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DOI
10.1093/hcr/hqy016

Publication date
2019

Document Version
Final published version

Published in
Human Communication Research

Link to publication

Citation for published version (APA):
Beyens, I., Valkenburg, P. M., & Piotrowski, J. (2019). Developmental Trajectories of Parental Mediation Across Early and Middle Childhood. *Human Communication Research*, *45*(2), 226-250. https://doi.org/10.1093/hcr/hqy016

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Download date:12 Nov 2026

Human Communication Research ISSN 0360-3989

ORIGINAL ARTICLE

Developmental Trajectories of Parental Mediation Across Early and Middle Childhood

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Despite a large body of literature on the opportunities of parental mediation to enhance positive and offset negative media effects, a long-term view as to the development of such mediation across childhood is lacking. The current study aimed to address this gap by presenting a developmental approach to parental mediation. Using an accelerated longitudinal design with four-wave panel data of 729 children, we investigated developmental trajectories of restrictive and active mediation across early (3–6 years) and middle childhood (7–10 years) and potential individual differences in these trajectories. Results revealed that parents' expressions of restrictive and active mediation follow a curvilinear pattern over time, whereby parents' mediation efforts increase across early childhood, peak at around age 8, before slowly declining throughout middle childhood. In addition, the results indicated that parenting style and children's social-emotional difficulties are important sources of individual differences in the trajectories, above and beyond demographics.

Keywords: Individual Differences, Media Use, Parental Mediation, Television, Video Games.

doi:10.1093/hcr/hqy016

The past four decades have witnessed a continuous stream of studies into the effects of parental mediation, defined as parents' efforts to either stimulate positive media effects or counteract negative media effects (Nathanson, 1999, 2001a). While in the 1980s and 1990s these studies focused on parental mediation of children's television viewing (e.g., Bybee, Robinson, & Turow, 1982; Corder-Bolz, 1980; Desmond, Singer, Singer, Calam, & Colimore, 1985; Nathanson, 1999), later studies were expanded to include video and computer game playing (e.g., Coyne, Padilla-Walker, Stockdale, & Day, 2011; Nikken & Jansz, 2006; Van den Bergh & Van den Bulck, 1999), and digital and mobile media use (e.g., Beyens & Beullens, 2017). These studies have shown, for example, that parents' explanations of media content

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to their children (i.e., active mediation) and restriction of exposure to certain content or technologies (i.e., restrictive mediation) can enhance the learning effects of viewing educational television content (Desmond et al., 1985), reduce the effects of television violence on aggression (Nathanson, 1999), and increase the effects of video game playing on prosocial behaviors (Coyne et al., 2011).

Yet, despite these promising findings on the effectiveness of parental mediation, the existing literature is marked by two important gaps. First, there is a lack of research into the development of parental mediation across early and middle childhood. While prior studies have been conducted to understand the development of parental mediation across adolescence (Opgenhaffen, Vandenbosch, Eggermont, & Frison, 2012; Padilla-Walker, Coyne, Fraser, Dyer, & Yorgason, 2012; Sang, Schmitz, & Tasche, 1992, 1993), no similar studies have been conducted across early and middle childhood (but see St. Peters, Fitch, Huston, Wright, & Eakins, 1991, on coviewing among 3- and 5-year-olds), despite calls to study such development in this period (Collier et al., 2016). This is surprising, because, firstly, scholars agree that children in early and middle childhood are particularly sensitive to media influences, and, secondly, because parental mediation—especially restrictive and active mediation—is said to be most effective in this developmental period (Warren, 2003). Therefore, the first aim of this study is to investigate the developmental trajectories of restrictive and active parental mediation across early and middle childhood.

A second, related, gap in the literature is a lack of knowledge about the role of individual differences in the development of parental mediation throughout early and middle childhood. Several cross-sectional studies (e.g., Nathanson, 2001b; Nikken & Schols, 2015; Warren, 2003; Warren, Gerke, & Kelly, 2002) have shown that parents differ considerably in how often they use restrictive and active mediation. These studies have identified numerous individual difference factors that influence the occurrence of restrictive and active mediation, such as parent's sex, parent's education level, and child's age. However, we still lack a clear understanding as to whether and how these factors explain the developmental trajectories of restrictive and active mediation across childhood. Therefore, the second aim of the current study is to investigate these individual difference factors.

The current study addresses these two gaps in the literature by presenting a developmental approach to parental mediation. By means of an accelerated longitudinal design with four-wave panel data, we traced trajectories of restrictive and active parental mediation aimed at children ranging in age from 3 to 10 years. We focused on three types of parental mediation that have been identified in earlier research: restrictive mediation (e.g., Martins, Matthews, & Ratan, 2017; Warren, 2017); negative active mediation (e.g., Martins et al., 2017; Nathanson & Botta, 2003); and positive active mediation (e.g., Nathanson & Botta, 2003; Rasmussen et al., 2016). Restrictive mediation is defined as parents' efforts to restrict certain content or technologies (e.g., violent content). Negative active mediation is defined as parents' criticisms of certain content (e.g., violent content). And, finally, positive

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active mediation is defined as parents' endorsements of certain content (e.g., educational content).

We did not include a fourth parental mediation style that has been identified in earlier research, coviewing or co-use (e.g., Martins et al., 2017; Valkenburg, Krcmar, Peeters, & Marseille, 1999; Martins et al., 2017), for two reasons. First, the effectiveness of coviewing and co-use is less convincingly demonstrated than that of restrictive and active mediation (Collier et al., 2016; Nathanson, 2001a). Second, coviewing was originally defined as parents and children watching television together, without any parent-child discussion about the content (Nathanson, 1999; Valkenburg et al., 1999). However, while parents and children can easily coview a television program or a movie without any active parent-child discussion, this lack of parent-child discussion is less common during shared use of interactive media, which, by definition, demand an active role of their users (Livingstone & Helsper, 2008). As a result, parental co-use of such media is difficult to distinguish from more active forms of mediation.

Towards a developmental parental mediation theory

Most contemporary parenting theories postulate that parenting is a two-way process that starts with the child (Kuczynski & Parkin, 2007). These theories conceive parenting behaviors as responses to the child: a child who displays a certain emotion or behavior elicits certain parenting behaviors in return. This supposition also seems to hold for media-specific parenting. When a young child becomes frightened or aroused while watching certain cartoons, his/her parent will likely engage in restrictive or negative active mediation to reassure the child or manage his/her responses.

Because developmental level is a strong predictor of specific emotions and behaviors in children, parenting theories postulate that parenting is most effective when it is attuned to the child's developmental level (Belsky, 1984; Maccoby, 1980). Indeed, according to family development theory (Rodgers & White, 1993), parents typically adapt their parenting behaviors to meet their child's developmental needs and skills. For instance, while parenting behaviors targeted at children in early childhood are most effective when attuned to child's immature self-regulatory abilities, parenting behaviors targeted at children in middle childhood are most effective when attuned to children's growing sense of autonomy (Collins, Madsen, & Susman-Stillman, 2002). Likewise, developmental parental mediation theory would explain how parents' mediation efforts change as a function of children's changing developmental skills, as well as their concomitant changes in media preferences and susceptibility to media effects (Padilla-Walker et al., 2012; Warren, 2003).

Early childhood is characterized by rapid developments in cognitive skills (Thomas, 1992), such as attention span (Lin, Hsiao, & Chen, 1999) and processing speed (Kail, 1991). For example, while a 3-year-old can typically concentrate on a

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single activity for a maximum of 20 minutes, a 5-year-old can typically concentrate on a favorite activity for up to an hour (Anderson, Lorch, Field, Collins, & Nathan, 1986). However, despite these rapid cognitive increases, in the beginning of early childhood (ages 3–4), children still have a preference for slowly-paced programs with simple, friendly, and nonthreatening characters (Valkenburg & Cantor, 2001). Therefore, it is no surprise that, at this time, children's media preferences largely involve educational content (Wright et al., 2001). Children's preferences for such content provide parents with ample opportunities to stimulate potential positive effects (e.g., academic skills, social-emotional skills). Therefore, it is plausible that, especially in early childhood, parents heavily engage in positive active mediation.

Another characteristic of children in early childhood is that they still lack the ability to separate reality from fantasy in media content and to understand special effects, such as the disappearance of a character in a flash of light or a transformation from a human into a monster. As a consequence, when incidentally or deliberately exposed to such fantasy content, children this age more easily develop fear reactions than older children do (Cantor, 2002). In addition, due to their immature self-regulatory skills, they easily imitate behaviors from fantasy characters, including their unrealistic, risky behaviors. In order to counteract these fear responses and imitative behaviors, parents may especially show a tendency to engage in restrictive mediation and negative active mediation.

At around age 5, children start to reject the typically slow-paced educational content (Rideout, 2014) and develop an increased preference for rapidly-paced, adventurous media content. At this age, children can express a stubborn preference for action-packed adventure programs (Cantor & Nathanson, 1997), often to their parents' aggravation. However, between ages 5 and 7, most children are still not yet able to separate fantasy from reality in media, so that they can still easily get upset by the programs that they themselves prefer to watch. As a response to children's changing media preferences, parents must find ways to counteract the potential negative effects that such content might evoke (e.g., fear, aggression, restlessness). Therefore, it is conceivable that, at the end of early childhood and the beginning of middle childhood (between the ages of 5 and 7), children may elicit more restrictive and negative active parental mediation efforts, as well as more positive active mediation efforts to guide children to educational rather than violent media content. In all, developmental parental mediation theory would predict that restrictive, negative active, and positive active mediation would all increase during early childhood.

During middle childhood, children acquire more sophisticated cognitive, social-emotional, and self-regulatory skills. This is reflected in their increased comprehension of media content and lowered susceptibility to media effects. In addition, they develop cognitive coping strategies (e.g., "blood is only ketchup") to protect themselves against the negative effects of violent and frightening media entertainment (Wilson, Hoffner, & Cantor, 1987). Due to children's enhanced developmental level and newly-developed skills of discounting media content, parents may perceive their child as less vulnerable and more autonomous, which, in turn, may induce

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them to use less restrictive and active mediation. As a result, middle childhood may be characterized by a decrease in parental mediation strategies (Davies & Gentile, 2012). Specifically, developmental parental mediation theory would predict that restrictive, negative active, and positive active mediation decrease during middle childhood.

In all, developmental parental mediation theory would predict a curvilinear trend in parental mediation from early to middle childhood. Some empirical support for this presupposition exists. Several cross-sectional studies have compared the prevalence of restrictive and active mediation among parents of children of different ages (e.g., Warren et al., 2002; Warren, 2003). Although none of these studies distinguished between positive and negative active mediation, they suggest a curvilinear pattern of parental mediation that is consistent with developmental parental mediation theory. They showed that both restrictive and active mediation seem to increase during early childhood, and decrease again during middle childhood. For instance, Warren (2003) found that parents of older preschoolers engage in higher levels of both restrictive and active mediation as compared to parents of toddlers and younger preschoolers. And in another study, Warren et al. (2002) found that parents of children in early childhood and younger (1–6 years) engaged in more restrictive and active mediation as compared to parents of children in middle childhood (7–12 years).

However, although in line with developmental parental mediation theory, these cross-sectional studies have only been able to investigate differences between parents of children with different ages (i.e., between-person differences). Such studies cannot investigate changes in parental mediation over time within one and the same parent (i.e., within-person differences). This is an important gap in the literature, because it is only by following the development of one and the same parent over time that we can understand whether and to what extent parents' mediation adapts to children's developmental level. Therefore, in this study, we investigated the development of parental mediation across time within parents. Based on parenting theories and developmental parental mediation theory, as well as earlier cross-sectional research findings, we hypothesized:

> H1: (a) Restrictive mediation, (b) negative active mediation, and (c) positive active mediation all follow a curvilinear trajectory over time. That is, they all increase during early childhood, after which they decrease again during middle childhood.

Individual differences in the development of parental mediation

Cross-sectional research has shown that individual differences exist in how often parents restrict or actively mediate children's media use (Nathanson, 2001b; Nikken & Schols, 2015; Warren, 2003; Warren et al., 2002). Although findings have not always been consistent, the literature generally points to demographic factors—including parent's sex, parent's education level, child's sex, household size,

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and household income—as individual difference factors of particular interest. For example, mothers and parents with higher education levels are more likely to engage in parental mediation than fathers and parents with lower education levels (Böcking & Böcking, 2009; Gentile, Nathanson, Rasmussen, Reimer, & Walsh, 2012; Nikken & Schols, 2015; Valkenburg et al., 1999). In addition, parents with a larger number of children engage in more restrictive and active mediation (Nikken & Schols, 2015), and parents of girls are more likely to engage in restrictive mediation than parents of boys (Nikken & Jansz, 2006; Warren, 2003), although this latter finding was not replicated in other studies (Nikken & Schols, 2015; Warren et al., 2002).

While there is accumulating evidence on the association of demographic factors with parental mediation, researchers (e.g., Austin, Knaus, & Meneguelli, 1997; Shin & Li, 2017) have called for scholarship that moves beyond demographics, arguing that demographic factors cannot fully explain individual differences across families. Already in the 1990s, Austin and colleagues (1997) suggested that demographic factors may, at best, serve as proxies for subtler individual differences. And more recently, Shin and Li (2017) found that parental mediation is best explained by parenting style—in particular parental responsiveness—and parental involvement, rather than by demographic factors.

Yet, despite scholars' call for empirical investigations that go beyond demographics, this has received little empirical attention. For instance, while scholars (e.g., Nathanson, 2015; Padilla-Walker & Coyne, 2011; Shin & Li, 2017) have pointed at parenting style—conceptualized as the degree of demandingness, responsiveness, and consistency that parents apply in their parenting behavior (Baumrind, 1991; Gardner, 1989)—as a key variable to consider, parenting style has rarely been investigated in relation to parental mediation. In fact, to our knowledge, only two studies have considered the relationship between parenting style and parental mediation. Valkenburg, Piotrowski, Hermanns, and de Leeuw (2013) found that parents who used an autonomy-supportive parenting style were more likely to engage in autonomy-supportive restrictive and active mediation. Conversely, parents who used an inconsistent parenting style were more likely to engage in inconsistent restrictive mediation. In a similar vein, Shin and Li (2017) found that parents with a more responsive parenting style were more likely to engage in both restrictive and active mediation. Beyond parenting style, scholars (e.g., Evans, Jordan, & Horner, 2011; Jordan, 2005) have also suggested that parental stress may influence parents' mediation efforts. For instance, interviews with parents revealed that parents believe they would be less likely to engage in mediation, particularly restrictive mediation, when they feel stressed (Evans et al., 2011).

Of course, while non-demographic parent factors may influence parental mediation, child factors are also likely important to consider. As discussed, parenting is generally conceived as a bidirectional process, in which children elicit certain parenting efforts (Kuczynski & Parkin, 2007), including parental mediation efforts (Van den Bulck, Custers, & Nelissen, 2016). In particular, scholars have suggested

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that children's social-emotional difficulties, including hyperactivity symptoms, emotional problems, and conduct problems, may lead parents to engage in more restrictive mediation (Beyens & Eggermont, 2016). This assumption makes sense, as numerous studies have shown that children's behavioral and emotional problems lead to more restrictive parenting in general (e.g., Kochanska, Friesenborg, Lange, & Martel, 2004; Lee, Zhou, Eisenberg, & Wang, 2013).

All told then, given this body of work, it seems likely that demographic variables, as well as other parent and child characteristics, may differentially influence the development of restrictive and active mediation across early and middle childhood. The existing literature sheds some light on potential relationships between these variables. However, these relationships are all based on observations at one point in time, and not based on the trajectories of parental mediation throughout childhood. Given that there is little available scholarship on the development of parental mediation across childhood, the extent to which parent and child factors influence the development of parental mediation is far less understood. As such, we posited the following questions:

> RQ1: Do demographic factors (i.e., parent's sex, parent's education level, child's sex, the number of people living in the household, and household income) predict developmental trajectories of restrictive and active mediation in early and middle childhood?
> RQ2: Do non-demographic parent and child factors (i.e., parenting style, parenting stress, and the child's social-emotional difficulties) predict developmental trajectories of restrictive and active mediation in early and middle childhood?

Method

Participants and procedure

Parents were recruited through a private survey research institute that maintains a nationally-representative online panel of approximately 60,000 families in the Netherlands. Data were collected as part of a larger longitudinal study among families with children aged 3 to 7 years at intake. All families having at least two children in the target age range (1,746 families) were invited to participate in the study. A total of 521 families agreed to participate. After receiving ethical approval from the sponsoring institution's Institutional Review Board, a four-wave panel study with one-year intervals was conducted. Parents completed questionnaires using a laptop during home visits conducted by a trained interviewer. As part of the larger study protocol, a sibling design was used, involving two children per family. Parents completed a questionnaire for each of the two children.

A total of 467 parents provided complete data about their two children at wave 1, of which 415 parents provided complete data for all four waves (11.13% dropout rate). Because the current study aimed to investigate developmental trajectories

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within one and the same parent, a parent was included in the analyses when s/he completed the questionnaire at all four waves. When the parent who had completed the survey at wave 1 was replaced by the other parent at any of the following waves, s/he was excluded from the analyses. This procedure resulted in the elimination of 101 parent reports, yielding parent reports about 729 children at intake (53.2% girls; $M_{age} = 5.41$ years, $SD = 1.41$) that were provided by 366 parents.

On average, the participating parents were 36 years old at intake ($M = 36.58$ years, $SD = 4.34$). Most parents were women (89.9%) and were born in the Netherlands (97.8%). Parents' families consisted of three people (4.1%), four people (53.3%), five people (30.3%), or six or more people (12.3%). Of the parents, 0.3% had received primary education, 48.9% had received secondary education, 36.9% held bachelor's degree, and 13.9% held master's or doctoral degree. Approximately half of the parents had an annual household income ranging between €38,800 and €65,000 (47.5%), one third of the parents earned less than €38,800 (32.6%), and 19.9% earned more than €65,000.

Measures

Parental mediation

To measure (a) restrictive, (b) negative active, and (c) positive active parental mediation of children's media use, parents completed a 12-item parent report scale. Our three subscales are extensions of the restrictive and active parental television mediation subscales developed by Valkenburg et al. (1999). Unlike Valkenburg et al.'s (1999) television mediation scale, our subscales focus on both television and games. In addition, we investigated two types of active mediation: negative and positive. A total of four items were used for restrictive mediation (e.g., "How often do you forbid your child to watch television programs or movies that contain violence?"), as well as for negative active mediation (e.g., "How often do you tell your child that certain things in a television program or movie are wrong?") and positive active mediation (e.g., "How often do you encourage your child to play an educational computer game?"). All 12 items were measured on a 4-point Likert scale (1 = *never*, 2 = *almost never*, 3 = *sometimes*, and 4 = *often*). Parents completed the scale at each wave of data collection.

A confirmatory factor analysis showed that the three-factor structure had a good fit at each wave (wave 1: CFI = .98; TLI = .97; RMSEA = .04, 90% confidence interval [CI] = .03–.05; wave 2: CFI = .98; TLI = .97; RMSEA = .04, 90% CI = .03–.05; wave 3: CFI = .97; TLI = .96; RMSEA = .05, 90% CI = .04–.06; wave 4: CFI = .96; TLI = .95; RMSEA = .06, 90% CI = .05–.07). All factor loadings across all three factors were significant across the four waves and ranged from .54 to .92 (see Table 1). Analyses that tested measurement invariance over time showed that full metric invariance models provided good fit to the data for restrictive mediation (CFI = .96; TLI = .94; RMSEA = .06, 90% CI = .05–.06), negative active mediation (CFI = .98; TLI = .97; RMSEA = .04, 90% CI = .03–.04), and positive active mediation (CFI = .97; TLI = .96; RMSEA = .05, 90% CI = .04–.05). This indicates that

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the items of each mediation construct have the same factor loadings across the four waves. Responses to the items for each subscale were averaged to create scales of restrictive mediation, negative active mediation, and positive active mediation. Higher scores were indicative of greater parental mediation. Cronbach alpha's for the constructs ranged from .79 to .89 (see Table 1).

Demographic factors

Parents provided information regarding their sex (1 = *man* and 2 = *woman*), their education level (1 = *no degree* to 8 = *master's or doctoral degree*), their child's sex (1 = *boy* and 2 = *girl*), the number of people living in the household (1 = *one person* to 6 = *six or more people*), and the annual household income (1 = *less than €4,600* to 27 = *€310,700 or more*).

Parenting styles

To assess responsive parenting and inconsistent parenting, parents completed the responsiveness and inconsistency dimensions of the Parenting Dimensions Inventory–Short Version (Power, 2002), a reliable and valid instrument for use with parents (PDI-S; Power, 2002). Four items were used to assess responsive parenting (e.g., "I encourage my child to talk about his/her problems") and four items were used to assess inconsistent parenting (e.g., "My child can often persuade me to give lighter punishments than I had intended"). Items were assessed on a scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). Responses to the items were averaged to create scales of responsive parenting ($\alpha = .77$, $M = 5.12$, $SD = 0.61$) and inconsistent parenting ($\alpha = .71$, $M = 2.30$, $SD = 0.81$), with higher scores indicating more responsiveness and inconsistency, respectively.

Parenting stress

The Parenting Stress Index, a reliable and validated instrument for use among parents of children up to 14 years (De Brock, Vermulst, Gerris, & Abidin, 1992), was used to assess parents' level of parenting stress. On a scale that ranged from 1 (*completely disagree*) to 5 (*completely agree*), participants rated five items, for instance, "I have much more trouble raising my children than I had expected." Responses to the items were averaged to create a parenting stress scale ($\alpha = .86$, $M = 1.80$, $SD = 0.64$), with higher scores indicating more parenting stress.

Child social-emotional difficulties

To assess children's social-emotional difficulties, parents completed the subscales of hyperactivity (five items; e.g., "My child is restless, overactive, and cannot stay still for long"), emotional problems (five items; e.g., "My child has a lot of worries, often worries about things"), and conduct problems (five items; e.g., "My child often has temper-tantrums or anger outbursts") from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Parents indicated how true each statement was for their child (0 = *not true*, 1 = *somewhat true*, and 2 = *certainly true*). Responses to the items were summed to create scales of hyperactivity ($\alpha = .81$, $M = 3.49$, $SD = 2.52$), emotional problems ($\alpha = .68$, $M = 1.71$, $SD = 1.91$), and

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Table 1 Factor Loadings for Confirmatory Factor Analysis of Parental Mediation Items and Construct Reliability Estimates

	Restrictive Mediation				Negative Active Mediation				Positive Active Mediation			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
1. How often do you forbid your child to watch certain TV programs or movies?	.60	.63	.54	.65								
2. How often do you tell your child that s/he is not allowed to play a certain computer game?	.74	.85	.79	.82								
3. How often do you forbid your child to watch television programs or movies that contain violence?	.74	.80	.72	.73								
4. How often do you tell your child that s/he is not allowed to play violent computer games?	.87	.82	.88	.84								
5. How often do you tell your child that certain things in a television program or movie are wrong?					.69	.67	.61	.59				
6. How often do you explain your child that things that happen in computer games are often not possible in real life?					.79	.73	.78	.75				
7. How often do you explain your child that violence in real life often hurts more than is shown in computer games?					.74	.77	.80	.81				
8. How often do you tell your child that s/he is not allowed to imitate the fighting in television programs or computer games?					.70	.70	.71	.68				
9. How often do you encourage your child to									.79	.83	.76	.82

(*Continued*)

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Table 1 Continued

	Restrictive Mediation				Negative Active Mediation				Positive Active Mediation			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
play an educational computer game?												
10. How often do you stimulate your child to watch an educational program or DVD?									.64	.72	.68	.76
11. How often do you encourage your child to play a certain game because it is good for his/her cognitive development?									.88	.79	.92	.86
12. How often do you encourage your child to watch a certain program or DVD because it is good for his/her emotional or social development?									.77	.91	.77	.89
Cronbach's α	.84	.86	.85	.87	.83	.81	.82	.79	.86	.87	.89	.89

Note. All factor loadings are significant at $p < .001$. W = wave.

conduct problems ($\alpha = .61$, $M = 1.53$, $SD = 1.56$), with some items requiring reverse coding. Higher scores indicate more hyperactivity, emotional problems, and conduct problems, respectively.

Statistical analyses

To investigate the hypotheses and research questions guiding this study, we used an accelerated longitudinal design, also called a cohort-sequential design. This design allows to investigate development over age instead of over measurement occasion, and estimate a common developmental trajectory. By using data of different age cohorts and linking together the data of adjacent age cohorts, the developmental trajectory of parental mediation can be tracked across the full age range of children (i.e., 3 to 10 years). The current study included children from five age cohorts, who were followed for four years: 3-year-olds ($n = 122$), 4-year-olds ($n = 141$), 5-year-olds ($n = 153$), 6-year-olds ($n = 138$), and 7-year-olds ($n = 175$). With this accelerated design, developmental trajectories between the ages of 3 years (i.e., age of the youngest age cohort at the start of the study) and 10 years (i.e., age of the oldest age cohort at the end of the study) could be estimated. The developmental trajectories were estimated using multiple group multiple cohort growth

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modeling using Mplus (Version 7.11, Muthén & Muthén, 2015) following the procedure outlined by Muthén and Muthén (2015). The multiple group approach considers the age cohorts as separate groups. The child's birth year was used as the grouping variable.

In the first step of the analyses, we examined developmental trajectories (H1a-c). Separate models were specified for each of the three types of mediation (i.e., restrictive mediation, negative active mediation, and positive active mediation). Specifically, for each type of mediation, we specified an unconditional model where the initial level of parental mediation (intercept) and the rate of change of parental mediation over time (slope) were modelled. First, we examined the possibility of linear trajectories by including a linear slope in each of these models. Next, we examined the possibility of curvilinear trajectories by adding a quadratic slope to each of the three models. A graphical presentation of the models is shown in Figure 1. For each type of mediation, we compared the values of the Bayesian information criterion (BIC) of the model with the linear slope to the BIC values of the model with the quadratic slope in order to assess whether adding the quadratic slope provided a better model fit. Lower BIC values were indicators of better fit.

In the second step, we examined predictors of the trajectories (RQ1 and RQ2), including demographic factors, parenting style (i.e., responsive and inconsistent parenting), parenting stress, and child social-emotional difficulties (i.e., hyperactivity, emotional problems, and conduct problems). In each model, we added the proposed predictors, as measured at the first wave of data collection, to predict the initial level (i.e., intercept) and the development (i.e., slope) of parental mediation, by regressing the intercept and slope factors onto the predictors. All measures were included in the models as observed constructs. All models were estimated using full information maximum likelihood (FIML) estimation with robust standard errors (MLR; Muthén & Satorra, 1995). Robust clustering was used to account for the clustered nature of the data (i.e., sibling pairs).

Results

Descriptive statistics

Results showed that, across all children and all data waves, parents most often reported using positive active mediation ($M = 2.75$, $SD = 0.59$), followed by negative active mediation ($M = 2.67$, $SD = 0.56$), and restrictive mediation ($M = 2.05$, $SD = 0.59$). In addition, all three types of parental mediation were significantly and positively intercorrelated at all four waves, with r values of .33 to .45 for restrictive mediation and negative active mediation; .16 to .32 for restrictive mediation and positive active mediation; and .41 to .51 for negative and positive active mediation. Finally, each type of mediation was significantly correlated over time, with r values of .35 to .53 for restrictive mediation; .38 to .61 for negative active mediation; and .44 to .62 for positive active mediation.

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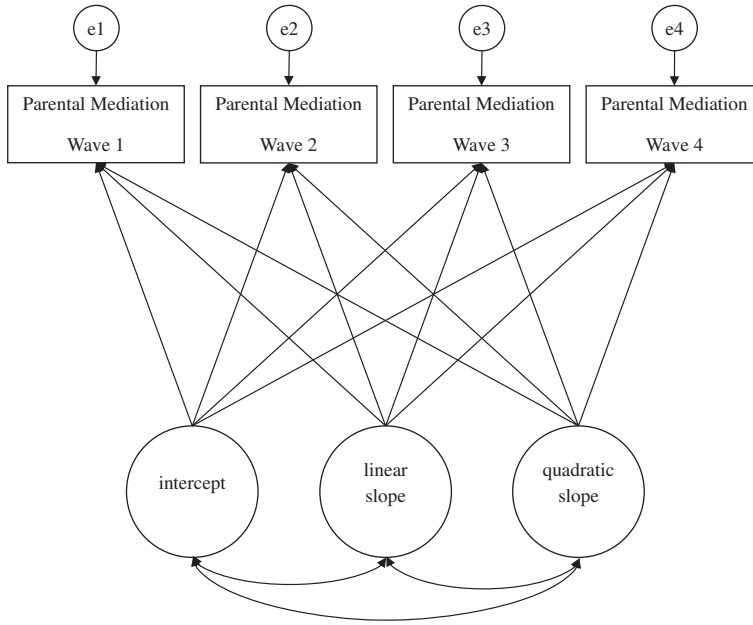

Figure 1 Graphical presentation of the growth model with linear and quadratic slopes.

Developmental trajectories

Restrictive mediation

To investigate the developmental trajectory of restrictive mediation (H1a), we first tested a growth model with a linear slope. The results showed that the model did not fit the data well (CFI = .87; TLI = .91; RMSEA = .10, 90% CI = .07–.12), suggesting that there was no evidence for a linear development. Next, we added a quadratic slope to the model to investigate the possibility of a curvilinear trajectory. The model fit the data well (CFI = .93; TLI = .95; RMSEA = .07, 90% CI = .04–.10), suggesting a curvilinear development. The BIC value of the model with the quadratic slope (6142.44) was lower than the BIC value of the model with the linear slope (6155.95), indicating that the model with the quadratic slope is preferred. As such, we further interpreted the estimates of the model with the quadratic slope.

As indicated by the mean of the intercept, the initial level of restrictive mediation (i.e., at age 3) was 1.86 (range 1–4; $SE = 0.07$, $p < .001$). There were significant changes in restrictive mediation over time, as indicated by a significant slope mean ($B = -.02$, $SE = 0.00$, $p < .001$). This indicates that restrictive mediation follows a curvilinear development over time. As shown in Figure 2, the initial level of restrictive mediation gradually increases over time (age 4: $M = 1.88$, $SD = 0.85$; age 5: $M = 1.96$, $SD = 0.83$; age 6: $M = 2.04$, $SD = 0.78$) and peaks at age 7 ($M = 2.16$, $SD = 0.73$) before gradually decreasing (age 8: $M = 2.13$, $SD = 0.71$; age 9: $M = 2.12$, SD

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= 0.69; age 10: $M = 2.06$, $SD = 0.73$). Frequencies showed that few parents sometimes or often restrict their child's media use: 16% at 3 years, 18% at 4 years, 18% at 5 years, 19% at 6 years, 21% at 7 years, 20% at 8 years, 18% at 9 years, and 18% at 10 years.

The intercept variance ($B = 0.36$, $SE = 0.13$, $p = .006$) was significant, indicating that individual differences exist in the initial level of restrictive mediation. The slope variance ($B = 0.00$, $SE = 0.00$, $p = .15$) was not significant, suggesting that no individual differences exist in the development over time. To investigate predictors of the trajectory of restrictive mediation (RQ1 and RQ2), we added the demographic factors (i.e., parent's sex, parent's education level, child's sex, the number of people living in the household, and household income), parenting styles (i.e., responsive and inconsistent parenting), parenting stress, and child social-emotional difficulties (i.e., hyperactivity, emotional problems, and conduct problems) to the model in order to predict the intercept and slope factors. The model fit the data well (CFI = .90; TLI = .89; RMSEA = .05, 90% CI = .03–.06). Parent's education level ($\beta = .12$, $B = 0.08$, $SE = 0.03$, $p = .007$), the number of people in the household ($\beta = .23$, $B = 0.16$, $SE = 0.05$, $p = .003$), child's sex ($\beta = -.39$, $B = -0.27$, $SE = 0.06$, $p < .001$), and child's emotional problems ($\beta = .06$, $B = 0.04$, $SE = 0.02$, $p = .015$) significantly predicted the intercept, such that more educated parents, parents living in larger households, parents of boys, and parents of children with more emotional problems reported higher levels of restrictive mediation at age 3. No other parent or child characteristics significantly predicted the intercept.

Although the slope variance was not significant, results indicated that a child's emotional problems ($\beta = -.03$, $B = -0.00$, $SE = 0.00$, $p = .031$) and hyperactivity ($\beta = .03$, $B = 0.00$, $SE = 0.00$, $p = .004$) significantly predicted the slope factor, pointing at differences in the development of restrictive mediation over time. Specifically, the curvilinear trend in restrictive mediation is less pronounced for children with heightened emotional problems and more pronounced for children with increased hyperactivity. No other parent or child characteristics significantly predicted the slope.

Negative active mediation

To investigate the developmental trajectory of negative active mediation (H1b), we first tested a growth model with a linear slope. The results revealed that the model did not fit the data well (CFI = .89; TLI = .93; RMSEA = .11, 90% CI = .09–.13), suggesting that there was no evidence for a linear development. Next, we added a quadratic slope to the model to investigate the possibility of a curvilinear trajectory. The model fit the data well (CFI = .94; TLI = .96; RMSEA = .08, 90% CI = .06–.11), suggesting a curvilinear development. The BIC value of the model with the quadratic slope (5300.74) indicated a better fit than the BIC value of the model with the linear slope (5327.48), indicating that the model with the quadratic slope is preferred. As such, we further interpreted the estimates of the model containing the quadratic slope.

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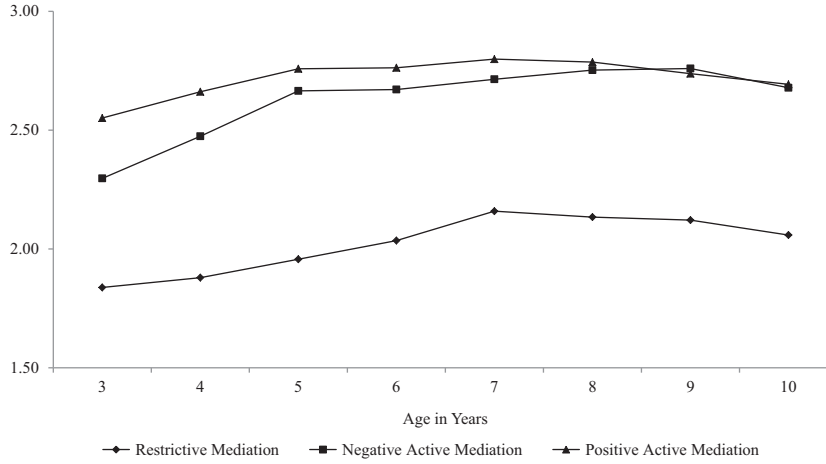

Figure 2 Means of restrictive mediation, negative active mediation, and positive active mediation, from ages 3 to 10 years.

The results showed that, with a value of 2.31 ($SE = 0.06$, $p < .001$), the initial level of negative active mediation (i.e., at age 3) was higher than for restrictive mediation. The results also revealed significant changes in the level of negative active mediation, as indicated by a significant slope mean ($B = -0.02$, $SE = 0.00$, $p < .001$). Similar to restrictive mediation, negative active mediation follows a curvilinear development over time. As shown in Figure 2, the initial level of negative active mediation gradually increases over time (age 4: $M = 2.47$, $SD = 0.85$; age 5: $M = 2.67$, $SD = 0.73$; age 6: $M = 2.67$, $SD = 0.70$; age 7: $M = 2.71$, $SD = 0.65$; age 8: $M = 2.75$, $SD = 0.64$) and reaches its peak at age 9 ($M = 2.76$, $SD = 0.66$) before gradually decreasing (age 10: $M = 2.68$, $SD = 0.65$). Frequencies showed that around one-third to half of the parents sometimes or often use negative active mediation: 29% at 3 years, 38% at 4 years, 46% at 5 years, 44% at 6 years, 46% at 7 years, 38% at 8 years, 44% at 9 years, and 43% at 10 years.

Both the intercept variance ($B = 0.36$, $SE = 0.04$, $p < .001$) and slope variance ($B = 0.00$, $SE = 0.00$, $p < .001$) were significant, suggesting that individual differences exist in the initial level of negative active mediation and its development over time. To investigate predictors of the trajectory of negative active mediation (RQ1 and RQ2), we added the proposed predictors to the model to predict the intercept and slope factor. The model fit the data well (CFI = .94; TLI = .94; RMSEA = .04, 90% CI = .03–.06). Child's sex ($\beta = -.53$, $B = -0.32$, $SE = 0.06$, $p < .001$) and responsive parenting ($\beta = .47$, $B = 0.28$, $SE = 0.06$, $p < .001$) significantly predicted the intercept, indicating that parents of boys and parents with a more responsive parenting style reported higher levels of negative active mediation when children were 3 years old. No other parent or child characteristics significantly predicted the intercept and none of the parent or child characteristics significantly predicted the slope factor.

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Positive active mediation

To investigate the developmental trajectory of positive active mediation (H1c), we first tested a growth model with a linear slope. The results revealed that the model (CFI = .96; TLI = .98; RMSEA = .06, 90% CI = .03–.09) fit the data well, suggesting that there was evidence for a linear development. Next, we added a quadratic slope to the model to investigate the possibility of a curvilinear trajectory. The model fit the data well (CFI = .99; TLI = .99; RMSEA = .04, 90% CI = .00–.07), suggesting a curvilinear development. The BIC value of the model with the quadratic slope (5587.55) was lower than the BIC value of the model with the linear slope (5601.55), indicating that the model with the quadratic slope is preferred. As such, we further interpreted the estimates of the model containing the quadratic slope.

The results showed that the initial level of positive active mediation (i.e., at age 3) was 2.59 ($SE = 0.06$, $p < .001$), which is higher than for the other types of mediation. The results also revealed significant mean changes in parents' level of positive active mediation, as indicated by a significant slope mean ($B = -0.01$, $SE = 0.00$, $p < .001$). This indicates that, similar to restrictive mediation and negative active mediation, positive active mediation follows a curvilinear development over time. As shown in Figure 2, the initial level of positive active mediation gradually increases over time (age 4: $M = 2.66$, $SD = 0.79$; age 5: $M = 2.76$, $SD = 0.80$; age 6: $M = 2.76$, $SD = 0.73$) and reaches its peak at age 7 ($M = 2.80$, $SD = 0.70$) before gradually decreasing (age 8: $M = 2.79$, $SD = 0.69$; age 9: $M = 2.74$, $SD = 0.68$; age 10: $M = 2.69$, $SD = 0.72$). Frequencies showed that about half of the parents sometimes or often use positive active mediation: 43% at 3 years, 51% at 4 years, 52% at 5 years, 53% at 6 years, 56% at 7 years, 56% at 8 years, 53% at 9 years, and 55% at 10 years.

Both the intercept variance ($B = 0.34$, $SE = 0.04$, $p < .001$) and slope variance ($B = 0.00$, $SE = 0.00$, $p = .001$) were significant, suggesting that individual differences exist in the initial level of positive active mediation and its development over time. To investigate predictors of the trajectory (RQ1 and RQ2), we added the proposed predictors to the model to predict the intercept and slope factor. The model fit the data well (CFI = .97; TLI = .97; RMSEA = .03, 90% CI = .00–.05). Parent education ($\beta = -.11$, $B = -0.06$, $SE = 0.03$, $p = .022$) and responsive parenting ($\beta = .36$, $B = 0.20$, $SE = 0.08$, $p = .008$) significantly predicted the initial level of positive active mediation, with less educated parents and parents with a more responsive parenting style reporting higher levels of positive active mediation when children were 3 years old. No other parent or child characteristics significantly predicted the intercept. Finally, children's emotional problems ($\beta = .12$, $B = 0.00$, $SE = 0.00$, $p = .015$) significantly predicted the development of positive active mediation over time. In particular, the curvilinear trend is more pronounced for children with more emotional problems. No other parent or child characteristics significantly predicted the slope.

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Discussion

Despite a large body of literature on the opportunities of parental mediation to enhance positive and offset negative media effects, we surprisingly lack a long-term view as to the development of such mediation throughout childhood. While scholars have examined the development of parental mediation throughout adolescence (Opgenhaffen et al., 2012; Padilla-Walker et al., 2012; Sang et al., 1992, 1993), the literature has thus far omitted this perspective during early and middle childhood. To address this gap, the current study investigated developmental trajectories of restrictive and active mediation targeted at children in early (3–6 years) and middle childhood (7–10 years), as well as individual differences in this development.

Parental mediation in early and middle childhood

Our results revealed that, across early and middle childhood, few parents engage in restrictive mediation. For instance, only about 20% of parents reported that they sometimes or often restrict their children's media use. This is less surprising than it might be at first sight. After all, especially in early childhood, parents are still the main gatekeepers of their children's media diets. Due to this parental gatekeeping (which is, in fact, implicit restriction), restriction may be less needed than among preadolescents and early adolescents. Our results also showed that parents seem to use active mediation (especially positive active mediation) more frequently than restrictive mediation, a finding that resembles the findings of previous studies (e.g., Bybee et al., 1982; Valkenburg et al., 1999; but see Böcking & Böcking, 2009; Warren, 2003). For instance, about half of the parents reported that they sometimes or often actively encourage positive content and one-third to half of the parents reported that they sometimes or often actively discourage negative content. The predominance of (positive) active mediation may potentially reflect the increasing emphasis parents place on informal learning in early and middle childhood, along with the wide availability of educational programs directed at young children. Finally, our findings showed that parents generally do not exclusively use one type of mediation. Instead, as indicated by the significant, positive correlations between all three mediation strategies, most parents seem to use the three different mediation styles simultaneously.

Importantly, as predicted by developmental parental mediation theory, our results also showed that restrictive mediation, as well as both types of active mediation, show a curvilinear pattern across early and middle childhood, whereby parents' mediation efforts increase across early childhood (3–6 years), peak at the onset of middle childhood (around age 7 to 9), before slowly declining again. The curvilinear trend suggests that parents adapt their mediation efforts to match their child's developmental level, as well as their changing media preferences and susceptibility to media effects.

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Specifically, parents' increasing efforts to engage in restrictive and negative active parental mediation throughout early childhood may reflect a response to children's heightened susceptibility to fantasy content at this stage, caused by children's inability to separate reality from fantasy in media content. In addition, it suggests that parents notice their children's increasing preferences for violent, action-packed media content at the end of early childhood (Cantor & Nathanson, 1997) and are aware of the potential negative effects that such content likely evokes, such as fear responses and aggressive behavior.

At the same time, parents increase their positive mediation efforts. This may reflect two different processes, depending on the child's developmental stage. At the beginning of early childhood, parents may increase their positive active mediation efforts as a response to children's preference for educational content, trying to stimulate the positive outcomes of such content. At the end of early childhood, parents may notice that children become less interested in educational content (Rideout, 2014) and more interested in violent and action-packed content (Cantor & Nathanson, 1997). Parents may respond to this media preference by further increasing their positive active mediation efforts in order to guide their children to educational rather than violent media content.

The gradual decline in restrictive and active parental mediation throughout middle childhood also reflects the assumptions of developmental parental mediation theory. Because at this stage parents may start to perceive their children as more autonomous, more skilled media users, and as less susceptible to media effects, they may reduce their mediation efforts. And besides reflecting a growing recognition of the child's autonomy, this decline may also reflect a broader loss of interaction among parents and children at this stage (Collins et al., 2002). Future research may investigate the validity of these explanations.

Parent and child demographics as predictors of parental mediation

Our study clearly suggests that different parents engage in different forms of mediation to different degrees. Although not as robust as we might have expected based on the literature, child's sex did influence parental mediation, such that parents of boys were more likely to engage in restrictive and negative active mediation in early childhood. It has often been found that boys in this age group are more interested in violent, action-packed media content than girls (Valkenburg & Janssen, 1999), and it is thus well possible that parents respond to this specific media preference of boys. Besides parents of boys, highly educated parents and parents with more children are also more likely to restrict content. Both findings echo previous findings. Nikken and Schols (2015), for example, similarly found that larger households tend to opt for restriction more often than smaller households (and for other types of mediation). In addition, several studies have demonstrated that highly-educated parents tend to engage in more media restriction (Böcking & Böcking, 2009; Gentile et al., 2012; Valkenburg et al., 1999).

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Going beyond demographics

Beyond demographics, we also asked whether other parent or child characteristics may influence the expression of parental mediation over time. Our results showed that parents who rely on a more responsive parenting style are more likely to engage in positive and negative active mediation. This is consistent with Nathanson's (2015) explanation that highly-involved parents, who are typically more responsive (Baumrind, 1991), are more comfortable interacting with their child and able to attune their parenting behaviors to their child's unique needs. Parental responsiveness is certainly an inherent attribute of active mediation and, as such, it makes sense that responsive parents are most likely to rely on active mediation.

Contrary to the suggestions in earlier studies (Evans et al., 2011), parenting stress was unrelated to any parental mediation effort. As such, our findings suggest that how parents approach their parenting (i.e., in a responsive way) matters more for how they mediate children's media use than how stressed they feel. However, we measured stress with rather global items, such as "I have much more trouble raising my children than I had expected." It is well possible that more specific, day-to-day stresses that parents experience do affect their mediation efforts in more dynamic ways. Future studies may need to elaborate on our findings and investigate the predictive value of more sensitive measures of parental stress. Likewise, more fine-grained methods, such as the experience sampling method, could investigate whether certain mediation efforts are more pronounced on stressful days.

Moving beyond parent characteristics, we also found evidence that child characteristics influence parents' mediation efforts. Specifically, in the context of restrictive mediation, we found that parents of children with more emotional problems (e.g., fearful, worried) are more likely to engage in restrictive mediation. While this may reflect parents' tendency to be more restrictive in their general parenting strategies with children who experience emotional problems (Kochanska et al., 2004; Lee et al., 2013), it may also imply that parents of such children more often believe that media content can exacerbate these problems. For example, highly emotional children may experience media content more intensely (Pearce & Field, 2016) and, as a result, parents may need to engage in more restrictive mediation to protect their children and meet their unique social-emotional needs.

Importantly, we found that social-emotional challenges were not only associated with the initial level of restrictive mediation, but also influenced how it unfolds over time. Specifically, the heightened restriction for very young children with more emotional problems tends to taper off somewhat with time, perhaps in response to children's improved ability to deal with potentially arousing and fearful media content over time. This change is accompanied by an increased likelihood of parents to encourage positive media content, providing additional support to the argument that parents augment their mediation strategies to map onto their child's unique developmental needs.

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Finally, we found that parents of children with higher levels of hyperactivity more strongly increase their efforts to restrict media content throughout childhood. A growing body of scholarship suggests that hyperactive children may be particularly attracted to fast-paced and violent media content (e.g., Ansari & Crosnoe, 2016) and that these children tend to fare better with explicit rules (Barkley, 2013). The increase in restrictive mediation among these children provides additional evidence that parental mediation is part of a transactional process that is attuned to the specific developmental and socio-emotional needs of the child.

In order to understand individual differences in the expression and development of parental mediation in childhood, the current study focused on factors that were highlighted by previous research. Of course, one can imagine a host of additional variables that may explain such individual differences. For instance, the frequency of children's media use, parents' own media use (Shin & Li, 2017), parents' and children's media-related skills and media literacy (Livingstone et al., 2017), and the extent to which parents work together to mediate children's media use (Mares, Stephenson, Martins, & Nathanson, 2018) may all influence parents' mediation efforts and how they develop over time. Besides these media-specific factors, more general factors, such as parental availability and involvement (Warren, 2001; Warren et al., 2002) and family communication (Warren, 2001), likely play a role as well. Furthermore, one can similarly imagine that the patterns identified in this study may differ in other cultures throughout the world (Livingstone et al., 2017). As such, the current study may act as a stepping stone to more nuanced and specific questions.

Conclusion

The current study is, to our knowledge, the first study to track the development of parental mediation throughout childhood. We found that active mediation is more common than restrictive mediation in both early and middle childhood, and that these behaviors seem to follow a curvilinear trend across childhood, with a peak at around ages 7 and 9. We also found that parental mediation strategies are not homogenous across families, with parenting styles and children's emotional problems being important sources of individual differences, above and beyond demographics. By expanding the assumptions of parenting theories to the domain of parental mediation, we hope that the current study has set the stage for a developmental parental mediation theory.

A further validation of developmental parental mediation theory is warranted. There are certainly opportunities to expand this work to study the development of mediation into adolescence, as called upon by other scholars (Collier et al., 2016; Coyne et al., 2017). Relatedly, it would also be interesting to study whether there are changes in how parents mediate. Researchers have suggested that it is not mediation per se that matters, but rather how this mediation is enacted (Valkenburg et al., 2013). Just as how often parents engage in parental mediation changes over time,

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how they engage in it may change as a function of children's developmental skills, media preferences, and susceptibility to media influences. All in all, we hope that our findings inspire other scholars to continue this work by tracking more nuanced and specific expressions of parental mediation over time, so that we can best understand the home media environment of young people today.

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