person (Corrales & Domenech Rodríguez, 2018; Elliott et al., 2008; Heber et al., 2017; Nieuwboer et al., 2013). As a result of these advantages, interventions administered online may have the potential to reach more caregivers.

Similar to face-to-face methods for delivering interventions, online platforms yield many advantages for data collection (Batterham, 2014; Regmi et al., 2017). Specifically, data collection through an online platform allows for the ability to collect large amounts of information, both quickly and economically (Regmi et al., 2017). Survey approaches through online platforms have also been found to effectively recruit populations that have traditionally been hard to recruit with adequate representation, such as culturally diverse populations and young adults (Batterham, 2014). Further, evidence supports the conclusion that data collected from online platforms, such as Amazon's Mechanical Turk platform, is generally consistent with data collected using face-to-face methods (Coppock, 2018).

## **Present Study**

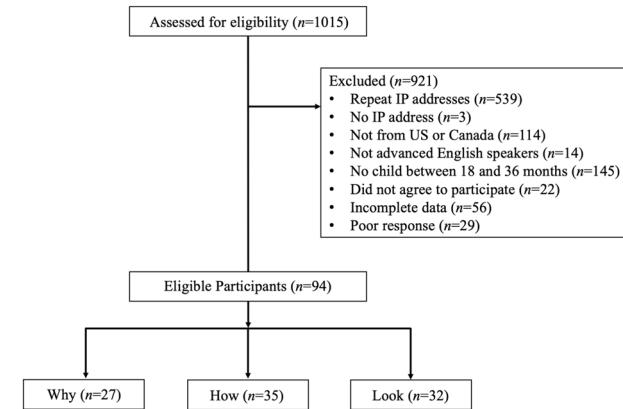
The goal of this pilot study was to provide a preliminary test for the modifiability of parental reflective functioning using

a brief intervention administered through an online platform (e.g., via Amazon's Mechanical Turk platform), and examine whether levels of parental reflective functioning after the intervention are moderated by parental depressive symptoms. We hypothesized that an intervention prompting parents to reflect on other children's actions would result in greater reflection on their own child's mental state. Specifically, we tested the effects of instructing parents to think about why (i.e., why condition) or how (i.e., how condition) the children in photographs participated in an action compared to asking parents to look at each photograph without specific instruction (i.e., look condition). We further hypothesized that instructing parents to reflect on children's mental states when completing actions (i.e., why condition), compared with instructing parents to reflect on children's physical states (i.e., how condition), would be associated with higher levels of parental reflective function. Last, we hypothesized that parents with greater depressive symptoms would report less reflection on their own child's mental state and that depressive symptoms would moderate the effect of intervention condition on reflective function.

## Methods

### Participants

Parents with at least one child participated in this study. Parents who were advanced English speakers, between ages 18 and 45, currently raising a child between 18 and 36 months, and residing in the U.S. or Canada were eligible to participate. There are concerns about invalid data on Mechanical Turk (Moss & Litman, 2018). We used two strategies to minimize invalid responses. First, we removed responses with exact matches and repeats for IP addresses. Second, we included a check question where participants were asked to remember the color green at the beginning of the survey and report this information back at the end of the survey. Responses of participants that provided incorrect answers were removed. Last, we removed participants that provided poor responses to open-ended questions. Specifically, we asked participants to write a minimum of 500 characters about their child's personality as well as a minimum of 500 characters about their relationship with their child. We removed responses that were copied and pasted from other sources, were off-topic, or had low English-language proficiency. Two independent raters screened the open-ended questions and decisions were reached via consensus. These screening strategies provide effective means to identify and eliminate invalid responses (Kennedy et al., 2018; Moss & Litman, 2018). There were a total of 1015, and 921 were removed for not meeting the eligibility criteria or to ensure high-quality data (see Fig. 1).



**Fig. 1** CONSORT Flowchart for Participant Recruitment

A total of 94 parents remained after implementation of the screening strategies.

The age of participants ranged from 24 to 45 years ( $M = 34.20$ ,  $SD = 5.20$ ). Fathers represented 60% ( $n = 56$ ) of participants. All participants were from the U.S. For all participants, 79% ( $n = 74$ ) identified as White, 9% ( $n = 8$ ) identified as Asian, 7% ( $n = 7$ ) identified as Black or African American, 2% ( $n = 2$ ) identified as American Indian or Native Alaskan, 1% ( $n = 1$ ) identified as Native Hawaiian or Other Pacific Islander, 1% ( $n = 1$ ) identified as other, and 1% ( $n = 1$ ) preferred not to answer. Seven percent ( $n = 7$ ) of the sample identified as Hispanic. Forty-five percent of the sample ( $n = 42$ ) reported their highest educational attainment as a bachelor's degree or higher, 12% ( $n = 11$ ) as an associate's degree, 20% ( $n = 19$ ) as a graduate degree, 6% ( $n = 6$ ) as some college without a degree, 5% ( $n = 5$ ) as trade, technical, or vocational training, 11% ( $n = 10$ ) as a high school diploma, and 1% ( $n = 1$ ) some high school, no diploma. Eighty-four percent ( $n = 79$ ) of the sample reported being currently married or partnered, 13% ( $n = 12$ ) reported being single, 2% ( $n = 2$ ) reported being divorced, and 1% ( $n = 1$ ) reported being widowed.

### Procedures

Parents completed all measures and the intervention online. The measures were only administered once after the intervention (none were administered prior to the intervention). We informed participants during the consent process that the study would take about 40 minutes to complete. They were informed that after completing the study, they would be paid \$5.28. Parents provided consent by signing an online form following a complete description of the eligibility criteria, study goals, and study procedures. All measures, eligibility criteria, study goals, and study procedures were approved by the Institutional Review Board. After consent was provided, parents completed a brief intervention in which they viewed

photographs of children completing a variety of actions. Parents were provided instructions on what to attend to, given their assigned condition. Participants were randomly assigned to one of the three conditions. Although our use of a randomization design does not guarantee groups are equivalent prior to the intervention, this design method allows us to conclude that differences in behavior between the three groups post-intervention were likely caused by experimental condition (Gorvine et al., 2017). After the intervention, all parents were invited to complete a series of questionnaires.

### Directed Reflection Intervention

Parents were presented with a series of 27 photographs of young children participating in a variety of actions (e.g., riding a bicycle, watering a plant, eating an ice cream cone; for the photograph set see <https://osf.io/9rbpk>). These photographs were from a repository of photographs submitted by families for use in research studies. Parents in the current study were randomly assigned to one of three distinct intervention conditions: the why condition, the how condition, or the look condition. For the why condition, parents were instructed to think about why the children participated in the actions. After being asked to think of an answer for each photograph, they were instructed to click a button to proceed to the next photograph. For the how condition, parents were instructed to think about how the children were doing what they were doing. After being asked to think of an answer for each photograph, they were instructed to click a button to proceed to the next photograph. In the look condition, the parents were instructed to look at each photograph without instruction specifying an aspect of the children's behavior to think about and then click a button to proceed once they had viewed the photograph. This approach, in which (a) and (b) represent two distinct interventions and (c) is the control condition, mirrors an action identification paradigm developed by Spunt et al. (2011) to investigate the neural bases of mentalizing observed actions. These three conditions are based on action identification theory, which posits that the same action can be identified in several ways (Vallacher & Wegner, 1987). Higher levels of identification focus on the mental states that explain an action while lower levels refer to the observable motor action. The directed reflection intervention was based on the task described in Spunt et al., 2011, with the exception that images of infants/young children were used in place of adults. Further, there is evidence that brief interventions, such as directing caregivers to think about what young children in a video clip may be thinking, wanting, feeling, or experiencing, can enhance some parental mentalizing abilities for parents (Schacht et al., 2017).

## Measures

### Reflecting on their Child's Mental State vs. their Child's Physical State Measure

Following the intervention, parents were presented 15 prompts and were instructed to imagine their child (the child who is 18–36 months old, or if the parents had more than one child in this age range to imagine their oldest child in this range). Parents were asked to rate how much each prompt made them think about (a) what their child is doing physically (i.e., reflecting on their child's physical state), and (b) about their child's thoughts and feelings in this situation (i.e., reflecting on their child's mental state). Example prompts included "your child is crying at bedtime" and "your child is singing a song you taught them" (for the full measure see <https://osf.io/et7pn>). Responses were scored on a 10-point Likert scale from 1 (*not at all*) to 10 (*very much*). This measure of parental reflective functioning was developed specifically for this study because existing instruments measure caregivers' general tendency to reflect upon children's internal mental state (e.g., Parental Reflective Functioning Questionnaire; Luyten et al., 2017). This study requires a more time-sensitive instrument to measure the potential for immediate changes in parental reflective functioning. We found good internal consistency for both physical state reflection (Cronbach's  $\alpha = 0.88$ ) and mental state reflection ( $\alpha = 0.89$ ).

### Depressive Symptoms

Parents completed the Center for Epidemiological Studies-Depression (CES-D; Cosco, Prina, Stubbs, and Wu, 2017) to assess depressive symptoms. Parents responded to 20 items about how they felt during the past week. These items were rated on a 4-point Likert scale ranging from 0 (*rarely or none of the time*) to 3 (*all of the time*). The standard cutoff for clinically significant depressive symptoms on the CES-D is a score of 16 or above (Boyd et al., 1982; Lewinsohn et al., 1997). Based on these derived scores, 16% ( $n = 15$ ) of the sample scored at or above the cutoff for clinically significant depressive symptoms. The CES-D has been found to be a reliable and valid measure (Cosco et al., 2017), with high internal consistency for the measure in this sample ( $\alpha = 0.93$ ).

### Data Analysis

Prior to our primary analyses, Pearson correlations were conducted to examine the bivariate relationships between age, depressive symptoms, the amount parents reflected on their child's physical state, and the amount parents reflected on their child's mental state. T-tests were conducted to test

whether female and male participants differed in age, the amount they reflect on their child's physical state, and the amount they reflected on their child's mental state. Analysis of variance and  $\chi^2$  tests were conducted to assess if the condition groups (i.e., why, how, look) differed in age, sex, or depressive symptoms.

For our primary analyses, we focus on how much parents reflected on their child's mental state adjusting for how much parents reflected on their child's physical state. Specifically, we subtracted the values for the amount participants reflected on their child's physical state from the amount participants reflected on their child's mental state. This analytical decision aligns with action identification theory (Vallacher & Wegner, 1987). We are not interested in how much parents reflect about their children in general. We are specifically interested in how much more higher-level reflection parents have about their children's mental states after completing the intervention in comparison to the amount of reflection they have about their child's physical actions. Further, we included parent age and sex as covariates in our primary analyses. This was informed by evidence that individuals increase in conscientiousness and emotional stability across their life, especially in young adulthood (20–40 years; Roberts et al., 2006) and that there are significant differences in caregiving behaviors when comparing younger and older parents (Bornstein & Putnick, 2007). Further, past research has found differences in maternal and paternal parental reflective functioning (Cooke et al., 2017).

For our first hypothesis, we conducted a hierarchical regression model. In doing so, we tested the hypothesis that prompting parents' reflection about other young children's actions (i.e., why + how vs. look) results in greater reflection on their own child's mental state. We chose to conduct hierarchical regression as this method allows us to enter predictors in stages and thus determine whether a variable is associated with significant variance in outcome over and above variables previously entered in the model. In the first step, we entered covariates (i.e., age and sex). In the second step, we entered a dummy coded variable for the intervention condition (i.e., why + how) vs. the control condition (i.e., look). By entering the variables in two separate steps, we were able to assess the added variance in mental state reflection about their child accounted for by the intervention.

For our second hypothesis, we conducted an additional hierarchical regression model. In doing so, we tested the effect of the type of directed reflection about young children's actions (i.e., why vs. how) on parental reflection on their own child's mental state. As noted above, we chose to conduct hierarchical regression. This allows us to determine if a predictor is associated with significant variance in outcomes over and above variables previously entered in

the model. In the first step, we entered the same covariate variables mentioned in the previous analysis (i.e., age and sex). In the second step, we entered the conditions (i.e., why vs. how). As in the first analysis, we entered the data in two separate steps. In this analysis, however, we tested how prompting different types of reflection about young children's actions impacted parents' reflection about their child's mental state.

For our third hypothesis, we conducted a moderation analysis. We tested whether depressive symptoms moderated the effects of reflective prompting (i.e., why + how vs. look) on parental reflection on their own child's mental state. This analysis allows us to assess if the association between prompting reflection and parents' reflection on their child's mental state varies depending on depressive symptoms. We covaried for age and sex. All variables were mean-centered. To interpret significant interactions, we tested the conditional effect of the condition (i.e., why + how vs. look) on the parents' reflection on their child's mental state at the mean and  $\pm 1$  SD of the moderator (i.e., 16<sup>th</sup>, 50<sup>th</sup>, and 84<sup>th</sup> percentiles). We also used the Johnson-Neyman technique. This technique allowed us to identify regions in the range of the moderator variable where the effect of the predictor on the outcome was statistically significant (Hayes & Matthes, 2009).

All analyses were conducted using SPSS v. 27 (IBM Corp., Armonk, NY). The moderation analysis and Johnson Neyman technique were conducted using the PROCESS macro (Hayes, 2017) for SPSS. For the moderation, model 1 (moderation analysis with one moderator) from PROCESS was utilized.

## Results

Pearson correlations between study variables are presented in Table 1. There was a significant positive association between parents' reflection on their child's mental state and reflection on their child's physical state. Depression was not correlated with reflection on their child's mental state or child's physical state. Female and male participants did not significantly differ on age, or depressive symptoms, or reflection on their child's mental state (Table 2). Female participants endorsed significantly more reflection on their child's physical and mental state than male participants (Table 2).

ANOVA tests were conducted to test whether participants in each condition differed in sample characteristics (i.e., age, depressive symptoms) (Table 3). Parents in each condition did not statistically significantly differ in age or depressive symptoms (see Table 3). A  $\chi^2$  test indicated that there were no significant differences in the proportion of participants that identified as male/female in each condition

(Table 3). Further, an independent samples t-test indicated that participants in either intervention condition (i.e., why + how) did not significantly differ from the look condition in depressive symptoms,  $t(92) = 1.23$ ,  $p = 0.221$ , Cohen's  $d = 0.29$ .

### Effects of Prompting Reflection

We tested whether prompting participants to reflect about other young children's actions (i.e., why + how vs. look) resulted in greater reflection on their own child's mental state (Table 4). Condition (why + how vs. look) was not significantly associated with parental reflection on their child's mental state.

### Relationship Between Type of Directed Reflection Used in the Intervention and Reflecting on their Child's Mental State

We then tested whether the type of directed reflection about young children's actions (i.e., why vs. how intervention) resulted in different levels of parental reflection on their own child's mental state (Table 5) and found no significant differences. Type of directed reflection was not significantly associated with parental reflection on their child's mental state.

**Table 1** Correlations, Means, and Standard Deviations for Study Variables

Variable	1	2	3	4
1. Age	–			
2. Reflecting on their child's physical state	0.01	–		
3. Reflecting on their child's mental state	0.08	0.48**	–	
4. Depressive symptoms	–0.03	–0.03	0.03	–
<i>M</i>	34.20	6.87	7.42	7.57
<i>SD</i>	5.20	1.48	1.44	9.99

Note. *M* mean, *SD* Standard deviation. *N* = 94. Correlation is significant at the 0.05 level (2-tailed). \*\* Correlation is significant at the 0.01 level (2-tailed).

**Table 2** Results of t-tests Comparing Male and Female Participants on Study Variables

Measure	Female		Male		<i>t</i> (92)	<i>p</i>	95% CI		Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>LL</i>	<i>UL</i>	
Age	34.92	5.17	33.71	5.21	1.11	0.272	–0.96	3.38	0.23
Reflecting on their child's physical state	7.41	1.51	6.50	1.35	3.06	0.003	0.32	1.50	0.64
Reflecting on their child's mental state	7.79	1.38	7.17	1.43	2.10	0.038	0.03	1.21	0.44
Depressive symptoms	7.26	10.12	7.79	9.99	–1.26	0.805	–4.71	3.67	0.05

Note. *M* mean, *SD* standard deviation, *LL* lower limit, *UL* upper limit

### Moderating Effects of Depressive Symptoms on an Intervention Prompting Reflection

Results of the regression analysis testing the interaction between depressive symptoms and conditions (i.e., why + how vs. look) in predicting parents' reflection on their child's mental state, indicated that the intervention effect for parents' reflection on their child's mental state was significantly moderated by depressive symptoms (Table 6). The intervention effect was not significant at low (16<sup>th</sup> percentile;  $\beta = -0.34$ ,  $p = 0.414$ , CI 95% [–1.18, 0.49]) or mean (50<sup>th</sup> percentile;  $\beta = 0.07$ ,  $p = 0.832$ , CI 95% [–0.59, 0.74]) levels of depressive symptoms. However, the intervention effect was significant at elevated (84<sup>th</sup> percentile;  $\beta = 1.27$ ,  $p = 0.015$ , CI 95% [0.25, 2.30]) levels of depressive symptoms (Fig. 2). Results of the Johnson-Neyman technique indicated that the intervention conditions (i.e., why + how) were associated with greater reflection on their child's mental state with a CES-D score at or above 10.29, indicating that, at subclinical levels of depressive symptoms, the intervention effect is statistically significant. When examining estimated differences in the size of the intervention at the suggested clinical cutoff (i.e., a CES-D score of 16), the intervention vs. control conditions displayed a small to medium effect size [ $F(5, 88) = 5.79$ ,  $p = 0.018$ ,  $\eta_p^2 = 0.062$ ].

Finally, given possible outliers on depressive symptoms apparent in Fig. 2, we used Grubbs's test to detect significant outliers, and one outlier was identified (Grubbs, 1950). The interaction between depressive symptoms and condition (i.e., Why + How vs. Look Condition) on parents' reflection about their child's mental state remained significant when the analyses were conducted without the identified outlier ( $B = 0.11$ ,  $SE = 0.04$ , 95% CI [0.02, 0.19],  $\beta = 0.61$ ,  $p = 0.020$ ). Further, as expected for depression symptom measures, the distribution of CES-D scores presented as right skewed (skewness = 2.28) and leptokurtic (kurtosis = 6.26). The right skewed distribution is consistent with population representative samples (Counsell et al., 2011). To ensure the robustness of the interaction, we used a heteroskedasticity-consistent

**Table 3** Means, Standard Deviations, One-Way Analysis of Variance, and Chi-Square Results Testing Intervention Group Differences in Demographic and Clinical Variables

Measure	Why (n = 27)		How (n = 35)		Look (n = 32)		Total (N = 94)		ANOVA		$\chi^2$	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	$\eta^2$		
Age	34.89	5.22	33.83	5.53	34.0	4.92	34.20	5.20	0.34	<0.01	-	0.714
Depressive symptoms	10.07	11.02	7.26	11.48	5.81	6.64	7.57	9.99	1.37	0.06	-	0.259
Sex/Gender	Male 17 (63%)	Female 10 (27%)	Male 21(60%)	Female 14 (40%)	Male 18 (56%)	Female 14 (44%)	Male 56 (69%)	Female 38 (40%)	-	-	0.28	0.870

Note.  $\chi^2$  is only used to test for differences between sex group. *M* mean, *SD* Standard deviation

**Table 4** Results of a Multiple Regression Analysis Examining the Effects of Condition (Why + How vs. Look) on Reflection about their Child's Mental State

Step	Predictor	<i>B</i>	<i>SE</i>	$\beta$	<i>p</i>	95% CI for <i>B</i>		<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>p</i>
						<i>LL</i>	<i>UL</i>				
Step 1	Age	0.02	0.03	0.08	0.436	-0.04	0.08			0.72	0.488
	Sex	0.31	0.32	0.10	0.321	-0.31	0.94				
Step 2	Why + how vs. look	0.33	0.33	0.10	0.319	-0.32	0.97	0.03	0.01	0.82	0.319

Note. *N* = 94. Dependent variables is reflecting on their child's mental state adjusting for reflecting on their child's physical state. Sex was coded with 0 = female and 1 = male. Intervention was coded as 0 = Look and 1 = Why + How. *B* = Unstandardized coefficient.  $\beta$  = Standardized coefficient. *LL* lower limit, *UL* upper limit

**Table 5** Results of a Multiple Regression Analysis Examining the Effects of the Why vs. How Conditions on Reflecting about their Child's Mental State

Step	Predictor	<i>B</i>	<i>SE</i>	$\beta$	<i>p</i>	95% CI for <i>B</i>		<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>p</i>
						<i>LL</i>	<i>UL</i>				
Step 1	Age	0.01	0.04	0.05	0.683	-0.06	0.09			1.27	0.289
	Sex	0.61	0.39	0.21	0.117	-0.16	1.39				
Step 2	Why vs. how	-0.22	0.37	-0.08	0.545	-0.96	0.51	0.05	0.01	0.96	0.418

Note. *N* = 72. Dependent variables is reflecting on their child's mental state adjusting for reflecting on their child's physical state. Sex was coded with 0 = female and 1 = male. Why vs. How was coded with 0 = How and 1 = Why. *B* = Unstandardized coefficient.  $\beta$  = Standardized coefficient. *LL* lower limit, *UL* upper limit

**Table 6** Results of a Multiple Regression Analysis Examining the Interaction between Depressive Symptoms and Condition (Why + How Conditions vs. Look Condition) on Reflecting about their Child's Mental State

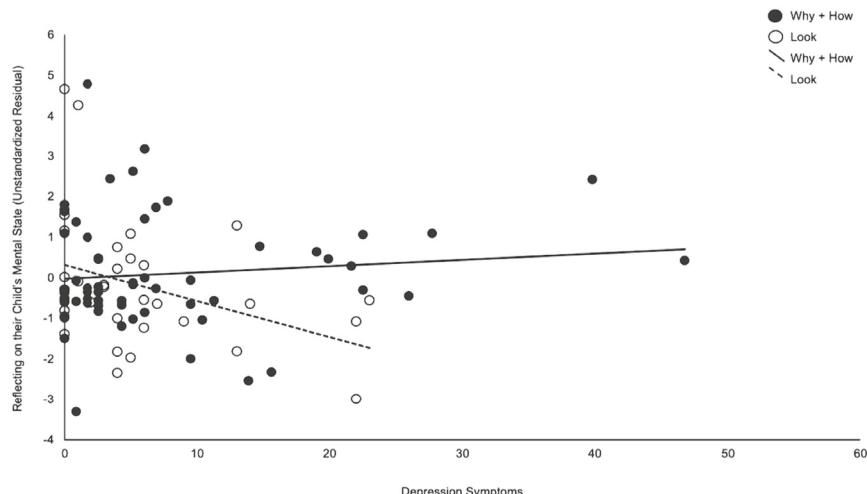
Step	Predictor	<i>B</i>	<i>SE</i>	$\beta$	<i>p</i>	95% CI for <i>B</i>		<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>p</i>
						<i>LL</i>	<i>UL</i>				
Step 1	Age	0.02	0.03	0.08	0.416	-0.03	0.08			1.72	0.139
	Sex	0.39	0.31	0.13	0.210	-0.23	1.01				
	Why + How vs. look	-0.34	0.42	0.14	0.414	-1.18	0.49				
	Depressive symptoms	-0.08	0.04	-0.09	0.044	-0.16	<0.01				
Step 2	Why + how vs. look $\times$ depressive symptoms	0.10	0.04	0.33	0.018	0.02	0.19	0.15	0.06	5.79	0.018

Note. *N* = 94. Dependent variables is reflecting on their child's mental state adjusting for reflecting on their child's physical state. Sex was coded with 0 = female and 1 = male. Why + How vs. Look was coded with 0 = Look and 1 = Why + How. *B* = Unstandardized coefficient.  $\beta$  = Standardized coefficient. *LL* lower limit, *UL* upper limit

standard error estimator for linear regression models (Hayes & Cai, 2007). The results of the regression remained significant when using this approach (*B* = 0.10, *SE* = 0.05 *p* = 0.029).

To determine power of the current study to detect effects, we conducted a post hoc power analysis using G\*Power3 (Faul et al., 2009). We wanted to ensure we were powered to examine the effects of condition (Why + How vs. Look)

**Fig. 2** Associations between Depressive Symptoms and Reflecting on their Child's Mental State in Each Condition. *Note* Results remained significant when one participant with a depressive symptom score that was identified as an outlier was excluded from analyses



on parents' reflection about their child's mental state. With approximately 30 participants in each group and using a two-tailed test, our post hoc power analysis indicated 0.80 power to detect a medium effect ( $f^2 = 0.40$ ).

## Discussion

The current study aimed to provide a preliminary test for the modifiability of parental reflective functioning using a brief intervention administered online. In this sample, we did not find evidence that an intervention aimed to prompt reflection (i.e., why + how) about other young children's actions resulted in significant differences in parental reflection on their own child's mental state when compared with a control condition (i.e., look). Further, with regard to the type of intervention, there was no significant difference in how much parents reflected on their child's mental state following the why vs. how conditions. However, depressive symptoms significantly moderated the effects of the intervention (i.e., why + how vs. look) on parents' reflection on their child's mental state. Specifically, the intervention was not significantly associated with parental reflection at low or average levels of parental depressive symptoms, but at high levels of depressive symptoms, those in the intervention groups had significantly higher parental reflection on their child's mental state than those in the control group.

Previous research demonstrated the effectiveness of short interventions, such as one session of video-guided feedback, to enhance aspects of parental mentalizing (Schacht et al., 2017). The present study extended these findings and examined if, relative to a control condition, directed reflection on other young children's actions (i.e., reflect on either why or how a young child in a photograph completes an action) was associated with greater parental reflection on their own child's mental state. Surprisingly, parents

assigned to the why or how conditions, in comparison to control conditions, did not report more reflection on their own child's mental state. This countered extant research on mentalization-based interventions (Camoirano, 2017).

In addition, research on interventions aimed at increasing parental mentalizing have involved tailored video-feedback focused on encouraging attunement and reflective functioning (Schacht et al., 2017). As noted above, these interventions require substantial resources to implement. For the present study, we tested how different types of directed reflection (i.e., why, how) in an intervention about other young children's actions leveraged modifications to parents' reflection on their own child's mental state. Drawing on previous action identification theory research (Spunt et al., 2011; Vallacher & Wegner, 1987), we tested two types of directed reflection. The first of these conditions asked parents to focus on the concrete actions involved in how the children in the photographs completed the actions. The second of these conditions asked parents to focus on the mental states that may explain why the children in the photographs completed the actions. In the present study, we failed to find significant differences in parental reflection on mental states of their own child in either of the conditions. Prompting different types of directed reflection towards other children did not lead to different levels of parental reflection on the mental states of their own child.

Evidence suggests that parents with depression show increased self-focus with their own internal state (Fischer-Kern et al., 2013); depressive symptoms may inhibit parents' ability to reflect on the internal states of their child. Results of our study indicate that depressive symptoms may moderate the relationship between reflective prompting and parental reflection on the mental states of their own child. Specifically, only for parents at high levels of depressive symptoms, did the intervention exhibit association with greater parental reflection on the mental states of their own

child. This is consistent with previous research in which individuals with more symptoms may possess a greater capacity for improvement through interventions (Stjerneklar et al., 2019).

The results of the current pilot study have possible implications for clinical application. First, as mentioned above, many interventions aimed at enhancing parental mentalizing provide parents with direct feedback about their recorded interactions with their own children. The results of the current study yielded positive associations between the intervention and parental reflection, specifically for parents with more depressive symptoms. Previous research suggests that parents with depressive symptoms tend to be preoccupied with their own emotional state (Ernst & McMahon, 2004) and thus may possess more potential for improvement from interventions targeting parental reflective functioning. Although parental reflective functioning was not measured before the intervention in the current study, we found that parents with subthreshold depression symptoms reflected more on their own child's mental state after being instructed to consider aspects of other children's actions compared to being instructed to look at photographs with no specific instructions. Future research should focus on the results of longitudinal studies to assess the long-term efficacy of a brief parental reflective functioning intervention for parents with depressive symptoms.

Of course, there are limitations to this study. First, given that reflective functioning was not measured prior to administering the intervention, it is unknown whether the intervention changed reflective functioning as it is possible that the groups by chance, systematically differed on this variable (or other unmeasured variables) at baseline. Thus, we can only draw conclusions about post-intervention differences but not change in overall reflective functioning. Second, evidence from this study found an association between the reflective interventions and parents' reflection on their child's mental state. However, we do not know whether the apparent effect persists over time or whether the intervention influenced participants' parental reflective functioning in their interactions with their own child. Longitudinal studies would provide opportunities to test the long-term and behavioral effects of the online intervention. Third, as is the case with all online survey research, we cannot be certain that participants in the study truly have a child or have a child within the target age range of 12 to 36 months. We took precautions to remove invalid Mechanical Turk responses. We removed responses with exact matches and repeats for IP addresses, as well as responses of participants that provided incorrect answers to a check question. We also removed participants that provided poor responses (copied and pasted from other sources, were off-topic, or had low English-language proficiency) to

open-ended questions about their child. However, our inability to independently verify parental status and age of the participants' children remains a significant limitation. Fourth, the sets of photographs used in the directed reflection intervention were not standardized for the emotion, context, age, sex, or race/ethnicity of the depicted children. Fifth, although the directed reflection intervention is an adaptation of a standardized task (Spunt et al., 2011), the version used in the present study was the first to include images of infants and young children. Last, the measure of parental reflective functioning used in the current study has not been independently validated. Validated instruments for parental reflective functioning (e.g., Parental Reflective Functioning Questionnaire; Luyten et al., 2017) measure caregivers' general tendency to reflect upon their own internal mental experiences across time (e.g., "I like to think about the reasons behind the way my child behaves and feels"). The use of these measures to test the current intervention would not have allowed us to accurately measure immediate changes in parental reflective functioning. An important area for future research will be to test if general tendencies in parental reflective functioning can be changed by brief online interventions.

Another important point to address is that the sample included a large proportion of fathers. Investigators of online survey responses through platforms such as Mechanical Turk have found that women tend to respond in greater proportions to online surveys than men overall (Difallah et al., 2018). As such, it is surprising that over half (60%) of participants in the current study identified as fathers. One potential reason for this discrepancy is that fathers with 18- to 36-month-old children, compared to women with children of the same age, have less caregiving demands on average (Saxbe et al., 2018), and thus, may have more time to participate in online surveys. This could suggest the need for future research to probe if these findings extend in samples with more mothers. On the one hand, inclusion of a larger proportion of fathers is a strength of the study. The majority of studies examining parent beliefs and behaviors are conducted with mothers (Cabrera et al., 2018), and there have been calls for diversifying research to increase the inclusion of fathers (Cabrera et al., 2018; Fagan et al., 2014). At the same time, this also raises questions about whether the observed findings would generalize to samples of predominantly mothers, as well as the extent to which parental reflective function interventions are likely to have the greatest benefits for children when targeting mothers are fathers. Future research is needed to replicate the findings of this study with a larger sample of both mothers and fathers to provide a well-powered test of differences, as well as longer term impacts on parenting behavior and child outcomes.

## Conclusion

Overall, encouraging parents to have directed thinking about young children's actions (i.e., instructions to reflect on why or how the child acted as depicted) may not result in more parental reflective functioning about their own children for all parents. However, we found preliminary evidence that parents with greater depressive symptoms, a group at increased risk for less empathy toward their children and reduced positive and increased negative parenting behaviors, may benefit from interventions aimed at enhancing parental reflection on their own child's mental state.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Ethical Approval** The authors complied with ethical standards in the treatment of participants. The study was approved by the Stanford University Institutional Review Board and all procedures were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments.

**Informed Consent** Written consent was obtained from all participants. The material reported in this manuscript is original, not previously published, and not under concurrent consideration elsewhere.

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