

## Measuring Mediation of Children’s Media Use

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This study presents the development of a new scale for measuring mediation of children’s noninteractive and interactive media use by their caregivers. Comprising two subscales, this 16-item measure was tested in a pilot study and then included in an online survey of 356 grandparents. The mediation constructs had good internal homogeneity, significant interconstruct correlations, and high loadings on a single latent factor for each subscale. Scores were well distributed along the range. A concurrent validity test indicated a significant negative association between attitudes toward media and restrictive mediation. These findings suggest that the new scale is reliable and useful.

*Keywords: children, mediation, media use, scale development*

The role parents might play in the mediation of children’s media use has been a topic of intensive academic inquiry for some time. Given the ongoing public and scholarly concern over the effects of media on children’s development and well-being, mediation practices are understood to offer means of minimizing negative effects and maximizing positive ones (Lemish, 2015). Numerous studies conducted during the past two decades have found that parental mediation of media use can facilitate children’s allocation of cognitive resources and learning; contribute to their management of affect arousal; strengthen familial interpersonal relationships; mitigate negative media effects such as aggression, substance abuse, and risky sexual behaviors; and provide overall support for children’s healthy cognitive, social, and emotional development (e.g., Austin, Bolls, Fujioka, & Engelbertson, 1999; Barkin et al., 2006; Clark, 2011; Collier et al., 2016; Nathanson, 1999; Pempek & Lauricella, 2017;

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Rasmussen, Keene, Berke, Densley, & Loof, 2017; Valkenburg, Krcmar, Peeters, & Marseille, 1999; Warren, 2003).

In addition to the mediation outcomes, the mediation strategies themselves have become a focus of systematic empirical inquiry over the years. A milestone publication that set the stage for much of the research in this area was published in 1999, focusing on the mediation of television viewing (Valkenburg et al., 1999). Inspired by this study, research conducted since then has approached mediation of screen viewing through three mediation scales: restrictive mediation, instructive mediation, and social covieing. Following the rapid adoption of digital media by children and adolescents, parental mediation has been expanded to include some new strategies, such as supervision, monitoring, and co-use (Livingstone & Helsper, 2008; Sonck, Nikken, & De Haan, 2013).

Despite the above measures and the extensive efforts invested in developing mediation scales, we still lack standardized scales that would similarly and concurrently measure mediation strategies applying to both noninteractive use of media—namely, viewing audiovisual content via various screen types—and interactive use for playing, learning, and/or communicating. Moreover, as the existing measures were developed exclusively for studies of parents, we know very little about mediation by other formal and informal caregivers, such as nannies, kindergarten teachers, grandparents, and older siblings. These mediators are especially important in the case of toddlers and preschoolers who lack the crucial cognitive, technical, and social skills needed for quality media use and better understanding of media content (Livingstone, Haddon, Görzig, & Ólafsson, 2011). In the present study, we sought to fill these gaps by extending research on mediation of children’s media use in two important directions: shifting from separate to concurrent examination of noninteractive and interactive media use and expanding assessment of mediation from measures designed for parents to those suiting other caregivers, such as grandparents.

### **Existing Mediation Scales**

Valkenburg and colleagues’ (1999) seminal study outlines three key strategies of television viewing mediation: restrictive mediation, instructive (also known as *active*) mediation, and social covieing. Parents engaged in restrictive mediation set rules for viewing or prohibit the viewing of certain content, instructive mediation refers to parental discussion of certain aspects of programs with children during or following viewing, and covieing describes situations in which parents and children share the viewing experience without necessarily discussing it.

With the advance of the Internet and its growing presence in children’s and adolescents’ lives, researchers have begun to suggest new mediation strategies. One pioneer study in this field by Livingstone and Helsper (2008) claims that Internet use is highly different from television viewing and consequently demands development of new parental mediation categories. Their findings point to a new strategy of “active co-use” that contains a mixture of practices previously included in instructive mediation, restrictive mediation, and covieing, as well as to a “monitoring” strategy that consists of checking children’s online activities following computer use.

Other researchers, however, have found no confirmation for the “active co-use” mediation strategy identified by Livingstone and Helsper (2008) and even argued that existing mediation strategies apply to television viewing and digital media alike (Li & Shin, 2017; Nikken & Jansz, 2014; Nikken & Schols, 2015; Smahelova, Juhová, Cermak, & Smahel, 2017; Sonck et al., 2013). Indeed, four mediation strategies appeared as meaningful constructs in most of these studies, three of which are similar to television viewing strategies: restrictive mediation, instructive/active mediation, and co-use. Furthermore, these studies suggest a new category of mediation—supervision—that includes parents’ attempts to remain in the child’s proximity when he/she engages in media use and to keep an eye on the screen.

### **Limitations of Existing Scales**

While acknowledging the previous studies’ valuable attempts at developing scales for more accurate measurement of parental mediation in the current media environment, several disparities have been noted and should be addressed. First, although screen viewing is widespread among children, studies that simultaneously measured mediation strategies of noninteractive screen viewing and interactive media use are scarce. The only two studies that partially deal with this challenge were conducted by Connell, Lauricella, and Wartella (2015) and Beyens, Valkenburg, and Piotrowski (2018). The first measured coviewing versus co-use of digital media, but did not refer to other mediation strategies, whereas the second was limited to two types of mediation (restrictive and instructive) and related to two specific media (television and computer games) rather than general types of media use (interactive and noninteractive). Despite these limitations, these studies supported the claim that mediation of different types of media use can be measured with similar tools, calling for the development of a scale that could be applied equally to noninteractive and interactive media uses.

Another concern is the attempt to use one scale to measure mediation of all electronic media uses, as employed recently in a study by Nikken and Schols (2015). Such measurement disregards the substantial differences in parents’ media literacy, their technical skills, and even their beliefs regarding the positive and negative effects of noninteractive and interactive media uses, which could result in major variability in applying mediation strategies across them. For example, parents might be restrictive regarding noninteractive use such as television viewing, but at the same time permissive toward interactive media use such as playing computer games. Thus, they could find it difficult to evaluate their application of restrictive mediation along a single scale. For a brief summary of studies that have made meaningful attempts in developing mediation scales, see Table 1.

**Table 1. Summary of Existing Scales.**

Scale	Type of media		Type of mediation				Reliability and validity tests
	Noninteractive	Interactive	Restrictive	Instructive/active	Supervision	Co-use	
Valkenburg et al., 1999	X		X	X			PCA + Cronbach's alpha
Livingstone & Helsper, 2008		X	X	X		X	Exploratory FA + Cronbach's alpha
Sonck et al., 2013		X	X	X	X		PCA + Cronbach's alpha
Nikken & Jansz, 2014		X	X	X	X	X	PCA + Cronbach's alpha
Connell et al., 2015 <sup>a</sup>	X	X					Not applicable
Nikken & Schols, 2015 <sup>b</sup>			X	X	X	X	PCA + confirmatory FA + Cronbach's alpha
Beyens et al., 2018	X	X	X	X			Cronbach's alpha

Note. PCA = principal component analysis; FA = factor analysis; X = particular medium or mediation style was examined in the study.

<sup>a</sup>No attempt to create a new scale but the first to distinguish between types of use.

<sup>b</sup>No distinction between types of media.

Besides the limitations listed above, existing reports of scale developments suggest that methods to ensure the scales' reliability and validity were only partially applied. The one exception is a study by Valkenburg, Piotrowski, Hermanns, and de Leeuw (2013), but their scale focuses on adolescents' perceptions about parental media mediation. So far, no study that proposes a measure of mediation has reported a complete procedure that includes all analyses required, namely, content validity, internal consistency, factorial validity, and concurrent validity. Furthermore, none has included the basic required steps, such as conducting a pilot study and/or checking whether the scores are distributed normally. It is possible, however, that such tests were conducted but not described, as the reports concerning them were included in articles focusing on empirical results rather than scale development.

Finally, it is uncertain whether existing scales can be applied to caregivers other than parents who mediate children's media uses. Previous studies on mediation strategies have tested scales on parents only, ignoring the important mediating role that could be played by many other caregivers, such as older siblings, nannies, and grandparents. These mediators are of particular significance in the case of young children, who are dependent on adults and older siblings for mediation of content, uses, and technical skills (Nikken & Jansz, 2014).

### **The Present Study**

The present study thus aims at developing a holistic scale for measuring mediation of children's media uses. Inspired by the most common scales in recent studies of parental mediation, the scale includes the four main mediation strategies identified in these studies, namely, restrictive mediation, instructive mediation, supervision, and co-use. For the first time, we examine all of these strategies separately with regard to noninteractive and interactive media uses. Moreover, the new scale was tested with grandparents of young children, thus expanding the literature to include other significant mediators, as well as in applying mediation of both noninteractive and interactive media uses to young children.

### **Method**

#### ***Scale Development***

Following the abovementioned limitations of existing scales, we developed a new measure to include children's noninteractive viewing of audiovisual content via all screen types (i.e., TV, computers, tablets, and smartphones) as well as their interactive use of various media for playing, learning, and/or communicating with others. Designed for use with various caregivers, the scale describes the four principal mediation strategies identified in previous research discussed above. Monitoring use by checking the device afterward was not included because this strategy does not apply to all media and all children's ages (Livingstone & Helsper, 2008) and its legitimacy is questionable considering the potential infringement of children's privacy (Livingstone & Bober, 2006).

After careful cross-checking of existing parental mediation measures, we identified the statements used most frequently in the previous studies, revealing consistent results. Consequently, we were able to limit our scale to two statements aimed at assessing each mediation strategy for each type of media use—noninteractive and interactive use—yielding two subscales of eight items in each, for a total of 16 items. Some items were taken from the abovementioned scales with minor adaptation. For example, the co-use item "use the media together because the child wants to" (Nikken & Schols, 2015) was rephrased as "watch something together on a screen that the child wants to watch" for the noninteractive use subscale and "do something together with a media device that the child wants to do" for the interactive use subscale. Other items, however, were original and were based on recapitulation of previous measures. For example, the numerous items relating to media use restrictions in previous scales were summarized into time and content restrictions, and items referring to instructive mediation were condensed to specific and general instruction. This approach resulted in a relatively short scale that can be incorporated in studies that simultaneously explore other related topics.

Content validity was ascertained in a series of discussions of the scale by a multimethod team that included three communication scholars, two with expertise in children and one who studies older adults. The measurement items were constantly revised based on team members' comments until agreement was attained. The final version was tested in a pilot study with a random sample of 20 grandparents. Participants were asked to rate the frequency in which they were involved in various mediating behaviors when they took care of their grandchildren on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). The pilot study applied a test-retest procedure at a 10-day interval. A series of *t* tests indicated a high level of reliability for all tested variables

( $p > .05$ ). In addition, the Cronbach's alphas for the noninteractive use subscale were .765 in the first wave and .889 in the second; for the interactive use subscale, they were .854 and .974, respectively, leading to the decision to keep all items as they were.

### ***Data Collection and Sample***

The study was based on an online survey of 356 Israeli grandparents of young children (aged two to eight years), who reported taking care of their grandchildren at least once a week. The literature suggests that many grandparents play an active role in caring for young children (Arber & Timonen, 2015; Becker & Steinbach, 2012; Dunifon, 2013; Meyer & Kandic, 2017), and that using various media, such as television, computers, and video games, accounts for a large proportion of the time children spend under their grandparents' supervision (Dunifon, Near, & Ziol-Guest, 2018; Öztürk & Hazer, 2017). Therefore, this population provides a strong illustration of nonparental care of children. To explore mediation of both traditional and new media, however, this study was limited to grandparents who use the Internet.

A commercial firm that operates an online panel of 50,000 Internet users collected the data. Study participants were randomly sampled from panelists 50 years of age and over and were contacted by the firm via e-mail with a link to the survey. Quotas were instituted to ensure that the sample included grandparents of grandchildren at different ages. To prevent repeat participation, each candidate received a one-time personal survey entry code. There were no eligibility requirements for participating in the survey other than being a grandparent of a young child, and participation was anonymous. The institutional review board at the first two authors' university examined and approved the study.

After answering screening questions related to having grandchildren, their age, and the frequency of their grandparental care, participants were presented with a description of the research aims, detailed instructions, and the researchers' contact information. Participants who had several grandchildren in the relevant age range were asked to choose the one with whom they spent the most time and refer to that child only in the survey. Although they were free to withdraw from the study at any time and for any reason, all participants submitted responses and most answered the entire questionnaire. Participants were also invited to contact the researchers with regard to any question they may have had, but none did so.

In the survey itself, the participants were asked to report whether their selected grandchild typically watches films, videos, or TV programs (via TV or the Internet) when they take care of him/her. Participants who answered positively were presented in a random order with the items of the subscale that relate to mediation of noninteractive media use. The same procedure was repeated with regard to interactive media use, defined as "playing computer games, using software or applications, visiting websites (for purposes other than watching videos), and so forth."

Participants were also presented with four media uses common among children of this age group and were asked to report their opinion about the impact each use has on child development on a 5-point Likert scale ranging from 1 (*very harmful*) to 5 (*very beneficial*). Two of the uses were noninteractive (watching TV and YouTube) and two were interactive (playing games and using educational software). Additional demographic and sociodemographic background questions provided information on participants' sex, age, marital status,

education, work status, and monthly income. Another question assessed their self-rated health on a 5-point Likert scale ranging from 1 (*very bad*) to 5 (*very good*).

Participants' ages ranged from 50 to 80 years, with a mean of 62.77 years ( $SD = 5.73$ ); 67.7% were women, 84.6% were married or in steady relationships, 80.3% had some postsecondary education, and 52.2% had an academic degree. Forty-six percent reported having a higher than average income and 30.3% lower than average; 44.7% were retirees and 33.7% worked full time. Thirty-three percent described their health as "very good" and 48.9% described it as "pretty good."

### **Data Analysis**

Data were analyzed in three stages, the first being internal consistency analysis, that explored whether items in each subscale held together as empirical realities. This was accomplished by testing the homogeneity of each of the subscales using internal consistency analysis (McKinnell, 1977). The second stage determined whether the different constructs (pairs of items) were interrelated and whether they were measuring aspects of the same underlying concept of mediation. This was done separately for each subscale by averaging the scores for each construct, correlating them using Pearson's correlation, and then running a confirmatory factor analysis with the construct scores (Wiggins & Bynner, 1993). The distribution, mean, and range of achieved scores of the overall subscale were assessed as well.

Pearson's correlation was used to explore the association between the two subscales, along with an exploratory factor analysis. This analysis applied principal component extraction because this procedure assumes that all of the variance in a measure is potentially explicable by the factors (components) that are derived. The rotation method was Quatrimax rotation with Kaiser normalization as it enabled a clearer interpretation of the factors than Varimax rotation. The accepted factors had an eigenvalue of at least 1.0 and reported factor loadings were at least .5. Finally, to test the concurrent validity of the new measure, we explored the association between study participants' reported involvement in mediating behaviors and their attitudes toward the impacts of media use on child development by performing linear regressions with factor scores as the dependent variables and all background characteristics and attitude scores as the independent variables. Data were analyzed using SPSS v.25 software, with a confidence interval of 95% in all tests.

## **Results**

### **Internal Consistency**

Following data collection, we used Pearson's correlations to explore the associations between items in each construct, and Cronbach's alpha measures were applied to assess the internal consistency of each subscale. Items in all constructs demonstrated positive and significant associations ( $p < .01$ ). The Cronbach's alpha for items composing the noninteractive use subscale was .782; for items in the interactive use subscale, it was .890. Next, each item in turn was omitted from its subscale. As no item elimination resulted in a lower alpha, all items were retained. The Cronbach's alpha for all 16 items together was .916, indicating very high reliability. The final scale is presented in Table 2, along with the average scores for each item.

**Table 2. Items of Subscales and Mean Scores.**

Subscale	Item	Mean (SD)
<b>Noninteractive media use</b>		
Restrictive	Specify when and for how long your grandchild can watch films, videos, and TV programs.	3.86 (1.206)
	Specify in advance what films, videos, and/or programs can be watched.	3.60 (1.433)
Instructive	Talk with your grandchild about a specific content s/he watches on the screen.	3.58 (1.128)
	Talk with your grandchild about films, videos, and TV programs in general.	3.35 (1.171)
Supervision	Stay in the same room and keep an eye on the screen when the child is watching any kind of screen content.	4.18 (1.001)
	Ask the child what he/she is watching.	4.06 (1.063)
Co-use	Watch something together on a screen that your grandchild wants to watch and have you join in.	3.66 (1.036)
	Watch something together on a screen that you want to watch and have your grandchild join in.	2.54 (1.268)
<b>Interactive Media Use</b>		
Restrictive	Specify when and for how long your grandchild can play and/or use software and/or apps.	3.66 (1.327)
	Specify in advance what games, websites, and/or apps can be used.	3.40 (1.473)
Instructive	Talk with your grandchild about something specific s/he does with digital media.	3.38 (1.083)
	Talk with your grandchild about games, websites, and/or app usage in general.	3.25 (1.153)
Supervision	Stay in the same room and keep an eye on the screen when the child uses games, websites, and/or apps.	3.94 (1.149)
	Ask the child what he/she is doing when he/she uses games, websites, and/or apps.	3.46 (1.229)
Co-use	Do something together with a media device that your grandchild wants to do and have you join in.	3.07 (1.189)
	Do something together with a media device that you want to do and have your grandchild join in.	2.77 (1.224)

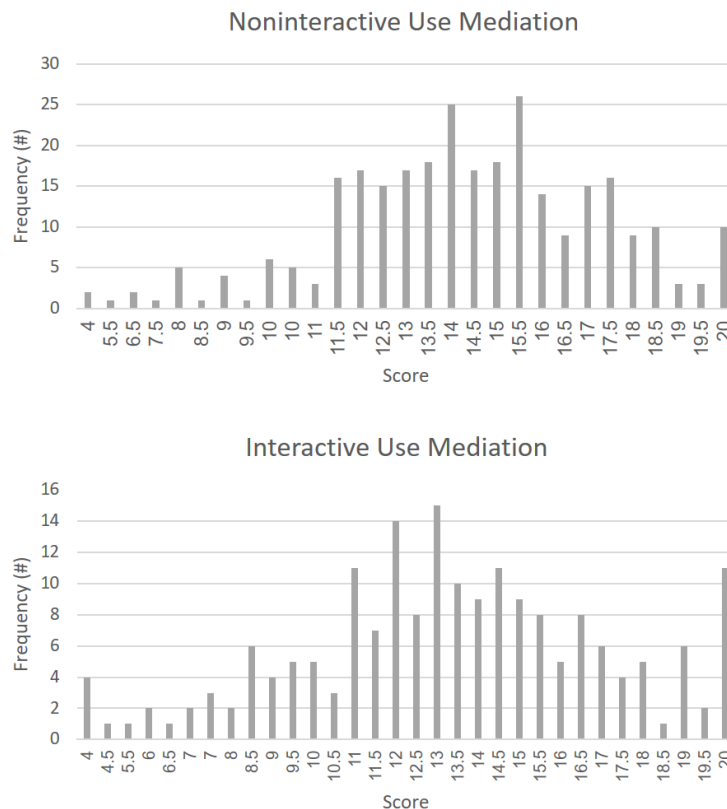
Note. The scale ranged from 1 (*never*) to 5 (*always*).



Overall, results demonstrate that the grandparents in this study were rather involved in various mediating behaviors, as in most cases the average score was higher than 3.0. Nevertheless, some mediating behaviors were more prevalent than others: Whereas supervision appeared to be the most dominant mediation strategy, especially with regard to noninteractive use of media, co-use for something that the grandparents wanted to watch or do was significantly less common.

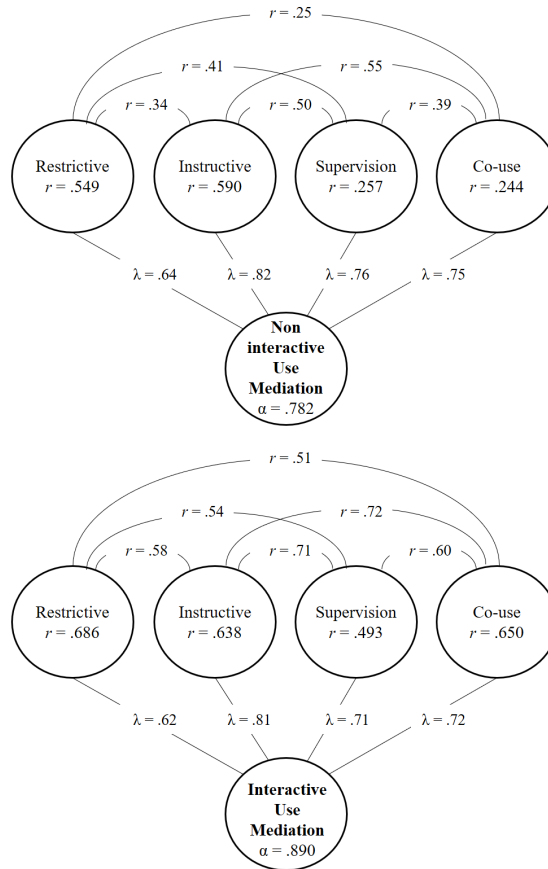
### **Factorial Validity**

A total score for each subscale was calculated for each participant by averaging the scores for each construct and summing the four means. Participants' total scores in the noninteractive use subscale ranged from 4 to 20 ( $M = 14.37$ ,  $SD = 2.96$ ), as did their interactive use subscale scores ( $M = 13.35$ ,  $SD = 3.72$ ), reflecting a broad range of involvement in mediating behaviors among grandparents as well as somewhat greater involvement in mediation of noninteractive use. Scores were rather normally distributed, with skewness of  $-0.477$  ( $SE = 0.143$ ) and kurtosis of  $0.604$  ( $SE = 0.286$ ) for the noninteractive use subscale and skewness of  $-0.235$  ( $SE = 0.177$ ) and kurtosis of  $-0.158$  ( $SE = 0.352$ ) for the interactive use subscale. Figure 1 displays score distributions for the current sample.



**Figure 1. The distribution of scores for the mediation subscales.**

Pearson’s correlation between the various construct scores displayed reasonable to high correlation coefficients ranging from .25 to .55 for the noninteractive use subscale and from .51 to .72 for the interactive use subscale. All correlations were significant at the .01 level and indicated consistency (i.e., grandparents who were highly engaged in one type of mediation tended to report high involvement in other types too). Yet, the higher correlations found with regard to interactive use indicate that whereas grandparents in this study were relatively eclectic with regard to mediating noninteractive use, they tended to apply multiple strategies to mediate interactive use. Nevertheless, the results of the confirmatory factor analyses revealed strong evidence of a single underlying mediation factor for each of the subscales. All constructs exhibited strong loadings, ranging from .64 to .82 on a latent factor for the noninteractive use subscale (variance explained = 56.5%) and from .79 to .90 for the interactive use subscale (variance explained = 71.4%). Figure 2 displays the correlations between items in each construct, the interconstruct correlation coefficients, and the loadings for each construct on the latent factors.



**Figure 2. Correlations (r), Cronbach’s alphas (α), and factor loadings (λ) for the two subscales. Note. All correlations were significant at the .01 level.**

### **Associations Between Mediation of Noninteractive and Interactive Use**

Although most study participants (91%) reported that their grandchildren watch films, videos, and/or TV programs when they take care of them, only 60% described interactive use of media and 59% informed both types of media use. The latter group's responses were used to explore associations between mediation of noninteractive and interactive media use. Analysis indicated strong positive association between respondents' total scores in the two subscales ( $r = .767, p < .01$ ), as well as among constructs of different subscales ( $.259 < r < .782, p < .01$ ).

An exploratory factor analysis conducted with all eight constructs revealed a two-factor structure (see Table 3) explaining 71.7% of variance. Most constructs were included in the first factor, and only the two "restrictive" ones were included in the second. This finding points at a clear differentiation between the restrictive mediation strategy and all other strategies among the current sample. Grandparents who reported being restrictive with regard to noninteractive use of media tended to apply this mediation strategy to interactive use as well. Similarly, grandparents who applied nonrestrictive strategies employed them for both types of media use.

**Table 3. Factors and Factor Loadings for Exploratory Factor Analysis of All Mediation Constructs.**

Factor	Constructs included in the factor	Factor loading	Variance explained (%)
Nonrestrictive mediation (4.642, .874)	Noninteractive—instructive	.870	58.0
	Noninteractive—co-use	.789	
	Interactive—instructive	.776	
	Noninteractive—supervision	.771	
	Interactive—supervision	.756	
	Interactive—co-use	.739	
Restrictive mediation (1.904, .883)	Interactive—restrictive	.789	13.7
	Noninteractive—restrictive	.755	

*Note.*  $N = 178$ . Principal component extraction and Quatrimax rotation with Kaiser normalization. Factors included based on eigenvalue of at least 1.0. Only loadings of at least .5 are presented. The two factors explained 71.7% of variance. Eigenvalue and Cronbach's alpha are within parentheses.

### **Concurrent Validity**

In the final stage of analysis, two scores reflecting attitude toward media (one for noninteractive and one for interactive use) were computed for each participant by summing the rankings of the relevant statements. Pearson's correlations between the items were .542 ( $p < .01$ ) for the noninteractive use items and .570 ( $p < .01$ ) for the interactive ones. Overall, interactive use was perceived as more beneficial to child development ( $M = 7.41, SD = 1.63$ ) than noninteractive use ( $M = 6.43, SD = 1.67$ ).

To explore the associations between attitudes and reported mediating behaviors, we performed two linear regressions with mediation factor scores as the dependent variables. As some of the literature points at associations between mediating behaviors and mediators' background characteristics, it was important to control for variables such as sex and age (Connell et al., 2015; Nevski & Siibak, 2016; Valkenburg et al., 1999), marital status (Warren, 2003), and education level (Vandewater, Park, Huang, & Wartella, 2004). The independent variables thus consisted of the two attitude scores, as well as all background variables. Variables that were not assessed according to ordinary sequential scales were transformed into dummy codes in this analysis.

The overall regression models (see Table 4) accounted for very low rates of variance, and none of the background variables was associated significantly with the mediation variables, a possible result of the rather homogeneous sample. Furthermore, none of the attitude scores was associated significantly with nonrestrictive mediation. Results indicated, however, that attitudes toward noninteractive use significantly and negatively associated with restrictive mediation ( $\beta = -.210$ ,  $p < .05$ ): Participants who perceived watching TV and YouTube as contributing to child development reported lower restrictive mediation. As a negative association between attitudes and mediation was expected according to previous research (Nikken & Schols, 2015; Rasmussen, White, King, Holiday, & Densley, 2016; Valkenburg et al., 1999; Warren, 2001, 2003), this finding confirmed the concurrent validity of the scale. Moreover, the absence of such association regarding interactive use stressed the importance of distinguishing between the two types of use in research of mediation.

**Table 4. Attitudes and Background Characteristics Associated With Mediation Factors: Summary of Linear Regression Analyses.**

Variable	Nonrestrictive mediation	Restrictive mediation
Sex	.123	.088
Age	-.100	.044
Having a partner	-.002	.113
Education	-.084	.046
Income	.001	-.080
Employment status	-.005	.027
Self-rated health	-.082	.075
Attitudes toward noninteractive use	.171	-.210*
Attitudes toward interactive use	.125	.071
$R^2$	.105	.054
$F (df)$	1.984 (9)	0.958 (9)

*Note.* Numbers represent beta values. Sex: 0 = woman, 1 = man; Having a partner: 0 = no partner, 1 = married or in a steady relationship; Education: 0 = nonacademic, 1 = academic; Income: 0 = similar to average or below, 1 = above average; Employment status: 0 = not working (retiree or unemployed), 1 = working (part time or full time).

\* $p < .05$ .

## Discussion

Compensating for the multiple limitations of existing scales, this article describes the development and testing of a new scale designed to measure mediation of children's noninteractive and interactive media use by various caregivers. The measure is based on mediation constructs identified in previous studies, including restrictive mediation, instructive mediation, supervision, and co-use, distinguishing between noninteractive (i.e., screen viewing) and interactive media use. It thus better fits research of mediation in the current media environment in which children use extensively different screens and media platforms for a variety of purposes and gratifications.

The 16-item scale and each subscale have good internal consistency and validity. All constructs in the scale have good internal homogeneity, significant interconstruct correlations, and high loadings on a latent factor for each subscale. The scores for each subscale generally display normal distribution, with significant association between subscales reflected in two mediation factors: restrictive and nonrestrictive. The restrictive mediation factor negatively correlates with attitudes toward noninteractive use of media. Overall, the current study demonstrates the viability of the new mediation measure. By doing so, it aims to contribute to discourse and research on mediation of children's use of media.

The findings of this study—the first to investigate mediating behaviors among adults who take care of children other than parents—reveal that mediation is not limited to parents alone. Furthermore, the study delineates a significant involvement of grandparents in mediating their grandchildren's use of media. Accordingly, studies of mediators should be expanded from parents only to all significant caregivers, as their behaviors may affect children's development and well-being at least to some extent, as discussed above (Pempek & Lauricella, 2017; Rasmussen et al., 2017).

Furthermore, this study points to a clear distinction between restrictive mediation and all other mediation strategies among grandparents in this sample. Interestingly, however, only their restrictive behaviors were negatively associated with attitudes toward media effects. Hence, similar to parents (Nevski & Siibak, 2016; Valkenburg et al., 1999), grandparents may restrict time and content because of concern for their grandchildren's development and well-being. Nonrestrictive grandparental mediation, however, cannot be explained by such concerns. It is possible that the wish to bond and strengthen interpersonal relationships with grandchildren may motivate nonrestrictive mediation by grandparents, as found in several studies of parental mediation (Clark, 2011; Fisch, 2017; Li & Shin, 2017).

Finally, the findings of this study indicate a somewhat greater consistency among grandparents with regard to mediation of interactive media use compared with that of noninteractive use, as reflected in the Cronbach's alpha of the subscales, Pearson's correlations among the various construct scores, and the loadings of the constructs on a latent factor. Their mean total score in the interactive use subscale, however, was somewhat lower than that in the noninteractive use subscale. In other words, grandparental mediation of children's interactive media use seems to apply more strategies of mediation than their mediation of noninteractive use, but at a lower intensity. Combined with study participants' more positive attitudes toward interactive use and the association of attitudes toward noninteractive use of media with restrictive mediation only, these findings reflect significant differences in the way interactive and noninteractive uses

are perceived and mediated by grandparents. Moreover, they demonstrate the importance of measuring mediation of both kinds of uses concurrently.

Some limitations of this study should be pointed out. Although the present study provides preliminary insights regarding mediation among grandparents, it can only be considered a springboard for future investigations. Offering a new reliable mediation measurement that expands the focus from parents to grandparents and possibly beyond to all caregivers who take care of children, this study was restricted to grandparents only. Furthermore, focusing on grandparents who use the Internet and reliance on an online survey for data collection resulted in a sample biased toward more educated and tech-oriented grandparents. Moreover, the study could not identify antecedents and consequences of grandparental mediation.

Future studies are needed to build on this work. These should be broader in scope, with a more diverse study population, including grandparents who do not use the Internet and other adults who take care of children. Obviously, the new measure should also be used with parents to enable comparisons of their mediation of children's noninteractive use with that of interactive media uses. Studies should also compare different mediators, explore associations between mediating behaviors of adults caring for the same children (e.g., parents and grandparents), and employ additional measures to explore mediation antecedents and consequences among these audiences.

Furthermore, longitudinal studies should be conducted to clarify causalities, and qualitative inquiries could help elucidate some of the more detailed aspects of mediation and the motivations behind them, as well as suggesting possible modes of intervention. Studies could then be used to develop and assess various intervention techniques and their efficacy in promoting mediation of children's media use in a digital world. If mediation is to maximally benefit future generations, it is important that current research on mediation is comprehensive, accurate, and based on useful measures.

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