Is Parental Mediation Negatively Associated with Problematic Media Use among Children and Adolescents?

A Systematic Review and Meta-Analysis

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Abstract

Background: Contemporary parenting has been challenged with the demand for establishing guidelines for parental roles in managing and controlling children and adolescent media use. Parental mediation—parenting strategies to regulate children's media use—has frequently been raised in the discussion of problematic media use. However, research has documented inconsistent findings on the relationship between parental mediation and problematic media use.

Objectives: This systematic review and meta-analysis aimed to investigate the correlation between parental mediation (restrictive mediation, active mediation, and co-using mediation) and problematic media use (internet gaming disorder, social media disorder, and general problematic media use) among children and adolescents.

Data sources: Systematic literature searches were conducted in three online databases, namely Web of Science, Scopus, and EBSCO (CINAHL).

Study eligibility criteria: PRISMA guidelines on eligibility criteria were observed.

Participants: A total of 41 studies were reviewed, involving around 47264 children/adolescents (aged between 5 and 22) and 77494 parents/carers

Results: The initial result found active mediation (r = -.058; 95% CI = -.100 – -.016) and co-using mediation (r = .155; 95% CI = .091 – .217) to significantly correlate with problematic media use. Insignificant relationship was found between restrictive mediation and problematic media use (r = -.031, 95% CI = -.063 – .000). Additional subgroup analyses revealed more complex relationships between parental mediation and problematic media use, whereby the moderators include types of problematic media use, age, reporter of parental mediation and problematic media use, measure of problematic media use, and measure of parental mediation.

Conclusions and Implications of key findings: This study highlights some methodological considerations for future studies of parental mediation and problematic media use.

Keywords: parental mediation, problematic media use, internet gaming disorder, social media disorder, meta-analysis

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A Systematic Review and Meta-Analysis

Since the increasing accessibility to media and digital content, research has documented the high prevalence of problematic media use among adolescents, which include excessive screen use (Schaan et al., 2019), internet addiction (Chung et al., 2019), internet gaming disorder (Fam, 2018), and social media addiction (Bányai et al., 2017). Unfortunately, the high engagement in problematic media use will expose the adolescents to adverse health impacts (Domoff, Borgen, et al., 2019), mental health issues (Raudsepp & Kais, 2019), and behavioural problems (Buja et al., 2018). The potential negative impacts of problematic media use raised more concerns in identifying ways to control media use among adolescents.

Given that adolescents are more likely to engage in media use at home (such as playing games and surfing social media sites), many studies had assumed parents to take a significant role in limiting media use among them. Much research had been conducted to examine the relationships between family-related factors and problematic media use among adolescents (Cui et al., 2018; Huang et al., 2019; King & Delfabbro, 2017). In general, research had usually divided parental mediation into three categories, namely restrictive mediation, active mediation, and co-using mediation (Nikken & Jansz, 2014). Restrictive mediation refers to set rules to limit media use among adolescents. Active mediation refers to communicating and discussing media-related concerns with adolescents. Co-using mediation refers to sharing and engaging in the media-related experience together with adolescents. Besides the three categories, studies had explored other dimensions of parental mediation, which include technical safety guidance (Nikken & Jansz, 2014), role modelling (De Lepeleere et al., 2018), and content and time limit (Smith et al., 2015). Seeing the significant role of parents, the American Academy of Pediatrics (AAP; 2001) recommended for parents to “limit children’s total media time (with

entertainment media) to no more than 1 to 2 hours of quality programming per day" and to "monitor the shows children and adolescents are viewing" (p.424). Similar recommendations were made by other researchers (Jiang et al., 2014; Strong et al., 2005) and agencies (The Australian College of Paediatrics, 1994), whereby the total screen time for adolescents should not exceed two hours per day. These studies generally implied that parents can effectively reduce problematic media use among adolescents.

However, the effectiveness of parental mediation in reducing problematic media use among adolescents remains questionable. In a review of 14 studies, Schneider et al. (2017) reported mixed findings in the relationship between parental supervision and problematic internet gaming among adolescents. While there are studies that found significant negative relationships between parental mediation and problematic media use (Kwon et al., 2011), there are also studies that found insignificant relationships (Boberska et al., 2019). The inconsistent past findings provide hints of further investigation on potential moderating variables.

There are three potential explanations for the inconsistent relationship between parental mediation and problematic media use among adolescents. First, parental mediation might be effective for children, but not for adolescents. Research has documented weakened parent-adolescent communication (Keijsers & Poulin, 2013), declined parental knowledge (Masche, 2010), as well as heightened parent-adolescent conflict (Weymouth et al., 2016). As a matter of fact, many adolescents will attempt to achieve higher autonomy and detach from family (Karabanova & Poskrebysheva, 2013), which might limit the parental influence on their behaviour. For example, Cillero et al. (2011) found restrictive mediation as a significant predictor of screen-viewing among primary school children, while co-using mediation as a significant predictor of screen-viewing among secondary school children. These studies implied limited parental influence on problematic media use among adolescents. In light of this, child age might be a moderator in the relationship between parental mediation and problematic

media use. There is a need to compare the relationship between children and adolescent samples.

Second, the inconsistent relationship might be due to the methodological differences among the past studies. On one hand, many studies combine estimates of various media use (TV viewing, game playing, and internet surfing), instead of examining each of the problematic media use as separate constructs (Rey-Lopez et al., 2008). For example, Carlson et al. (2010) utilized single-item as an indicator of screen time ("how many hours did you watch TV, play video games, or play computer games yesterday?"), with reported screen time of more than 120 minutes indicates excessive screen time. On the contrary, Koning et al. (2018) utilized separate validated measures to assess internet gaming disorder and social media disorder. On the other hand, many studies examine parental rules as yes/no questions, with minimal consideration on the types of rules (Ramirez et al., 2011). For example, Gingold et al. (2014) require the respondents to report the existence of family rules on TV content using dichotomous yes-no response; while Brindova et al. (2014) require respondents to report parental rules on time and content in 4-point Likert scale (always, mostly, rarely, and never). Altogether, it is clear that some of these methodological differences might moderate the relationship between parental mediation and problematic media use among adolescents.

Third, the operationalization of problematic media use might contribute to the inconsistent findings. Many early studies assume screen time as an indicator of problematic media use (e.g., Roe & Muijs, 1998). However, since the introduction of internet gaming disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013), more studies shifted the focus to examine the symptoms of problematic media use (i.e., salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse). The change in the operationalization of problematic media use suggests a need to distinguish between highly engaged media users and problematic media

users (Griffiths, 2017), whereby many highly engaged media users (high screen time) did not report any forms of addictive symptoms (low problematic media use). Hence, it is possible that parental mediation is more effective in limiting screen time, but not problematic media use. There is a need to examine the moderating role of measure of problematic media use in the relationship.

Seeing the inconsistent previous findings as to the outcome of methodological differences, the current study aimed to review the relationship between parental mediation and problematic media use with a meta-analytic approach. Having considered the potential switch of media preference among adolescents in recent years, the current study placed the main focus on internet gaming disorder and social media disorder. Specifically, it is the purpose of the current study to (1) synthesize the relationships between parental mediation and problematic media use, (2) identify dimensions of parental mediation that is critical to problematic media use, and (3) investigate how the study characteristics can influence the correlation coefficients, whereby the study characteristics include types of problematic media use, types of parental mediation, adolescents' age, reporter, and types of measures (parental mediation and problematic media use).

METHOD

This review was performed in accordance with the preferred reporting guidelines for systematic reviews and meta-analyses (PRISMA Group; Moher et al., 2009). A review protocol of this study was not previously registered.

Search Strategy

Systematic literature searches were conducted in three online databases for articles published before August 2019, which includes Scopus, Web of Science, and EBSCO (CINAHL). The following terms were used as keywords: ("social media" OR "screen time" OR digital gam* OR electronic gam* OR video gam* OR computer gam* OR mobile gam*)

AND (parent* OR household) AND (mediation OR monitor* OR involvement* OR control* OR restrict* OR rules). The databases were screened between July and August 2019. The searches identified a total of 1949 studies, which were then screened systematically and independently for eligibility by two authors (first and second author). Figure 1 illustrates the data screening process.

Study Inclusion and Exclusion Criteria

We searched studies that displayed original quantitative research data connecting parental mediation to the children and adolescents' degree of problematic media use (symptoms of problematic use or screen time on gaming or social media). To be included in the current study, studies had to: (i) be written in English; (ii) be published in a peer-reviewed journal; (iii) reported estimates of the relationship between parental mediation (restrictive, active, and co-using mediation) and problematic media use (internet gaming disorder, social media disorder, and general problematic media use); and (iv) involved children and adolescents. Studies were not eligible if they: (i) did not include any measure of parental mediation and problematic media use as measured variables; (ii) was not original article; (iii) were case studies or qualitative studies; (iv) focused exclusively on the therapeutic aspects of digital gaming or social media use (i.e. educational or serious games interventions); (v) focused on gambling behaviours (e.g. online poker, roulette, etc.); and (vi) were unpublished dissertations, thesis studies and/or conference papers.

Data Extraction

The following information was extracted from the eligible studies: study type (grouped as cross-sectional and longitudinal study), study location, sample size, children's and adolescents' age, percentage of males, recorded problematic media use (grouped as internet gaming disorder, social media disorder, and general problematic media use), parental mediation (grouped as restrictive mediation, active mediation, and co-using mediation),

measure of problematic media use and parental mediation, reporter, type of analysis, and estimates of the relationship between parental mediation and problematic media use (odds ratio, correlation r, or β coefficient).

Assessing the Quality of the Selected Studies

As lack of a published quality checklist of this type of study, we adapted the quality check tool created by Joanna Briggs Institute to examine the quality across all selected studies (see Supplement A). This tool is suitable for investigating both longitudinal and cross-sectional studies including in total seven criteria for cross-sectional studies and nine for longitudinal studies. This checklist addressed, for instance, suboptimal sampling method used, the eligibility criteria of participants provided, the confounding factors identified, appropriate measures employed (parental mediation and problematic media use), an appropriate description of the study properties provided, and relevant analysis employed. Each study was scored according to this system whereby a score of 0 coincided to the item not being present, a score of 0.5 coincided to the item being present with some limitations, and a score of 1 coincided to the item being present. Based on this quality assessment, studies could gather a maximum of seven points for cross-sectional studies and nine points for longitudinal studies ranging from 0 to 7 or 9 points where more scores referring higher quality of the study being assessed.

Statistical analysis

The findings concerning each outcome factor were then combined and analyzed using R software (R Foundation for Statistical Computing, 2018). A meta-analysis was performed when a subject factor had at least three independent effect size ratings. The correlation coefficient (*r*) with 95% confidence intervals were used in the estimations of effects. In a case where the original study reported other effect measures, these were converted into correlations using broadly utilized formulas (Borenstein et al., 2009). The random effect method was used

because of the assumed heterogeneity between samples. Cohen recommendations were employed when interpreting the correlational effect sizes, more precise 0.1 implies a small effect size, 0.3 implies medium effect size, and 0.5 implies large effect size (Cohen, 1992). The statistical significance in heterogeneity across articles was analysed using the chi-squared method. Values of I^2 varied from 0% to 100%, whereby values 25% indicates low, 50% moderate and 75% high levels of variation, respectively (Higgins et al., 2003).

Additionally, subgroup analyses were performed to identify potential moderators of the relationship between parental mediation and problematic media use. Six subgroups were developed, namely problematic media use (internet gaming disorder, social media disorder, and general problematic media use), age (adolescent, child, and merged sample), reporter of parental mediation and problematic media use (child-child, child-parent, parent-child, and parent-parent), measure of parental mediation (validated measures, new/adapted measures, screen time, and other measures), and measure of problematic media use (validated measures, new/adapted measures, screen time, and single-item scales).

RESULTS

Descriptive Characteristics of the Selected Studies

A total of 41 research papers were included in the current review. Table 1 presents all selected studies. Majority of the included studies were cross-sectional (78%; 32 studies). There were also nine prospective studies where the follow-up assessments were set from 7-8 to 24 months after the baseline evaluation. Most of the studies were published after the year 2010 (93%, 38 populations). The majority of the studies were conducted in America (13 populations), 12 from Europe, 11 from the Western Pacific Regions, 2 from the Eastern Mediterranean Region, and 3 covered multicultural samples. Participants' age (concerning the children/youth, no parents) ranged from 5 to 22 years. Sample sizes across all 41 studies ranged from 45 (Kuo et al., 2015) to 63145 participants (Gingold et al., 2014). Of all 41 studies, 19 studies gathered

data (either merely or with youth's report) from caregiver/parent(s). With regard the gender, where reported the proportion of males (children or parents) in the studies varied from 27.5 per cent (Jang & Ryu, 2016) to 89.7 per cent (Kuo et al., 2015).

Quality of the studies

Quality and risk of bias evaluations were performed for all studies reviewed (see Supplement A). The maximum quality score was 7 (range 2-7) for cross-sectional and 8 (range 6.5-8) for longitudinal studies. In total, 30 studies (73%) were perceived as low risk concerning all risk of bias (scores ≥ 4). Main explanations for low-quality scores were suboptimal sampling method, failure to include (full) eligibility criteria of study participants, inadequate measurement of screen exposure or problematic social media or gaming behaviour, or/and parental mediation.

Measures Used to Assess Problematic Media Use

A variety of measures on youth degree of screen time were used in all over the studies, including the child- or/and parent-report on daily or weekly time (in hours or minutes) used for the typical screen media activities such as computers and game consoles. Youth's degree of screen time was also assessed using adapted measures including the Center for Disease Control and Prevention's State and Local Youth Risk Behavior Survey (Brener et al., 2013), Flemish Physical Activity Questionnaire (FPAQ; Deforche et al., 2009), and Media and Technology Usage and Attitude Scale (Rosen et al., 2013). In addition, screen-based sedentary activities were identified with adopted measures including the Children's Leisure Activities Study Survey (Chinese version; Huang et al., 2009; CLASS; Telford et al., 2004), sedentary screen time in leisure time (Maher et al., 2013), Adolescent Sedentary Activity Questionnaire (ASAQ; Hardy et al., 2007), and Sedentary Behaviour Questionnaire (Robinson, 1999). To quantify the overall amount of youths' screen media use was also employed selected items derived from Young in Norway study (Torgersen, 2004), Health Behaviors and Leisure Activities (Anderson

& Dill, 2000), and School Sleep Habit Survey (Wolfson & Carskadon, 1998). One study adopted media use assessment based on media content (not based on devices) categories (Pea et al., 2012). Also, the Internet Addiction Test (Young, 1998) and pathological gambling items of the DSM-IV (American Psychiatric Association, 1994) were adapted to identify problematic game use symptoms. Furthermore, the degree of gaming disorder symptoms was assessed using previously validated questionnaires of the addiction to computer game (Anuthawarn, 2008), Problematic Online Gaming Questionnaire (POGQ; Demetrovics et al., 2012), Game Addiction Scale for Adolescents (GASA; Lemmens et al., 2009), and Problematic Game Use Scale (Korean Creative Content Agency, 2015). One study assessed youth's problematic social media use using Social Media Disorder Scale (Van den Eijnden et al., 2016). Finally, the adopted 24-hours media use diary was also used to determine target group media use behaviour (Australian Communications and Media Authority (ACMA), 2007).

Measures Used to Assess Parental Mediation

Throughout all studies, the screening instruments used to identify parental mediation contained diverse measures derived from previously validated questionnaires, including EU Kids Online Survey (Livingstone et al., 2011), The Adult Involvement in Media Scale (AIM; Gentile et al., 2004), Television Mediation Scale (Valkenburg et al., 1999), Video Game Mediation Measure (Nikken & Jansz, 2006), and "What Parents Say and Do" (WPSAD; King et al., 2015).

Parental mediation was also assessed using adapted measures (specific items derived from one/two previous parenting instruments), which are the Parental Support For Physical Activity Scale (Trost et al., 2003), Parenting Strategies for Eating and Activity Scale (Larios et al., 2009), parental/child perceptions of parental restrictions (Gubbels et al., 2011), proactive parenting items regarding media (Padilla-Walker & Thompson, 2005) and media mediation items (Nikken & Jansz, 2006), the parental rules on computer and television use (Barradas et

al., 2007; Springer et al., 2010), Internet specific rules (van Den Eijnden et al., 2010), restrictive mediation (Abelman & Pettey, 1989; Nathanson, 2001), active and restrictive mediation (Nathanson & Botta, 2003), parents' rules and restriction for media (Hardy et al., 2007), and adolescents' perceived parental monitoring (Cottrell et al., 2003; Stattin & Kerr, 2000).

Several studies adapted previously reported questionnaires originally used to assess the general parenting practices or social home environment including the Parenting Styles Questionnaire (Tangney et al., 2004), Authoritative parenting construct (Baumrind, 1978; Jackson et al., 1998), the Family Nutrition & Physical Activity Screening Tool (Ihmels et al., 2009), Parenting Behaviour Index (National Youth Policy Institute, 2010), the Parenting Strategies for Eating and Activity Scale (PEAS; Larios et al., 2009), the Parenting Styles and Dimensions Questionnaire - Short Version (PSDQ; Robinson et al., 2001), Parental Bonding Instrument (PBI; Parker, 1990), and parental monitoring about time spending (Alsaker et al., 1991). The remaining studies employed a single or several non-validated and self-created items to assess different conditions of parental media practices.

Overall Relationships between Parental Mediation and Problematic Media Use

Using the random effect model, problematic media use was found to be significantly correlated with active mediation and co-using mediation (Table 2). To be more specific, higher active mediation is associated with lower problematic media use (r = -.058, 95% CI = -.100–-.016); while higher co-using mediation is associated with higher problematic media use (r = .155, 95% CI = .097–.217). However, an insignificant summary correlations coefficient was found between restrictive mediation and problematic media use (r = -.031, 95% CI = -.063–.000).

Subgroup Analysis

Five moderators were entered into the subgroup analysis. The moderators include (i) types of problematic media use, (ii) age, (iii) reporter of parental mediation and problematic

media use, (iv) measure of problematic media use, and (v) measure of parental mediation. Results of the subgroup analysis are presented in Table 3.

Types of problematic media use. The types of problematic media use demonstrated insignificant moderation effect across all relationships. Active mediation is negatively correlated with general problematic media use, but not with internet gaming disorder and social media disorder (Q = 0.64, p = .727). Co-using mediation is positively correlated with all types of problematic media use (Q = 3.37, p = .066); while insignificant relationships were found between restrictive mediation and all type of problematic media use (Q = 0.74, p = .692).

Age. Significant moderation effects of age were found for restrictive mediation (Q = 9.20, p < .05) and active mediation (Q = 16.34, p < .001). Restrictive mediation is negatively correlated with problematic media use in the child and merged samples, but not in the adolescent sample. Identically, active mediation is negatively correlated with problematic media use in the child sample only. On the contrary, co-using mediation is positively correlated with problematic media use in all age groups (Q = 0.18, p = .914).

Reporter of parental mediation and problematic media use. Reporter was found to be significant moderator for active mediation (Q = 29.07, p < .001). Active mediation is significantly correlated with problematic media use when the studies utilize single-source data (child-child and parent-parent), but an insignificant relationship was found when the studies utilize multi-source data (parent-child). Insignificant moderation effects of reporter were found for restrictive mediation (Q = 1.23, p = .745) and co-using mediation (Q = 1.27, p = .531).

Measure of problematic media use. The measure of problematic media use plays as a significant moderator in all types of parental mediation. Restrictive mediation is negatively correlated with screen time but positively correlated with symptoms of problematic media use (Q = 20.97, p < .001). Similarly, active mediation (Q = 14.28, p < .01) and co-using mediation (Q = 11.10, p < .05) are significantly correlated with screen time only.

Measure of parental mediation. No clear conclusion can be drawn based on the subgroup analysis. Measure of parental mediation reported a significant moderation effect for active mediation (Q = 13.02, $p < .01$), but insignificant moderation effect for restrictive mediation (Q = 5.85, $p = .054$) and co-using mediation (Q = 0.030, $p = .860$). Overall, the relationships are likely to be significant when the studies utilize multi-item measures (validated or new/adapted measures). On the contrary, the relationships are likely to be insignificant when the studies utilize single-item scales.

DISCUSSION

This systematic review and meta-analysis aimed to quantify the correlation between parental mediation (restrictive mediation, active mediation, and co-using mediation) and problematic media use (internet gaming disorder, social media disorder, and general problematic media use) among children and adolescents. Using 169 effect sizes extracted from 41 studies, two out of the three relationships were found significant. In precise, co-using mediation recorded the largest effect size, with higher co-using mediation and lower active mediation associated with higher problematic media use. Despite many of the parenting guidelines that recommended screen-related family rules, an insignificant relationship was found between restrictive mediation and problematic media use. This finding is noteworthy as parents are generally more reliant on restrictive mediation than other types of mediation, (Domoff, Radesky, et al., 2019). Unfortunately, many parents experienced a lack of control over their children's media use due to the technology advancement (Radesky et al., 2016), whereby it is becoming more difficult to successfully set clear rules for all forms of media use.

Additional subgroup analyses revealed more complex relationships between parental mediation and problematic media use. The subgroup analysis found age as a significant moderator for restrictive mediation and active mediation. Specifically, restrictive mediation and active mediation significantly correlated with problematic media use among children

sample, but not in the adolescent sample. This finding is consistent with the study conducted by Chou and Chou (2019), with parents' time limit significantly predict smartphone addiction among junior high school students, but not senior high school students. One possible explanation for the age difference is the tendency to detachment during adolescence. Indeed, many adolescents will strive for greater autonomy (Karabanova & Poskrebysheva, 2013), with the increased adolescent individuation might raise the difficulty for effective parent-adolescent communication (Keijsers & Poulin, 2013). A recent meta-analysis by Lionetti et al. (2019) demonstrated a normative decline in the quality of parent-adolescent communication, with parental control recorded the largest developmental change. Hence, parents might have weakened power to set media-related rules and actively monitor media use among adolescents.

On the other hand, co-using mediation is positively associated with problematic media use across all age groups. This finding raise question on the effectiveness of co-using mediation in preventing problematic media use among children and adolescents. Some had recommended parents to co-use electronic media with children and adolescents as a means to facilitate quality family discussion (American Academy of Pediatrics, 2001, 2013). Contrary to this view, another line of the research proposed the heightened difficulty for parents to actively monitor children's media use (Jiow & Lim, 2012; Jiow et al., 2017). This is due to the advancement of technology had greatly enhanced the affordances of media use. While previously games are more linear with definite endings, games in recent years are more complex, with the consistently growing world, and offer various forms of in-game social interactions (player-player and player-game interaction). Consequently, many parents felt being outsmarted by their children in media use (Palaigeorgiou et al., 2017), and need to invest more time and energy to successfully co-use or co-play with children. Children might misinterpret parents' effort to co-use as encouragement for more media use. Besides, research showed that parents who are gamers are likely to implement co-using mediation than their non-gamers counterparts (Jiow

& Lim, 2012; Nikken & Jansz, 2003). Domoff et al. (2020) further propose that children will imitate and model parents' behaviour, which includes problematic media use. Having observed their parents' media use, as well as frequent co-use with parents, children might perceive media use as an acceptable norm that might inspire them for higher engagement in media use.

The current study also revealed a significant subgroup effect of reporter in the relationship between active mediation and problematic media use. Specifically, a significant negative relationship was found when the studies utilize single-source data collection strategies; while an insignificant relationship was found when the studies utilize multi-source data. One possible reason for the discrepancy is the higher tendency for social desirability bias and common method variance in single-source, single-method data (Holmbeck et al., 2002). For example, when the children report high active mediation from parents, they may unconsciously report a lower level of problematic media use (social desirability bias). Indeed, the child-parent reporting discrepancies had long been addressed (Augenstein et al., 2016; De Los Reyes & Ohannessian, 2016), as well as methodological concerns regarding self-report measures of parenting practices and problematic media use (Bryant et al., 2007; Fan et al., 2006; Morsbach & Prinz, 2006). However, it is noteworthy that the subgroup sizes for reporter in the current meta-analysis are greatly imbalanced. While there are 41 effect sizes that utilized single-source data (28 child-child and 13 parent-parent), only eight effect sizes that utilized multi-source data (parent-child). Hence, more studies with multi-source data are needed before a clear conclusion can be made.

Besides, the measure of problematic media use was found to be another significant moderator for all types of parental mediation. Specifically, restrictive mediation is negatively correlated with problematic media use when the studies examined screen time; and is positively correlated with problematic media use when the studies utilized validated measures. Similarly, active mediation and co-using mediation are significantly correlated with problematic media

use when the studies examined screen time; but insignificant relationships were found when the studies utilized validated measures. This implies that parental mediation is effective in reducing screen time, but less effective in reducing symptoms of problematic media use, with restrictive mediation might exacerbate the symptoms of problematic media use. While it is true that screen time is an important element of behavioural addiction, but it should not be treated as the sole indicator of problematic media use. For instance, a family rule of no more than two hours of screen time per day (restrictive mediation), or discussion on the negative impacts of excessive screen use (active mediation), might effectively restrict the total screen time, but children and adolescents might remain thinking about the media use (preoccupation) or feel irritable (withdrawal symptoms) when media use was restricted. For this reason, recent studies had highlighted the great need to distinguish between high engagement and problematic media use (Griffiths, 2017).

Additionally, Kaye et al. (2020) proposed to make a distinction between screen time and screen use, whereby screen time is a numerical measurement of time spent in screen-related behaviour; while screen use is a goal-directed behaviour, such as social use and educational use. Research has documented the inaccuracy of self-report screen time across various platforms (Andrews et al., 2015; Araujo et al., 2017; Ernala et al., 2020; Lee et al., 2017). However, the terms screen time and screen use had been used interchangeably among the reviewed studies (e.g., Boberska et al., 2019; Len-Ríos et al., 2016; Padilla-Walker & Coyne, 2011). Given the methodological deficits of screen time, more research, accounting for both screen use and symptoms of problematic media use, is needed to develop a full picture of the relationship between parental mediation and problematic media use.

Last but not least, although the result demonstrated mixed findings for measures of parental mediation, the relationship between parental mediation and problematic media use is likely to be significant if the studies utilize multi-item scales (validated or new measures).

While there are studies that argue that multi-item scales outperform single item scales (Diamantopoulos et al., 2012; Sarstedt & Wilczynski, 2009), but there are situations where single-item scales are appropriate to use, such as the expectation of high common method variance (Gardner et al., 1998; Hoeppner et al., 2011). Having considered the high reliance on single-source single-method data in this field, the utilization of single-item scales may have its benefits. Despite this, many of the included studies utilize adapted scales and single-item scales. For instance, Jiang et al. (2014) require the respondents to report the existence of screen-related family rule in yes-no response; Brindova et al. (2014) adapted two Likert items to assess family rules on time and media content respectively; Boberska et al. (2019) adopted a six-item parental restriction scale which covers several areas of screen-related family rules. This lack of consensus on the concept and operationalization of parental mediation was also addressed in a recent systematic review by Nielsen et al. (2019). In light of this, further work is required to update and strengthen the concept of parental mediation in the current era. In further research, the development and adaptation of psychometrically-tested measures could be a means of narrowing the gap.

Several limitations need to be considered. First, the other types of parental mediation are not being accounted for in the current review. The initial data extraction process had extracted some parental mediation subtypes, such as technology-related parenting (Sanders et al., 2016), parental modelling (Totland et al., 2013), and parental care (Siomos et al., 2012). However, there is an insufficient number of studies to form a meaningful analysis. Second, although a few study characteristics were extracted from the studies (age range, mean age, gender ratio, measure of parental mediation, and measure of problematic media use), comparison of the study characteristics is not possible due to small group sizes. For example, there are four studies that utilized validated scales of problematic media use. However, each of the studies utilized different scales. Hence, these study characteristics were not included in the

subgroup analysis. Third, the direction of causality is not clear. Although there are some longitudinal studies to support the direction of causality (e.g., Koning et al., 2018), most of the included studies were in cross-sectional design. Additionally, there are longitudinal studies that suggest an opposite direction of causality, whereby children's media use might influence the parent's choice of parental mediation (Padilla-Walker & Coyne, 2011). There is a possibility that parents might strategize parental mediation accordingly to children's media use. For example, parents might set more restrictions when the children frequently exceed the agreed screen time. In the same manner, parents might be more willing to discuss media-related topics when children did not demonstrate any symptoms of behavioural addiction. More longitudinal studies are needed to further examine the direction of causality. Fourth, no effort was made to contact the original authors for raw data. Conversion of effect sizes is based on published formulas. Fifth, the high heterogeneity in this study signals the existence of other potential moderators that have not been addressed. Although the initial plan includes mother-report and father-report as a separate subgroup, there are too limited number of effect sizes for meaningful comparison. Sixth, only English articles were included in the current study.

In conclusion, children and adolescents who experienced higher co-using mediation and lower active mediation are more likely to engage in problematic media use. Contrary to many of the parenting guidelines, an insignificant relationship was found between restrictive mediation and problematic media use. Additional subgroup analysis revealed more complex relationships between parental mediation and problematic media use. First, restrictive mediation and active mediation are negatively correlated with problematic media use among children but not among adolescents; while co-using mediation is positively correlated with problematic media use for both children and adolescents. Second, the current literature had largely relied on single-source data, with more multi-source data needed to support the relationships. Third, parental mediation might be negatively correlated with screen time, but

not with symptoms of problematic media use. Lastly, an update on the conceptualization of parental mediation is of critical need.

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Table 1

Summary of Studies

First Author (Year)	Study Type	Country	Sample	Age (Mean)	Male (%)	Parental Mediation	Problematic Media Use
Abedini (2012)	Cross-sectional	Iran	500 secondary school students	Male: 14.7 Female: 14.6	50.8	• Authoritarian parenting • Authoritative parenting	• Addiction to computer game
Appelhans (2014)	Cross-sectional	United States	103 household with children	10.0	47.6	• Caregiver screen time monitoring	• Screen time
Benrazavi (2015)	Cross-sectional	Malaysia	296 parent-adolescent dyads	NR	51.4	• Monitoring mediation • Parental restrictive mediation • Active mediation of Internet use • Active mediation of Internet safety	• Problematic online gaming
Bjelland (2015)	Cross-sectional	Belgium, Germany, Greece, Hungary, Norway	3300 children	11.2	48.8	• Parental rules • Controlling style • Autonomy-supportive style	• Perceived excessive screen time
Boberska (2019)	Longitudinal	Poland	879 parent-child dyads	8.5	47.6	• Parental restrictions	• Screen use
Bonnaire (2017)	Cross-sectional	Paris	434 secondary school students	Male: 13.2 Female: 13.1	53.2	• Free access to video game • Rules about video game practice • Video game ban • Playing late at night (Parental monitoring)	• IGD
Bounova (2016)	Cross-sectional	Greece	1141 parent-child dyads	13.9	48	• Screen-viewing household rules	• Screen-based sedentary behavior
Brindova (2014)	Cross-sectional	Czech Republic, Slovak republic	906 adolescents	13.0	52.8	• Parental rules about time spent with a computer • Parental rules about content of computer work	• Excessive time spent playing computer games
Carlson (2010)	Cross-sectional	United States	7415 children	NR	51.0	• Set limits on time child watches television • Set limits on time child plays video games	• Screen time
Chang (2018)	Cross-sectional	Taiwan	2454 child-parent dyads	NR	52.2	• Parental mediation of the eye care behavior of children	• Computer/mobile device screen time

First Author (Year)	Study Type	Country	Sample	Age (Mean)	Male (%)	Parental Mediation	Problematic Media Use
Choo (2014)	Longitudinal	Singapore	2974 primary and secondary school students	11.2	72.6	• T1 Parental restriction of child video-gaming behaviour	• T1 Pathological symptoms of video-gaming • T2 Pathological symptoms of video-gaming
Cillero (2011)	Cross-sectional	Spain	236 primary school-aged children and parents 238 secondary school-aged children and parents	Primary school: 10.1 Secondary school: 12.3	Primary school: 54.2 Secondary school: 49.2	• Perceived maternal rules for screen-viewing • Perceived paternal rules for screen-viewing • Co-viewing TV (school days) • Co-viewing TV (weekends)	• Console playing (Weekdays) Console playing (Weekends)
Cui (2011)	Cross-sectional	China	1128 children	11.7	53.1	• Family's rules on child's TV viewing • Parent-child TV co-viewing	• Sedentary time
De Lepeleere (2015)	Cross-sectional	Belgium	207 parents of primary school children	9.4	51.7	• Self-efficacy for monitoring TV • Self-efficacy for motivating games	• Screen time
De Lepeleere (2018)	Cross-sectional	Belgium	247 parents of primary school children	8.3	52.9	• Rules regarding gaming • Giving an explanation on the rules regarding gaming • Monitoring children's gaming • Motivating children to reduce gaming	• Screen time
Fardouly (2018)	Longitudinal	Australia	284 preadolescent social media users and parents	11.2	46.8	• Parental control over social media use	• Social media use
Gentile (2012)	Cross-sectional	United States	1323 children and parents	9.2	47.0	• Limits on amount	• Weekly video game time
Gingold (2014)	Cross-sectional	United States	63145 household with children younger than 18 years old	NR	51.1	• Rules about TV content	• Screen time >2h/d • Screen time >4h/d

First Author (Year)	Study Type	Country	Sample	Age (Mean)	Male (%)	Parental Mediation	Problematic Media Use
Granich (2011)	Cross-sectional	Australia	298 children	12.5	49.3	• TV coviewing with mom • Household rules about electronic media use: No late night TV • Household rules about electronic media use: Time limit on PC use	• Electronic media use on a weekday
Heim (2007)	Cross-sectional	Norway	825 school children	NR	51	• Parental monitoring	• Communication usage • Entertainment usage • Advanced usage • Gameboy usage • Utility usage
Jang (2016)	Cross-sectional	South Korea	333 middle school sample 284 high school sample	Middle School: 13.4 High school: 16.4	Middle School: 31.5 High school: 27.5	• Monitoring • Over expectation • Reasoning	• Problematic mobile game use
Jiang (2014)	Cross-sectional	China	3461 adolescents	13.2	49.9	• No ST rules at home	• Weekday recreational screen time • Weekend recreational screen time
Johnson (2015)	Cross-sectional	United States	287 parents of 6-12 year old children	9.3	58.2	• Restrictive mediation • Social coviewing	• Television viewing – weekdays • Television viewing - weekends
Koning (2018)	Longitudinal	Dutch	354 adolescents	13.9	48.9	• Internet-specific rules - T1 • Internet-specific rules - T2 • Reative restrictions - T1 • Reative restrictions - T2 • Frequency of communication - T1 • Frequency of communication - T2 • Quality of communication - T1 • Quality of communication - T2	• IGD - T1 • IGD - T2 • Social Media Disorder - T1 • Social Media Disorder - T2
Kuo (2015)	Longitudinal	Canada	Parents of 29 adolescents with autism spectrum disorder and 16 siblings	15.1	89.7	• Restrictive mediation • Social mediation • Active mediation	• Time spent playing video games

First Author (Year)	Study Type	Country	Sample	Age (Mean)	Male (%)	Parental Mediation	Problematic Media Use
Lederer (2015)	Cross-sectional	United States	2819 students	12.5	50.0	• Video game family rule	• Video game time
Lee (2017)	Cross-sectional	Korea	1556 students	NR	51.0	• Restrictive mediation • Active mediation • Co-using	• Online game addiction
Len-Rios (2016)	Cross-sectional	United States	354 adolescents	13.2	50.0	• Parental monitoring (parental limits on social media)	• Social media use
Lloyd (2014)	Cross-sectional	Australia	70 families with children	8.4	58.6	• Control • Limit setting • Monitoring • Discipline	• Sedentary behaviour (Screen time)
Martins (2017)	Cross-sectional	United States	434 parents	10.3	55.0	• Restrictive mediation • Neutral mediation • Coplaying	• Video game play
Padilla-Walker (2011)	Longitudinal	United States	478 families	12.3	48.0	• Maternal regulation • Paternal regulation • Maternal active mediation • Paternal active mediation • Maternal restrictive mediation • Paternal restrictive mediation	• Media use
Padilla-Walker (2018)	Longitudinal	United States	681 adolescents	13.3	49.0	• Restrictive mediation • Active mediation • Passive co-use • Connective co-use	• Overall time spent with media
Pieters (2014)	Cross-sectional	Belgium	1926 adolescents	16.9	44.5	• Parental control on media use	• Intensity of video game playing
Ramirez (2011)	Cross-sectional	United States	160 parent-adolescent dyads	14.6	48.1	• Total number of screen time rules	• Playing video/computer games
Samaha (2017)	Cross-sectional	Lebanon	4770 parents	NR	52.7	• Have screen time rules (No, ref: Yes)	• Screen time
Sharif (2006)	Cross-sectional	United States	4508 adolescents	12.2	49.0	• Maternal control	• Video game weekday screen time • Video game weekend screen time

First Author (Year)	Study Type	Country	Sample	Age (Mean)	Male (%)	Parental Mediation	Problematic Media Use
Siomos (2012)	Longitudinal	Greece	2017 students	15.1	51.8	• Father's overprotection Mother's overprotection	• Computer addiction
Smith (2015)	Cross-sectional	Australia	422 adolescents	16.3	41.0	• Parents talk about cybersafety • Parental rules and limit setting for online content • Parental rules and limit setting for length of time spent online • Parents being physically present while online • Parents seeing what adolescents were doing online	• Weekdays hours spent gaming • Weekend hours spent gaming
Tandon (2014)	Longitudinal	United States	713 parent-child pairs	9.2	51.0	• Media rules	• Screen time • Sedentary behaviour • Home sedentary behaviour
Totland (2013)	Longitudinal	Norway	908 adolescents	NR	52.2	• Maternal regulation • Paternal regulation	• PC/game time
Yamada (2018)	Cross-sectional	Japan	1659 school children	NR	49.9	• No rules setting to restrict screen time (ref: yes)	• Prolonged screen time

Table 2

Summary of Relationships between Parental Mediation and Problematic Media Use

Parental mediation	k	*r* [95% CI]	z	*p*	I^2	Test of heterogeneity
Restrictive mediation	103	-.031 [-.063, .000]	-1.95	.051	95	Q(102) = 2146.47, $p < .001$
Active mediation	50	-.058 [-.100, -.016]	-2.70	.007	88	Q(49) = 404.48, $p < .001$
Co-using mediation	16	.155 [.091, .217]	4.71	.000	69	Q(15) = 85.77, $p < .001$

Table 3

Subgroup Analysis for the Relationship between Parenting Mediation and Problematic Media Use

Subgroup	Restrictive Mediation			Active mediation			Co-using Mediation		
	k	*r* [95% CI]	I^2	k	*r* [95% CI]	I^2	k	*r* [95% CI]	I^2
Problematic Media Use	Q = 0.74, *p* = .692			Q = 0.64, *p* = .727			Q = 3.37, *p* = .066		
IGD	58	-.020 [-.062, .023]	92	25	-.043 [-.096, .011]	90	11	**.114 [.030, .196]**	63
SMD	6	-.025 [-.196, .148]	93	4	-.082 [-.234, .075]	89	-	-	-
PMU	39	-.048 [-.095, .000]	97	21	**-.077 [-.150, -.003]**	84	5	**.220 [.143, .294]**	77
Age	Q = 9.20, *p* < .05			Q = 16.34, *p* < .001			Q = 0.18, *p* = .914		
Adolescent	41	.027 [-.027, .081]	96	16	-.056 [-.126, .015]	87	8	**.164 [.040, .282]**	91
Child	20	**-.085 [-.142, -.027]**	82	7	**-.235 [-.332 -.144]**	31	4	**.135 [.036, .232]**	0
Merged	42	**-.063 [-.107, -.019]**	93	27	-.020 [-.070, .029]	88	4	**.158 [.091, .224]**	59
Reporter (PM-PMU)	Q = 1.23, *p* = .745			Q = 29.07, *p* < .001			Q = 1.27, *p* = .531		
Child-Child	64	-.036 [-.077, .005]	93	28	**-.057 [-.103, -.011]**	87	3	**.139 [.019, .256]**	93
Child-Parent	1	-.030 [-.084, .024]	-	-	-	-	-	-	-
Parent-Child	19	-.001 [-.060, .058]	96	8	.055 [-.017, .126]	89	10	**.170 [.073, .263]**	78
Parent-Parent	19	-.050 [-.129, .031]	97	13	**-.116 [-.207, -.023]**	84	3	**.101 [.024, .176]**	0
Measure: PMU	Q = 20.97, *p* < .001			Q = 14.28, *p* < .01			Q = 11.10, *p* < .05		
Validated measures	23	**.098 [.012, .182]**	94	11	-.023 [-.126, .081]	90	1	.024 [-.026, .074]	-
New/adapted measures	5	.101 [-.044, .243]	93	5	-.031 [-.123, .062]	72	-	-	-
Screen time	68	**-.085 [-.111, -.058]**	90	29	**-.092 [-.148, -.037]**	89	14	**.166 [.097, .233]**	74
Other measures	7	-.050 [-.120, .021]	96	5	.033 [-.002, .067]	75	1	.190 [-.190, .520]	-
Measure: PM	Q = 5.85, *p* = .054			Q = 13.02, *p* < .01			Q = 0.030, *p* = .860		
Validated measures	19	.052 [-.024, .128]	96	9	**-.204 [-.329, -.072]**	84	1	**.121 [.005, .234]**	-
New/adapted measures	52	**-.049 [-.091, -.006]**	90	33	**-.049 [-.095, -.004]**	85	5	**.165 [.044, .282]**	93
Screen time	-	-	-	-	-	-	-	-	-
Single item scales	32	-.053 [-.106, .001]	95	8	.023 [-.019, .064]	92	10	**.152 [.065, .237]**	62

Note. *IGD* Internet Gaming Disorder; *SMD* Social Media Disorder; *PMU* Problematic Media Use; *PM* Parental Mediation; *k* Number of estimates; Boldface estimates significant correlation.