

Regular Article

The parent's and the child's internal working models of each other moderate cascades from child difficulty to socialization outcomes: Preliminary evidence for dual moderation?

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Abstract

Infants' difficulty, typically characterized as proneness to negative emotionality, is commonly considered a risk for future maladaptive developmental trajectories, mostly because it often foreshadows increased parental power assertion, typically linked to future negative child outcomes. However, growing evidence of divergent developmental paths that unfold from infant difficulty has invigorated research on causes of such multifinality. Kochanska et al. (2019) proposed that parent and child Internal Working Models (IWMs) of each other are key, with the parent's IWM of the child moderating the link between child difficulty and parental power assertion, and the child's IWM of the parent moderating the link between power assertion and child outcomes. In Children and Parents Study (200 community mothers, fathers, and children), child difficulty was observed at 8 months, parents' power assertion at 16 months, and children's outcomes rated by parents at age 3. Parents' IWMs were assessed with a mentalization measure at 8 months and children's IWMs were coded from semi-projective narratives at age 3. The cascade from infant difficulty to maternal power assertion to negative child outcomes was present only when both the mother's and the child's IWMs of each other were negative. We did not support the model for father-child dyads.

Keywords: Internal Working Models; child difficulty; mothers; fathers; longitudinal studies

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Children embark on widely divergent socialization trajectories. Some willingly embrace their parents' influence and move toward increasingly competent, prosocial, internalized, well-regulated social conduct – an outcome generally desired by families and societies. Others reject and resent their parents' influence and enter paths toward troubling outcomes, such as callousness, disregard for conduct rules and others' feelings, and disruptive, antisocial behavior. To understand how and why such divergent developmental paths unfold and to delineate factors that contribute to the success or failure of the socialization process have long been key goals – indeed, the Holy Grail – for researchers in developmental psychology and psychopathology more broadly (Maccoby, 1992, 2007; Thompson, 2006, 2015).

Many scholars have highlighted the role of the infant's difficulty, a concept introduced by Thomas and Chess (1977), broadly used since, and variously defined. High negative affectivity or emotionality, fussiness, low adaptability, proneness to anger and distress, or emotional intensity (typically to aversive stimuli) are commonly considered its central features (Bates, 1980; Kiff et al., 2011; Lengua & Wachs, 2012; Rothbart & Bates, 2006; Sanson et al., 2004; Slagt et al., 2016; Zhang et al., 2021), with many similarities – although some differences as well – across cultures

(Super et al., 2020). Other child characteristics have also been implicated, such as unresponsiveness or insensitivity to punishment (Dadds & Salmon, 2003) and, commonly, undercontrol (Tiberio et al., 2016). The concept of difficulty has expanded considerably along with the ascent of research on differential susceptibility, often incorporating a broad variety of psychophysiological and molecular genetic measures underpinning negative emotionality and stress response system (Bakermans-Kranenburg & van IJzendoorn, 2006; Belsky et al., 2007; Belsky & Pluess, 2009; Boyce & Ellis, 2005; Caspi et al., 2010; Kochanska et al., 2015; Kok et al., 2013). Many researchers continue to use the umbrella term of “child difficulty” to refer to the set of children's biobehavioral qualities that present early childrearing challenges (e.g., Super et al., 2020; Kim & Kochanska, 2021; Kochanska & Kim, 2020).

One popular perspective, originating largely from the social learning tradition and further informed by the flourishing research on children's temperament, has integrated the roles of child difficulty and parenting. That model has depicted difficult children as eliciting increasingly negative, power-assertive, coercive, and harsh parental control. That negative control, in turn, is seen as leading to disruptive, antisocial child outcomes, including aggression, disregard for rules, and other conduct problems, further exacerbating and entrenching adversarial dynamics within the parent-child dyad (Awada & Shelleby, 2021; Bates et al., 2012; Bell, 1968; Dadds & Salmon, 2003; Dishion & Patterson, 2006; Lengua & Kovacs, 2005; Lipscomb et al., 2011; Lorber & Egeland, 2011;

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Scaramella & Leve, 2004; Rothbart & Bates, 2006; Shaw & Bell, 1993; Tiberio et al., 2016).

Although this model has been broadly accepted, empirical evidence has been far from consistent. Illustrative of the tenets of developmental psychopathology (Cicchetti & Rogosch, 1996), growing literature has revealed substantial multifinality in developmental trajectories triggered by early difficulty. Multiple constructs, at many levels, have been identified as important factors that can influence the divergence in paths from child difficulty to parental negative control to maladaptive socialization outcomes (Campbell et al., 2000; Kim & Kochanska, 2021; Lorber & Egeland, 2011; Paulussen-Hoogbeem et al., 2007; Putnam et al., 2002; Shaw & Bell, 1993; Shaw et al., 2000; Taraban & Shaw, 2018).

In research largely inspired by attachment theory, the quality of the early parent-child relational context has emerged as a particularly important moderator of those paths. Across several studies, broadly ranging measures, correlational and experimental designs, and child ages, the maladaptive sequelae of early child difficulty have been consistently shown to unfold in insecure or suboptimal relationships but not in those that were secure (Kochanska et al., 2019). More recent research efforts stimulated by those findings have aimed to elucidate specific explanatory mechanisms that can account for that body of evidence. Toward that goal, Kochanska et al. (2019) highlighted the representational aspects of the parent-child relationship. Bridging the attachment and social cognition frameworks, they proposed that the parent's and the child's Internal Working Models (IWMs) of each other are the key factors that account for those consistent results.

Several separate yet highly synergistic lines of research have highlighted constructs that comprise parents' IWMs of their children. One of the key constructs pertains to reflective functioning – the parent's willingness or ability to see the child as a psychological agent with internal states (Benoit et al., 1997; Camoirano, 2017; Dykas et al., 2011; Katznelson, 2014; Luyten et al., 2017; Luyten et al., 2017; McMahon & Bernier, 2017; Meins, 1999; Meins et al., 2012; Meins et al., 2001; Sharp & Fonagy, 2008; Slade, 2005). In insecure relationships, parents tend to have IWMs of their children that are impoverished in terms of reflective functioning, and often hostile; whereas in secure relationships, they tend to have reflective and positive IWMs (Dykas et al., 2011; Main et al., 1985; Meins, 1999; Verhage et al., 2016).

Of note, the concept of parental IWMs extends beyond the representations of the child, and includes representations of one's own childhood experiences, as assessed by the Adult Attachment Interview (George et al., 1984), and representations of current romantic relationships, as assessed by instruments developed in social psychology, such as Experiences in Close Relationships-Relationship Structures (Fraley et al., 2011). Both types of representations have been meaningfully related to socialization processes. The current work, however, focuses specifically on parental IWMs regarding the child.

Complementing the parent's side, the child's IWM reflects the history of the relationship, including expectations for parental accessibility, responsiveness, trustworthiness, and availability of support. In insecure relationships, children come to perceive the parents as untrustworthy, unresponsive, and rejecting, but in secure relationships – as trustworthy, available, responsive, and accepting (Bowlby, 1969/1982; Bretherton & Munholland, 2008; Carlson et al., 2004; Cassidy et al., 2013; Dykas & Cassidy, 2011; Sroufe, 2016; Thompson, 2021). At toddler age, when parental control becomes a new salient aspect of the parent-child relationship, in insecure relationships, children's IWMs likely expand to

include the perception of parents as mean-spirited, arbitrary, and unfair, whereas in secure relationships – as well-intentioned, fair, and benevolent (Bugental & Johnston, 2000; Grusec, 2011; Grusec & Goodnow, 1994; Shaw & Bell, 1993; Toth et al., 1997).

Although parents' and children's IWMs are both key concepts in attachment-informed perspective on the parent-child relationship, surprisingly, the respective lines of research and empirical traditions have rarely intersected. Although researchers studying parents' IWMs and those studying children's IWMs have made significant progress, the two traditions have been poorly integrated. Few, if any, studies have deployed measures of both concepts simultaneously, assessing both the parent's and the child's representations. Arguably, doing so would be crucial for understanding the process of socialization within the parent-child dyad.

How can the parent's and the child's IWMs of each other account for the multifinality in the paths from child early difficulty to parental power assertion to child outcomes, demonstrated in insecure or suboptimal vs. secure or optimal relationships? Kochanska et al. (2019) proposed that the parent's IWM of the child biases the perception of the child's behavior, accounting for the moderated link between child difficulty and parental control. A parent who has an impoverished, negative IWM of the child is "primed" to perceive even mild forms of the child's difficult behavior as challenging, aversive, and intentional. For that parent, difficult, angry, irritating, challenging, hard-to-manage child traits easily trigger harsh, angry, affectively negative, rejecting control (Haltigan et al., 2014; Lorber & O'Leary, 2005; Nix et al., 1999; Scaramella & Leve, 2004; Smith et al., 2015). By contrast, for a parent who has a rich, reflective, positive IWM of the child, the same child traits do not trigger negative control; indeed, they may even elicit supportive, patient, and empathic response, and deliberate efforts to gain insights into the child's inner states and psychological reasons for the challenging behaviors and emotions (Dix, 1991).

A complementary process occurs on the child's side. The child's IWM of the parent biases the child's perception of parental control, accounting for the moderated link between parental control and child outcomes. A child who has a negative IWM of the parent is "primed" to perceive parental control as hostile, unfair, mean-spirited, and arbitrary (Gershoff, 2002; Grusec & Goodnow, 1994). The child then resents and rejects parental socialization influence; a mutually adversarial cascade unfolds, ultimately leading to poor developmental outcomes, particularly disruptive behavior problems. By contrast, a secure child, who has a positive, trusting IWM of the parent, comes to view control – even if firm – as benevolent, fair, and well-intentioned, and willingly embraces socialization, entering a path to positive outcomes and socio-emotional competence (Grusec, 2011; Grusec & Goodnow, 1994; Rohner & Melendez-Rhodes, 2019). As a result, the maladaptive cascade is "defused" (Kochanska et al., 2010; Kochanska & Kim, 2012).

Preliminary evidence supported the moderating role of parental IWMs (An & Kochanska, 2022). IWMs were conceptualized as the parent's capacity for mind-mindedness, assessed by examining the parent's spontaneous comments directed to the infant during naturalistic interactions, a broadly accepted behavioral measure (McMahon & Bernier, 2017; Meins, 1999). The path from infants' observed difficulty (negative affect, unresponsiveness) to parental observed power assertion at ages 2–4.5 to children's observed and parent-rated disregard for conduct rules at age 5.5 was present only

for those dyads in which parents had impoverished IWMs of the children, or low level of appropriate mind-minded comments. Of note, this effect was found only for father-child and not mother-child dyads.

However, to date, as mentioned earlier, no study has examined the complete, “dual moderation” model, in which *both the parent’s and the child’s IWMs of each other* are assessed as moderators of the path from the child’s early difficulty to parental control to the child’s outcomes. Such a model would provide a much more accurate account of the dyadic dynamics underlying the divergent cascades. To do so is the goal of the current article. We expected that the parent’s IWM of the child would moderate the first part of the path – from the child’s difficulty to the parent’s power-assertive control, and the child’s IWM of the parent would moderate the second part of the path – from the parent’s power-assertive control to the child’s developmental outcomes.

We present evidence from a longitudinal Children and Parents Study (CAPS, 200 community families). We examined the parent’s negative IWM of the child, conceptualized as low level of reflective functioning regarding the child, assessed in infancy as Pre-Mentalizing Mode through a well-established instrument, Parental Reflective Functioning Questionnaire (PRFQ, Luyten et al., 2017), and the child’s positive IWM of the parent, assessed in semi-projective narratives, adapted from MacArthur Story Stems Battery (MSSB, Buchsbaum & Emde, 1990; Buchsbaum et al., 1992; Davies et al., 2018; Toth et al., 1997) at age 3. We examined how those IWMs moderate, respectively, the path from child difficulty observed in infancy to parental power assertion observed at 16 months, and the path from parental power assertion to the child’s disruptive, externalizing behavior, reported by the parent at age 3.

All constructs were measured in parallel manner in mother-child and father-child dyads. This direction of our work was frankly exploratory. Despite growing calls for a better understanding of fathers’ role in social-emotional development (Cabrera et al., 2014; Cabrera & Volling, 2019), our knowledge of socialization dynamics in father-child relationships remains limited and poorly integrated, particularly when it comes to work using observational data for cascades that originate in infancy. It is unclear whether parenting constructs and their outcomes studied in mother- and father-child relationships are the same or different (Belsky et al., 1998; Chang et al., 2003; Fagan et al., 2014; Feldman & Shaw, 2021; Malmberg & Flouri, 2011; Rothbaum & Weisz, 1994; Schoppe-Sullivan & Fagan, 2020).

Relations among child difficulty, parenting, and children’s outcomes in mother- and father-child dyads are even less well understood. As recent examples, Wittig and Rodriguez (2019) reported evocative effects of child temperament on mothers’, but not fathers’ parenting. Padilla and Ryan (2019) reported evocative effects of child negative emotionality on fathers’ observed parenting, and of child sociability – on mothers’ observed parenting. Vertsberger and Knafo-Noam (2019) found that children’s observed anger at 9 months was associated with increase in reported negativity at 18 months for both mothers and fathers. Bernier et al. (2022) observed that children’s negative emotionality was associated with future aggression through paternal stress, but this path was moderated by maternal stress. Tiberio et al. (2016) studied reciprocal relations between child (under)control (conceptualized as child difficulty) and parenting over time, from toddler age to adolescence. The transactional processes were largely comparable in mother- and father-child dyads, although some differences were also present. Lipscomb et al. (2011) found that

adversarial dynamics between children’s negative emotionality and mothers’ and fathers’ overreactive parenting between infancy and toddler age were largely similar for mother- and father-child dyads. Bendel-Stenzel et al. (2022) found an interaction effect of infants’ anger and mother-child security at 15 months for children’s outcome (self-regulation) at 5 ½ years, consistent with the differential susceptibility model, for mother-child dyads but not for father-child dyads. In their recent review, Taraban and Shaw (2018) concluded that evidence for the association between child difficulty and harsh parenting was clearer for mothers and children than for fathers and children. Given the obvious lack of consensus in the literature, restraint with regard to hypotheses seems prudent, and this direction is best seen as exploratory.

Method

Participants

Two hundred two-parent community families with infants (born in 2017 and 2018; 96 girls) volunteered in response to flyers, posters, social media, and mass emails broadly distributed in local communities. The families resided in a college town, a small city, and rural areas and towns in the Midwest (mothers, fathers, and infants). The eligibility criteria were as follows: Both parents willing to participate and speak English during sessions; a biological, typically developing child; and the family not planning to move in the next five years. The families came from a range of educational background: 14.5% of mothers and 24.0% of fathers had no more than a high school education, 46.5% of mothers and 43.5% of fathers had an associate or college degree, and 39.0% of mothers and 32.5% of fathers had a postgraduate education. The median household income was \$85,000 ($SD = \$44,530$, range = \$4,000 to \$320,000). In terms of racial background, 88.5% of mothers and 88.5% of fathers were White, 1.5% of mothers and 3.0% of fathers African American, 5.5% of mothers and 3.5% of fathers Asian, and 4.5% of mothers and 3.5% fathers multiracial. Three (1.5%) fathers did not disclose their race. In terms of ethnicity, 4.5% of mothers and 1.5% of fathers identified as Latino, with the rest identifying as non-Latino (95.0% of mothers and 98.5% of fathers) or not reporting their ethnicity (0.5% of mothers). Parents reported 82.5% children as being White, 2.5% African American, 3.0% Asian, and 10.5% multiracial. Three (1.5%) families did not disclose child race. Eleven (5.5%) of the children were identified as Latino, 94.0% as non-Latino, or were missing ethnicity information (0.5%). In 20% of families ($N = 40$), one or both parents were not “White Alone,” i.e., they reported ethnicity as Latino and/or race as non-White. The families resided in areas considered “small metro” (59%), “medium metro” (33%), and “rural” (8%). Demographic data were entered using REDCap electronic data capture tools hosted at the University of Iowa (Harris et al., 2019; Harris et al., 2009). The University of Iowa IRB approved the study (CAPS, 201701705); the parents completed informed consents at the entry to the study.

Overview of design

The data reported in this article were collected when children were 8 months ($N = 200$, 96 girls), 16 months ($N = 194$, 93 girls), and 38 months (age 3, $N = 175$, 86 girls; greater attrition was due to the concurrent COVID-19 pandemic). At 8 months, each mother-child dyad and each father-child dyad were observed at home during a 2-hr carefully scripted session, conducted by a female experimenter (E). At 16 and 38 months, each dyad

participated in a 1.5–2.5-hr laboratory session on different days (typically within 1–2 weeks). All sessions were videorecorded. The laboratory included a naturalistically furnished living room and a sparsely furnished play room. Multiple teams coded behavioral data. Between 15% and 20% of cases were sampled for reliability; frequent realignments followed to prevent observers' drift. Kappas, weighted kappas, and intra-class correlations (ICCs) were used to compute reliability, as appropriate. The laboratory sessions encompassed a broad range of paradigms and contexts, varying in their psychological potentials (play, snack, chores, free time, standard tasks, etc.). The order of the parents' laboratory sessions was counterbalanced.

Child difficulty was observed and parents' IWMs of the child were self-reported at 8 months. Parents' power assertion (and child defiance, a covariate) were observed at 16 months. Children's IWMs of the parents were observed and children's outcomes were parent-reported at age 3. Children who returned at age 3 had been less difficult at 8 months, $t(198) = 2.00, p = .047$, and less defiant at 16 months, $t(191) = 2.38, p = .018$, than children who did not return.

Children's observed difficulty, age 8 months (prone to anger and to discomfort)

Proneness to anger: Observed contexts, coding, and data aggregation

Details are in An and Kochanska (2022). We observed the child's anger in three episodes from the Laboratory Temperament Assessment Battery (Goldsmith & Rothbart, 1999): Arm Restraint (holding down the child's arms; two 30-s trials), Car Seat (buckling the child in a car seat; one 60-s trial), and Toy Retraction (taking away a toy and holding out of reach; three 15-s trials). We coded the child's bodily anger (0–4), and facial and vocal anger (0–3) in 5-s segments. The latency to express anger in each trial was also coded. Reliability for discrete anger expressions, kappas, averaged .81 for Arm Restraint, .76 for Car Seat, and .75 for Toy Retraction; ICCs for the latencies to express anger averaged 1.00 across coders.

For each episode, we summed the codes for discrete anger expressions for each trial, reversed the latency score, and averaged across trials, and standardized those scores and aggregated into composites of observed anger for each episode (Cronbach's alphas .76, .80, and .81 for Arm Restraint, Car Seat, and Toy Retraction, respectively). Those scores cohered across episodes, with inter-correlations ranging from .15 to .22, $ps = .002-.04$, and were averaged into an overall composite of the child's proneness to anger.

Proneness to discomfort: Observed contexts, coding, and data aggregation

We adapted two paradigms designed in our laboratory (Kochanska et al., 1998): Cold Object (having raised the baby's clothing, E touched his or her side and stomach with a stethoscope for 10 sec each), and Spray (E gently sprayed a bit of water on the baby's neck; after 30 sec, the mother used a tissue to wipe it). We coded the child's bodily, facial, and vocal distress (all 0–3; for each trial in Cold Object, and for each of three epochs in Spray, the first 5 sec, next 25 sec, and 5 sec of mother wiping). Reliability of coding, weighted kappas, ranged .73–.95 for Cold Object and .75–.96 for Spray.

For each episode, standardized scores were averaged; Cronbach's alphas were .77 for Cold Object and .71 for Spray. Those scores cohered across the two episodes, $r(189) = .20$,

$p = .006$, and were averaged into an overall composite of proneness to discomfort.

Final difficulty composite

Proneness to anger and to discomfort correlated, $r(198) = .27, p < .001$. Consequently, we aggregated those into the composite of child difficulty. Girls' and boys' scores were not significantly different.

Parents' self-reported IWMs of the child, 8 months

Both parents self-reported their own reflective functioning regarding the child using the PRFQ (Luyten et al., 2017). We focused on the Pre-Mentalizing Mode subscale, consisting of 6 items that reflect parents' inability to understand the child's mental states (e.g., "When my child is fussy, he or she does that just to annoy me"; "Often, my child's behavior is too confusing to bother figuring out"). Items were rated on a 7-point scale: 1 = *strongly disagree*, 7 = *strongly agree*. Cronbach's alphas were .56 and .59, for mothers and fathers, respectively. Fathers' scores were higher than mothers', $t(198) = -2.70, p = .007$. Mothers' or fathers' IWMs of their daughters vs. sons were not significantly different.

Parents' observed power assertion, age 16 months

Observed context, coding, and data aggregation

Details are in An et al. (2022). Following parent-child play, the parent asked the child to put all the toys in a large basket (10 min). We coded the parent's control for each of the 20 30-s segments using a rating (1–4) that reflected the increasing amount of power or pressure: 1 = *no control* (no interaction, purely social exchange, play), 2 = *gentle guidance* (gentle, subtle, polite, pleasant control), 3 = *control* (firm, no-nonsense, matter-of-fact, relatively assertive control), and 4 = *power-assertive, negative, harsh control* (control delivered in forceful, impatient, threatening, angry, negative manner). The verbal, affective, and physical markers of each rating were clearly described, based on extensive past research (e.g., Kochanska et al., 2012). Reliability, weighted kappas, ranged from .65 to .67.

The instances of each code were tallied, weighted (no control multiplied by 1, gentle guidance multiplied by 2, control by 3, and power assertion by 4), and summed, creating a composite of power-assertive control for each parent. Fathers used more power-assertive control than mothers, $t(185) = -5.36, p < .001$. Girls received less power assertion from mothers, $M = 42.72, SD = 4.85$, than did boys, $M = 45.15, SD = 5.54, t(191) = -3.23, p = .001$, and from fathers, girls, $M = 45.97, SD = 6.84$, boys, $M = 48.18, SD = 6.96, t(184) = -2.18, p = .03$.

Children's observed IWMs of parents, age 3 years

Each child was presented with six stories (three featuring each parent): Hot Chocolate/Hot Cookies, Hurt Knee/Hurt Arm, Monster in Bedroom/Shadow in Closet (a warm-up story, Birthday Party, was first, but not coded). The stories, originally modeled after MacArthur Story Stems Battery, MSSB (Bretherton et al., 1990; Buchsbaum & Emde, 1990; Holmberg et al., 2007; Oppenheim et al., 1997) were adapted from a recent version by Davies et al. (2018). Each story depicted the parent issuing a directive (e.g., "don't touch hot food," "don't climb that rock"), and the child disobeying and getting hurt (burned, injured). Thus, the stories had the potential to elicit both the descriptions

Table 1. Descriptive data for all measures

	Child Measure							
	<i>M</i>	<i>SD</i>	Range	<i>N</i>				
Age 8 Months								
C Difficulty ^a	0.00	0.46	-1.23 - 1.60	200				
Parallel Measures for Mother-Child and Father-Child Dyads								
	Mother-Child Dyad				Father-Child Dyad			
	<i>M</i>	<i>SD</i>	Range	<i>N</i>	<i>M</i>	<i>SD</i>	Range	<i>N</i>
Age 8 Months								
P IWM of C: Pre-Mentalizing ^b	1.51	0.57	1.00 - 6.00	199	1.65	0.58	1.00 - 4.33	200
Age 16 Months								
P Power-Assertive Discipline ^c	43.98	5.35	31.00 - 63.00	193	47.11	6.97	27.00 - 67.00	186
C Defiance (Covariate)	2.09	3.02	0 - 15	193	1.70	2.65	0 - 16	186
Age 3 Years								
C IWM of P: Positive Representation ^d	0.00	0.96	-1.44 - 1.66	156	0.00	0.94	-1.36 - 2.05	150
Age 3 Years								
C Disruptive Behavior Problems ^e	-0.01	0.88	-2.17 - 3.07	171	0.00	0.83	-1.60 - 2.62	159

^aComposite of standardized measures of anger and discomfort.

^bPRFQ.

^cPower-assertive discipline in toy cleanup.

^dComposite of standardized scores of the representation of P as good and of P as comforting in narratives, MSSB.

^eComposite of standardized externalizing problems scale and reversed compliance scale in ITSEA. C = Child. P = Parent. IWM = Internal Working Model.

of punitive, disciplinary themes and of supporting, comforting themes regarding the parent. The story was presented using dolls and props, with E and child seated at a small table. Es had been extensively trained in animated yet standard delivery. After each story stem, E asked the child to show and tell her what happened next and followed up with a standard set of prompts.

Coding

In this report, we use two codes (given to the entire story): Good Representation of the parent and Comfort offered by the parent. Good Representation referred to the parent who, in response to the child protagonist's distress, was described as protective, forgiving, helpful, warm, affectionate, composed, emotionally present, empathic, reassuring, trustworthy, knowledgeable, and resourceful. The score ranged from 0 = *no evidence*, to 1 = *some evidence present*, to 2 = *clear evidence present*, to 3 = *strong, somewhat consistent, detailed evidence present*, to 4 = *rich, abundant evidence present*. Reliability between the master coder and two other coders, weighted kappas, were .80 and .89. Comfort offered by the parent was an additional code, given to each story: 0 = *absent*, 1 = *present*. Reliability, kappas, were .70 and .84.

Data aggregation

The scores of Good Representations and Comfort regarding the parent were averaged across the three stories; the former, for mothers, $M = 1.58$, $SD = 1.04$, range 0.00 - 3.67; the latter, $M = 0.51$, $SD = 0.38$, range 0.00 - 1.00, and for fathers, $M = 1.65$, $SD = 0.98$, range 0.00 - 4.00; and $M = 0.38$, $SD = 0.36$, range 0.00 - 1.00. Good Representations of mothers and fathers were not significantly different, but mothers received higher Comfort scores, $t(148) = 4.10$, $p < .001$.

The two scores correlated; for children's perceptions of mothers, $r(154) = .85$, $p < .001$, and of fathers, $r(148) = .75$, $p < .001$. Therefore, they were standardized and aggregated into

children's positive IWM (of each parent). Girls' scores were higher than boys' with regard to their mothers, girls, $M = 0.24$, $SD = 0.96$, boys, $M = -0.24$, $SD = 0.91$, $t(154) = 3.24$, $p = .001$, and their fathers, girls, $M = 0.19$, $SD = 0.92$, boys, $M = -0.18$, $SD = 0.92$, $t(148) = 2.48$, $p = .014$.

Children's parent-reported disruptive behavior, age 3 years

Both parents completed Infant-Toddler Social and Emotional Assessment, an instrument whose good psychometric qualities had been established in several studies (ITSEA, Briggs-Gowan et al., 2006; Carter et al., 2003). Parents rated multiple items as 0 = *not true/rarely*, 1 = *somewhat true/sometimes*, or 2 = *very true/often*. We used the overall Externalizing score (the mean of the scales of Activity/Impulsivity, Aggression/Defiance, and Peer Aggression) and the score on the Compliance scale. Mothers' and fathers' scores for Externalizing or Compliance were not significantly different.

Externalizing and Compliance scores were correlated, $r(168) = -.54$, and $r(156) = -.38$, both $ps < .001$, for mothers and fathers, respectively, and they were standardized and aggregated (having reversed the latter score) into the disruptive behavior score. Mothers' or fathers' ratings of their daughters and sons were not significantly different. All descriptive data are in Table 1.

Covariate: Children's defiance, age 3

Observed context, coding, and data aggregation

Children's defiance was coded in the same contexts as parental power assertion, for each 30-s segment. It was defined as resistance to the parent's directives, accompanied by poorly controlled anger, whining, temper tantrum, fussing, doing the opposite to what the parent asked, etc. Reliability, kappas, were .71 and .73. The instances of defiance for the child with each parent were tallied. The scores for children with mothers and fathers were not

Table 2. Correlations among all measures

	Child Difficulty, Age 8 Months	Parent IWM of Child, Pre-Mentalizing, Age 8 Months	Parental Power-Assertive Discipline, Age 16 Months	Child IWM of Parent, Positive Representation, Age 3 Years	Child Disruptive Behavior Problems, Age 3 Years	Child Defiance, Age 16 Months ^a
Child Difficulty, Age 8 Months	—	-.05	.05	.09	-.08	-.01
Parent IWM of Child, Pre-Mentalizing, Age 8 Months	-.03	.19**	.00	-.03	-.15*	.09
Parental Power-Assertive Discipline, Age 16 Months	-.08	.10	.19*	-.01	.14 ⁺	.33***
Child IWM of Parent, Positive Representation, Age 3 Years	-.04	-.04	-.08	.50***	-.19*	-.07
Child Disruptive Behavior Problems, Age 3 Years	-.09	-.01	.16*	-.36***	.50***	.20*
Child Defiance, Age 16 Months ^a	-.08	-.14 ⁺	.24***	-.15 ⁺	.12	.28***

Note. ⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

^aCovariate. Correlations for mother-child dyads are above the diagonal, for father-child dyads are below the diagonal. Correlations between mother-child and father-child constructs are on the diagonal. IWM = Internal Working Model.

significantly different. Girls were less defiant toward their mothers than were boys, girls, $M = 1.51$, $SD = 2.04$, boys, $M = 2.63$, $SD = 3.63$, $t(157.83) = -2.68$, $p = .008$, but there was no significant gender difference in defiance toward fathers.

Results

Preliminary analyses

We examined the correlations among all the constructs (see Table 2). In both mother-child and father-child dyads, more defiant children received more parental power assertion. In both dyads, children who had less positive IWMs of their parent were rated by that parent as having more disruptive problems. In both dyads (although for mothers and children, marginally) children who received more parental power assertion were rated as having more disruptive behavior problems. Mothers, but not fathers, who had more negative IWMs of the child (higher Pre-Mentalizing scores) rated their children as less disruptive. All constructs that were assessed for both mother- and father-child dyads showed significant cross-parent correlations.

Main analyses: The moderated mediation model

Analytic plan

We examined the proposed moderated mediation model separately for mother- and father-child dyads. Specifically, we modeled child difficulty at 8 months as the predictor, parental power assertion as age 16 months as the mediator, and children's disruptive behavior at age 3 as the outcome. We further modeled parents' negative IWMs of the child (Pre-Mentalizing) at 8 months as a moderator of the link between child difficulty and parents' power assertion, and children's positive IWMs of the parent at 3 years as a moderator of the link between parents' power assertion and children's outcomes. To control for the continuity of child difficult and challenging behaviors along the developmental cascade, we included child defiance at 16 months as a covariate for both the mediator and the outcome. Child gender was covaried. For ease

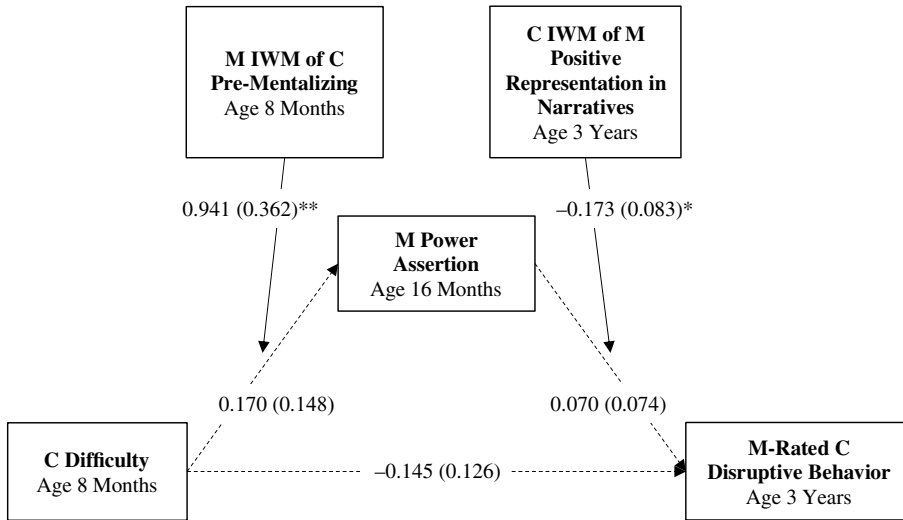
of interpretation, we mean-centered the predictor, the mediator, and the moderators before forming the interaction terms (parental power assertion was also standardized).

We examined the moderated mediation in Mplus (Muthén & Muthén, 1998–2022) using Stride et al. (2015) specification of PROCESS Model 21 (Hayes, 2017). Converting the PROCESS syntax into Mplus allows us to use the full information maximum likelihood treatment for the missing data. To account for the non-normal sampling distribution of the indirect effects, we estimated the indirect effects using the nonparametric resampling method (bias-corrected bootstrap) and reported the 95% confidence intervals from 10,000 resamples. We also reported the simple slopes for the significant moderation effects of each path (Aiken & West, 1991). Specifically, due to the skewed distributions of parental Pre-Mentalizing, we probed the simple slopes at the 16th, 50th, and 84th percentiles of the moderators when appropriate (as -1 SD of the moderator may be out of the range of the actual data, whereas the percentiles more accurately reflect the data distribution; see Hayes, 2017).

Mother-child dyads

Results are illustrated in Figure 1A. Child difficulty at 8 months was not associated with their mothers' power assertion at 16 months, but this path was qualified by a significant interaction between child difficulty and mothers' IWMs of the children (Pre-Mentalizing). Simple slopes, depicted in Figure 2A, showed that, as hypothesized, for mothers with highly negative or impoverished IWMs of their children (84th percentile on Pre-Mentalizing), child difficulty was associated with higher levels of mothers' power assertion, $B = 0.473$, $SE = 0.225$, $p = .035$. For mothers with median (50th percentile) or low (16th percentile) Pre-Mentalizing scores, the association was absent, $B = 0.003$, $SE = 0.133$, $p = .983$, and $B = -0.311$, $SE = 0.180$, $p = .084$, respectively. In other words, difficult infants received more power assertion from their mothers with negative IWMs of the child (high Pre-Mentalizing), but not from mothers with reflective IWMs of the child (low Pre-Mentalizing).

(A) Mother-Child Dyads



(B) Father-Child Dyads

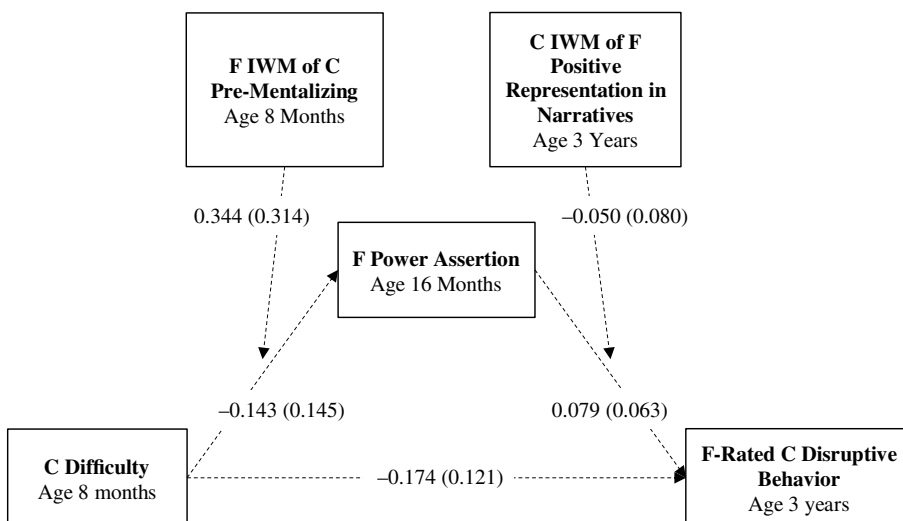


Figure 1. Moderated mediation models for the developmental cascade from child difficulty to parental power assertion to child disruptive behavior. C = Child. M = Mother. F = Father. IWM = Internal Working Model. * $p < .05$. ** $p < .01$.

Mothers' power assertion also was not associated with their ratings of children's disruptive behavior, but the association was qualified by a significant interaction between mothers' power assertion and children's IWMs of the mothers. Simple slopes, depicted in Figure 2B, showed that, for children whose scores on positive IWMs of the mothers were low (16th percentile on positive narratives), mothers' power assertion at 16 months was associated with higher levels of child disruptive behaviors at 3 years, $B = 0.292$, $SE = 0.148$, $p = .049$. For children whose positive IWMs of the mother were average (50th percentile) or high (84th percentile), this association was absent, $B = 0.055$, $SE = 0.072$, $p = .444$, and $B = -0.134$, $SE = 0.102$, $p = .188$, respectively. In other words, experience of power-assertive discipline at toddler age was linked to more disruptive behavior at age 3, but only for children who perceived their mothers as unavailable, unresponsive, rejecting, unlikely to comfort or protect, and not trustworthy, but not for children who perceived their mothers as trustworthy, available, and likely to offer comfort and protection.

Consequently, the results supported the moderated mediation proposed in our hypotheses, such that the entire path from child difficulty at 8 months to mothers' power assertion

at 16 months to children's disruptive behavior at 3 years unfolded specifically when *both mothers and children had negative, impoverished IWMs of each other* (i.e., for the mothers, high Pre-Mentalizing regarding the child, and for the children, low scores on positive representation regarding the mother in the narratives), $B = 0.138$, $SE = 0.103$, bootstrapped 95% confidence interval [0.003, 0.435].

Father-child dyads

Results are illustrated in Figure 1, Panel B. Child difficulty at 8 months was not associated with fathers' power assertion at 16 months. Fathers' power assertion was also not associated with their ratings of children's disruptive behavior at 3 years. Those respective paths were not moderated by either fathers' IWMs of the children or children's IWMs of their fathers. Consequently, the results did not support mediation or moderated mediation. However, we found one direct association between children's IWMs and father-rated child disruptive behaviors. Children who expressed less positive IWMs of their fathers were rated by their fathers as more disruptive, $B = -0.303$, $SE = 0.068$, $p < .001$.

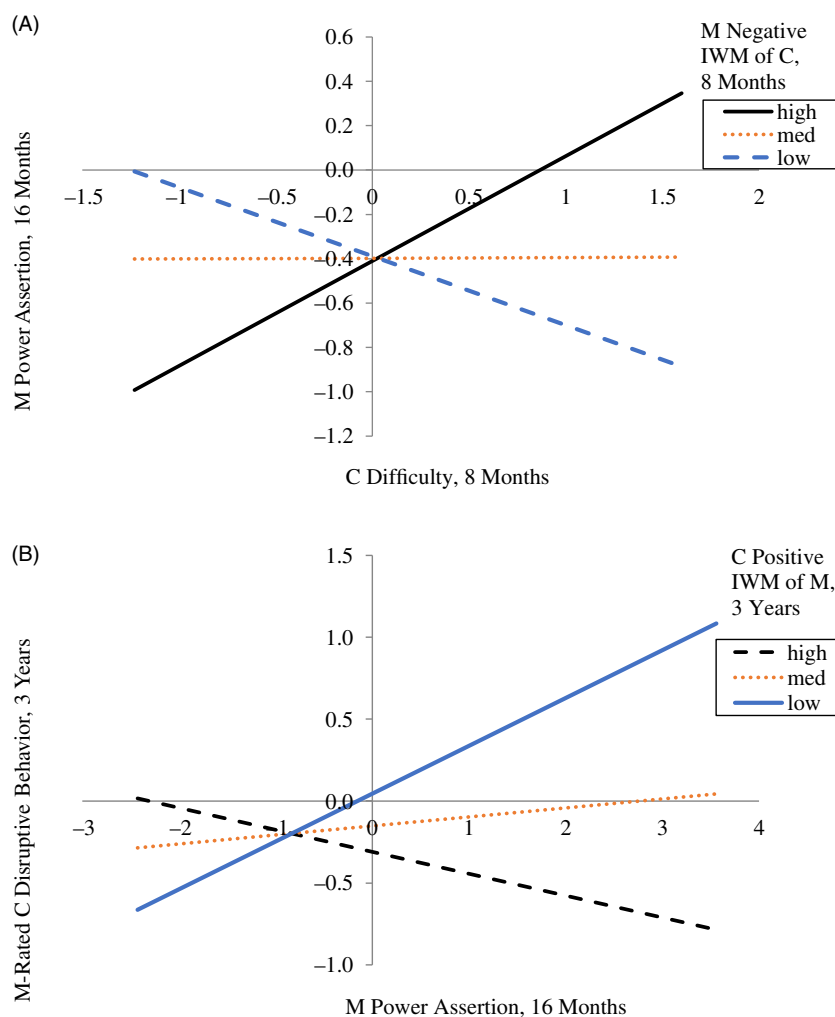


Figure 2. Panel A: Simple slopes for association between child difficulty and mothers' power assertion, moderated by mother negative IWM of the child (Pre-Mentalizing, PRFQ). Panel B: Simple slopes for association between mothers' power assertion and child disruptive behavior, moderated by child positive IWM of the mother (positive representation in narratives, MSSB). Solid lines represent significant simple slopes, and dashed lines represent nonsignificant simple slopes. C = Child. M = Mother. IWM = Internal Working Model.

Sensitivity analyses

Because dynamics in one parent-child dyad may be impacted by the other parent-child dyad, we conducted a sensitivity analysis, in which variables from the other parent were included as covariates in the models. The sensitivity analysis produced very similar results to the main findings, in that both moderated effects in the mother-child dyads remained significant. In addition, when one parent used more power assertion, the other parent would report more disruptive behavior of the child, $B = 0.150$, $SE = 0.061$, $p = .013$ and $B = 0.132$, $SE = 0.066$, $p = .047$, for mothers' and fathers' power assertion, respectively.

Discussion

In recent decades, research interests in parents' and children's representations or IWMs of each other has grown exponentially; and yet, few studies have integrated measures of both to understand how together they influence socialization processes. We drew from attachment-inspired research on parental reflective functioning to assess individual differences in ability and willingness to perceive the child as a psychological agent with a complex inner life, and on children's representations of the parents to assess individual differences in explicit or implicit perception of the parent as trustworthy, available, responsive, and accepting.

In most studies, parental IWMs are modeled as predictors or correlates of parenting, and often mediators of links between the

parent's characteristics or experiences and his or her parenting (e.g., Nijssens et al., 2020). Parents with reflective, positive IWMs – often with roots in their own early relationships – are seen as responsive and supportive of their children. Children's IWMs are typically considered reflections of the history of the relationship with the caregiver (Carlson et al., 2004; Johnson et al., 2010; Dykas & Cassidy, 2011). Children with positive, trusting IWMs are seen as compliant, competent, and cooperating in the process of socialization (Grusec, 2011; Kerns et al., 2001; Thompson, 2006, 2015). Surprisingly few studies, however, have examined whether parental and child IWMs can moderate socialization processes, but those that have yielded findings consistent with our model.

Buttitta and colleagues (Buttitta et al., 2019) reported a significant moderating effect of fathers' reflective functioning, coded from an interview, on the association between family low income, seen as a risk factor for adaptive parenting, and the fathers' observed helpful, sensitive structuring behavior to their toddlers in a teaching task. The association was significant only for fathers with low levels of reflective functioning, but not for those with average or high levels. As mentioned earlier, An and Kochanska (2022) found that difficult infants received more power-assertive control from fathers with lower reflective ability, assessed as appropriate mind-mindedness, but not from those with higher reflective ability. Wong et al. (2017) demonstrated a significant positive relation between child negative affectivity at 7 months and externalizing problems at 18 months; however, the relation was

significant only for children whose mothers had low or average level of reflective functioning regarding the infant, coded from an interview at 16 months, but not for children whose mothers' reflective functioning was high.

Researchers studying effects of harsh discipline, and even child maltreatment, have also reported relevant findings. Within the attachment framework, Lee and colleagues (Lee et al., 2016) measured 5-year-olds' IWMs of their mothers using narratives in MSSB, mothers' harsh punishment using observations and reports, and child outcomes (emotion regulation) using observations. They found that harsh punishment had adverse effects on emotion regulation only for children whose IWMs, expressed in the narratives, were negative. All measures, however, were concurrent, a limitation of the study. Toth and colleagues (Toth & Cicchetti, 1996; Toth et al., 2002) found that children's positive perceptions of their mothers may offset or reduce negative effects of maltreatment on child outcomes.

Within the social-cognitive framework, Gershoff et al. (2010), studying an international sample of 8-12-year-olds, found that children's perception of normativeness of harsh parenting in their communities dampened the negative associations between harsh control techniques and child behavior problems. This is consistent with other social-cognitive models of parenting that have proposed that children who perceive parents as fair and accepting are more likely to respond positively to their control than children who perceive them as arbitrary and hostile (Grusec, 2011; Grusec & Goodnow, 1994; Rohner & Melendez-Rhoades, 2019). But to our knowledge, few if any studies have considered *both* the parent's and the child's IWMs simultaneously as important factors in the process of socialization. The current work addresses this gap.

The findings supported our model, although only for mother-child dyads. Both postulated moderated effects were significant. Difficult infants received more power-assertive control as toddlers, but only if the mothers had impoverished, Pre-Mentalizing, negative IWMs of the child; children who had received more power assertion became more disruptive at age 3, but only if they perceived their mothers as unresponsive, rejecting, and unlikely to offer comfort and help at times of stress. The whole path from child difficult temperament to maternal power assertion to disruptive behavior unfolded only in dyads in which *both* the mother and the child viewed each other negatively.

The moderated mediation was not replicated in father-child dyads. However, as for mothers, we found a significant direct association between children's IWMs of their fathers and fathers' ratings of children's disruptive behaviors. Children who perceived their fathers as unresponsive and rejecting were also rated by fathers as being more disruptive. This association suggests a link between children's relationship schema and their behavioral adjustment; alternatively, it may also reflect negative reciprocity between children's and fathers' perceptions of each other at 3 years (i.e., children who view their fathers negatively are also viewed negatively by their fathers). Either way, the findings suggest that children's negative IWMs, despite not serving as a moderator, may nevertheless play a role in the unfolding maladaptive dynamics in father-child dyads during early childhood.

How can we explain the differences in findings for the mother- and father-child dyads? It is possible that mothers and fathers with an impoverished understanding of their infants' inner lives respond differently when confronted with the infant's temperamental difficulty, such that it may be more challenging for mothers. Mothers generally spend more time than fathers interacting with the infants (in CAPS, 59 and 35 hrs per week, respectively), and

therefore, may be more affected by the child's proneness to anger and discomfort. As mentioned earlier, in their review, Taraban and Shaw (2018) concluded that generally, associations between children's difficult temperament and harsh parenting appear more evident for mothers and children than for fathers and children.

Compared with fathers, mothers may be less willing to explicitly endorse negative IWMs – as indeed they were in our study – and when they do, it is possible that they may react more negatively to their difficult infants (An et al., 2022). We should note that the Pre-Mentalizing scores were low for both parents. This is, however, a typical finding, and our parents' scores were very comparable to several recent studies across various cultures (Gordo et al., 2020; Moreira & Fonseca, 2022; Wendelboe et al., 2021).

Children's young age – infancy to age 3 – may account for the differences in the studied processes in mother- and father-child relationship. Children's representations of their mothers – and particularly with regard to comfort and responsiveness at times of stress, as depicted in the narratives – might be key in moderating the implications of maternal parenting at toddler age. But later on, children's representations of their fathers may become equally or even more important. Further, children's IWMs likely reflect developmental transformations in processing skills related to social information, such as the level of social understanding and shared intentionality (Dykas & Cassidy, 2011; Newton et al., 2016). In this context, we note that although MSSB has been extensively and successfully used with young children, age 3 is considered the earliest threshold for this methodology (Buchsbaum et al., 1992). Infants and toddlers have already developed some cognitive capacity essential for building IWMs of their caregivers (e.g., memory for caregivers and socio-emotional interactions, emotion understanding, seeing other people as intentional agents; Sherman et al., 2015). As children move into the preschool years, and their social cognition skills dramatically expand (Wellman & Liu, 2004), their narratives likely gain robustness as windows into their IWMs of the parents. Future research can address an intriguing question: How do the child's experiences in the relationship with the parent and the child's general social cognition skills, examined jointly, influence his or her IWM of the parent?

A developmental argument can be also applied to parents' IWMs; perhaps later in development, fathers' IWMs of their children take on increasingly important regulatory role, and emerging evidence supports such an assumption (Nikolic et al., 2022). In addition, although PRFQ is a well-established measure, the reliability of the Pre-Mentalizing Modes subscale was modest in this study, similar to other studies of parents' IWMs of their infants (e.g., Krink et al., 2018), likely to increase later in the first and second years (e.g., Luyten et al., 2017). The modest reliability may have limited our ability to detect significant findings in the father-child model. We will continue to follow the CAPS families to examine the dynamics among child difficulty, parental control, and outcomes, and the dual moderation effects by the parent and child IWMs.

The strengths of this work include a rich empirical base and multi-method data, encompassing behavioral observations, reports, and child narratives. Retention was robust. In CAPS, at age 16 months, we retained 97% of the original families, and at age 3 – over 90% of the families that had participated at age 16 months, despite the entire age 3 assessment occurring during the height of the COVID-19 pandemic, in 2020–2021.

Potential translational implications (at least for mother-child relationships) are another strength. Although this work represents basic research on socialization, it can nevertheless significantly inform parent-child intervention programs. A growing number

of interventions focus on parental mentalization abilities (Schacht et al., 2017; Suchman et al., 2017), but very few target the child's representations of the parent (for exception, see Bosmans et al., 2019). We believe that both the parent's and the child's IWMs of each other could *simultaneously* serve as intervention targets. To our knowledge, not a single experimental study has addressed such possibility by systematically examining separate conditions: An intervention targeting the IWMs of the parent, the child, both, or neither.

This work has weaknesses. From the conceptual standpoint, the fact that the model was only supported for mother-child relationships is a limitation. We note that in another sample of community families, drawn from the same geographical area, we found the expected effect of parental IWM (albeit assessed as behavioral mind-mindedness rather than self-reported Pre-Mentalizing) moderating the link between child difficulty and parental power assertion for father-child dyads only (An & Kochanska, 2022). This discrepancy highlights the need for future replications of the model across samples, using comparable measures.

From the empirical standpoint, CAPS involved low-risk community samples, limiting generalizability to at-risk populations. Parents were generally quite gentle, children easily manageable, and their views of each other generally positive. In future studies, it will also be important to include impoverished, under-served samples and those enriched for multiple forms of parental psychopathology. Problematic parental IWMs have been robustly identified as correlates of parental psychopathology, mechanisms of developmental risk for children, and potential target for intervention in such populations (e.g., Berthelot et al., 2015; Camoirano, 2017; Luyten et al., 2020; McMahon & Bernier, 2017; Schacht et al., 2017; Suchman et al., 2017; Wendelboe et al., 2021; Zayde et al., 2021).

In the context of future high-risk samples, a more nuanced approach to parental IWMs will be important. In this study, reflective functioning was assessed using the Pre-Mentalizing scale from PRFQ (Luyten et al., 2017). There is evidence that reflective functioning, or mentalizing that is specific to the parent's early traumatic experiences (e.g., abuse, neglect, rejection) is particularly important for the parent-child emerging relationship, including response to child negative emotion (Berthelot et al., 2015). It might therefore be an especially powerful moderator of the link between the child's difficulty and the parent's discipline and control. In future studies, adding measures of parents' trauma-specific mentalizing, especially in high-risk groups, may provide important insights into processes leading to parental use of harsh discipline and child maltreatment.

Further, the Pre-Mentalizing mode of reflective functioning can be conceptualized more richly as a multi-dimensional concept. Luyten et al. (2020) outlined several distinct forms: the psychic equivalence mode, teleological mode, or pretend (hyper-mentalizing) mode. Future research, adopting such more nuanced approach, may elucidate further whether those distinct non-mentalizing dysfunctional parental representations may differently influence socialization processes.

Although we believe that our multi-method approach to the key concepts – children's difficult temperament, parents' and children's IWMs, parents' power assertion, and children's outcomes – was essentially robust, the fact that the analyses examined each measure obtained at one time point only was a limitation. As we follow this sample of families, we plan to test our model more appropriately, controlling for the longitudinal stability of the constructs.

The fact that measures of the parent's IWM of the child and child outcomes were both reported by the parent was a limitation. However, those constructs were unrelated for fathers, or even slightly negatively related for mothers and children (the negative association was likely caused by the skewed distribution of maternal IWM), so this concern is probably not serious.

Ethnic diversity was limited, although we note that the sample included 20% of not "White-alone" families, a valuable step forward in studying diversity in socialization environments (Nishina & Witkow, 2020). Further, other aspects of diversity, such as education or income, varied broadly. Taken together, the limitations underscore the need for future studies and suggest that the current findings should be seen as preliminary.

In science, times when divergent lines of research are bridged are especially exciting. We envision the future as involving collaborations between scientists who study parents' IWMs and children's IWMs, involving researchers in relationship science and those in adult and infant cognition science. We feel that the time for such integration is ripe, and we anticipate compelling developments ahead as such research moves forward.

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Author contributions. Both authors contributed to conceptualization and writing. GK designed CAPS, secured funding, and supervised data collection and coding. DA conducted the statistical analyses.

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Conflicts of interest. The authors declare no conflicts of interest.

Ethical standards. This research has been conducted in full compliance with all ethical standards and approved annually by the University of Iowa IRB.

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