



Are screen media the new pacifiers? The role of parenting stress and parental attitudes for children's screen time in early childhood

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ARTICLE INFO

Handling Editor: Min Jou

Keywords:

Digital media
Screen time
Early childhood
Parenting stress
Parental attitudes

ABSTRACT

Screen media are increasingly shaping our everyday lives, including those of young children. Among other reasons, parents might use screen media as a problem-oriented coping strategy to reduce parenting stress levels. Furthermore, parental attitudes towards children's screen media use have been shown to predict screen time in young children. The present study examines the intertwined roles of parenting stress and parental attitudes to children's screen time throughout early childhood. Parents of $N = 462$ children aged up to 3 years ($M = 1.28$, $SD = 0.61$; 50% female) participated in four assessments within 10 months. Parents reported their level of parenting stress, their attitudes toward young children's screen media use, and their child's screen time at each assessment. Across all measurement time points, results indicated that both parenting stress and positive parental attitudes are positively associated with children's screen time. Furthermore, parental attitudes were found to strengthen the link between stress and children's screen time at two of the four measurement time points. Recommendations for children's screen time should consider parental stress and suggest alternative strategies for coping with parenting stress.

1. Introduction

The late 2000s have made screen media an integral part of daily life, including that of young children. Although screen media can offer new opportunities for learning (Dayanim & Namy, 2015; Richert, Robb, Fender, & Wartella, 2010), they may also pose risks to early childhood development (Chonchaiya, Sirachairat, Vijakkhana, Wilaisakditipakorn, & Pruksananonda, 2015; Madigan, Browne, Racine, Mori, & Tough, 2019; Reid Chassiakos, Radesky, Christakis, Moreno, & Cross, 2016). Because screen use habits are formed in early years and reinforced over time (Lee, Bartolic, & Vandewater, 2009), establishing a healthy relationship to screens during early childhood is of great importance. Parents decide when and how long their child is allowed to spend time on a screen. To identify factors that influence how parents allow children to use screens, the current study examined the relationship between parenting stress, parental attitudes towards children's screen media use,

and children's screen time in early childhood. Specifically, we examined whether parental attitudes towards young children's screen media use moderates the effects of parenting stress on children's screen time.

1.1. Screen media in early childhood

Many children start using screen media devices as young as a few months old (e.g. Radesky & Christakis, 2016). In Germany, 2- to 3-year-olds have an average total screen time of 59 min per day (Kieninger, Feierabend, Rathgeb, Kheredmand, & Glöckler, 2021), and 4- to 6-year-olds spend an average of 56–75 min in front of screens every day (Bernath, Waller, & Meidert, 2020; Kieninger et al., 2021). Higher levels of screen time have been reported in other countries. For example, a recent US national study found that children up to the age of 2–4 years have an average screen time of 2.5 h a day (Rideout & Robb, 2020). The same study found that children's daily screen time increases with age

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(Rideout & Robb, 2020). An increase in children's screen time can also be observed regardless of their age. Another study in the US suggests an increase of 32% in children's screen time in the last two decades (Goode, Fomby, Mollborn, & Limburg, 2020). Other studies from Germany indicate that average screen time for 2- to 3-year-old children has increased from 38 min to 59 min per day since 2014 (Feierabend, Plankenhorn, & Rathgeb, 2015; Kieninger et al., 2021). The rise in children's screen time may be attributed to the proliferation of portable screen media devices, such as smartphones and tablets, which have become widely available since 2007 (Block, 2007).

The extent to which this screen time can be seen as a meaningful extension of toddlers' lives is controversial. Risks attributed to screen media include negative effects on sleep, attention, and learning (Reid Chassiakos et al., 2016). Additionally, screen time is associated with higher incidences of obesity and depression and exposure to inappropriate and unsafe content (Reid Chassiakos et al., 2016). However, other research findings indicate that interactive and social screen-based activities can also offer opportunities for development, such as early learning (Lauricella, Pempek, Barr, & Calvert, 2010; Nielsen, Simcock, & Jenkins, 2008), language acquisition (Kirkorian, Choi, & Pempek, 2016; Reid Chassiakos et al., 2016), exposure to new ideas and knowledge (Reid Chassiakos et al., 2016), and more opportunities for social contact (Strouse et al., 2021). Given that early childhood is a crucial period for experiences that promote development (Black et al., 2017; Britto et al., 2017), establishing reasonable screen time routines in early childhood is of great importance. International health organizations such as the World Health Organization and the American Academy of Pediatrics have issued recommendations for appropriate exposure to screen media to provide guidance to parents of young children. For example, the World Health Organization (2019) recommends that children under 2 years of age should not have any screen time, and 2- to 4-year-olds should not have more than 1 h of screen time, with less being better. However, screen media are ubiquitous in today's world, and preventing children's access to screens might be challenging (Youth and Media & ZHAW Zurich University of Applied Sciences, 2020).

Parents' reasons for using screen media in everyday life with their young children vary and can be categorized as child centered and parent centered. Child-centered reasons include education, learning new skills, acquiring new knowledge, providing entertainment, and preventing boredom, whereas the most frequently cited parent-centered reason is "to keep the child busy so other things can get done", such as completing household chores (Geurts, Koning, Vossen, & Van den Eijnden, 2022; Li, Mendoza, & Milanaik, 2017; Nevski & Siibak, 2016). However, screen media are also used by parents to distract, occupy, and change their children's behavior (Geurts et al., 2022; Li et al., 2017; Nevski & Siibak, 2016; Nikken, 2019), and potentially to reduce their own levels of stress (Duch, Fisher, Ensari, & Harrington, 2013).

1.2. Parenting stress

Stress has been defined as "particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). The transactional model of stress and coping proposes three coping strategies that can be used to handle stress (Lazarus & Folkman, 1984). Emotion-oriented coping is the intrapsychic reduction of emotional arousal, perception-oriented coping is the re-evaluation of the stressful situation, and problem-oriented coping involves the individual actively changing the stressful situation. While caring for their child, parents may manage stressful situations by allowing their children more screen time (Duch et al., 2013; Nabi & Krcmar, 2016; Parks, Kazak, Kumanyika, Lewis, & Barg, 2016; Shin, Choi, Resor, & Smith, 2021; Thompson & Christakis, 2007) or by disregarding the usual limit to their children's screen time (Lampard, Jurkowski, & Davison, 2013; McLearn, Minkovitz, Strobino, Marks, & Hou, 2006; Parks et al., 2016; Tang, Hruska, Ma, & Haines, 2021;

Walton, Simpson, Darlington, & Haines, 2014) in the short term. Other stressful situations in a parent's life, such as maternal depression (Bank et al., 2012; Burdette, Whitaker, Kahn, & Harvey-Berino, 2003; Howe et al., 2017), maternal structural life circumstances (Vaala & Hornik, 2014), maternal relationship dissatisfaction (Pempek & McDaniel, 2016), and household chaos (Emond et al., 2018) are also associated with more screen time in young children. In contrast, a small body of research has found no direct association between parental stress and children's screen time (Certain & Kahn, 2002; Evans Schmidt, Rich, Rifas-Shiman, Oken, & Taveras, 2009; Thompson, Adair, & Bentley, 2013).

Parenting stress is a specific form of stress and should be considered as distinct from other forms of stress (Diener & Swedin, 2020): Parents experience stress with their tasks and responsibilities as a caregiver, and they have to balance their children's needs with their own and other demands, such as for time and resources (Diener & Swedin, 2020). One theory that has gained prominence in this field of research is the P-C-R theory. This theory assumes three main predictors of parenting stress: the characteristics of the parent (P), such as depression, relationship with spouse, and anxiety; characteristics of the child (C), such as mood, agreeableness, and hyperactivity; and the parent-child relationship (R), such as level of conflict (Abidin, 1990, 1997, 2012; Diener & Swedin, 2020). Parenting stress has been shown to be related to factors within parents and children. On the parents' side, parenting stress is associated with higher levels of parental depression (Diener & Swedin, 2020), less effective parenting practices (Huth-Bocks & Hughes, 2008), and a lack of emotional closeness with children (Moreira & Canavarro, 2018). On the children's side, it is related to children's emotional and behavioral problems and to slower social and cognitive development (Diener & Swedin, 2020). Furthermore, the relationship between parenting stress and child behavior problems is bidirectional (Diener & Swedin, 2020). As child behavior problems increase, parenting stress may also increase. Conversely, higher levels of parenting stress can negatively impact children's behavior. Little work has addressed the specific effects of parenting stress on young children's screen time (Beyens & Eggermont, 2017; Shin et al., 2021; Walton et al., 2014), but initial findings suggest a positive relationship between parenting stress and children's screen time (Beyens & Eggermont, 2017; Shin et al., 2021).

1.3. Parental attitudes

Another factor that has been found to be associated with children's screen time is parental attitudes towards young children's screen media use. Attitudes in general are psychological states expressed by approval or disapproval of a particular value or situation (Ajzen, 2001; Eagly & Chaiken, 1993). They refer to an individual's willingness to respond in an evaluative manner to a person, object, situation, or idea, and they can be expressed in the cognitive domain of assumptions and beliefs, the affective domain of feelings and emotions, and the behavioral domain (Ajzen, 2001). One recent qualitative study found a spectrum of parental attitudes to young children's screen time ranging from positive to negative. Positive attitudes refer to screen media for fostering social relationships, as a new teaching tool, and as a convenient babysitter. Negative attitudes relate to concerns of overstimulation, displacement of interactions and other activities, and hindering the child's creativity (Mallawaarachchi, Hooley, Sutherland-Smith, & Horwood, 2022). Quantitative studies have found a positive direct relationship between parents' attitudes about the use of screen media in early childhood and their young children's screen time (Böcking & Böcking, 2009; Cingel & Krcmar, 2013; Duch et al., 2013; Lauricella, Wartella, & Rideout, 2015; Nevski & Siibak, 2016; Njoroge, Elenbaas, Garrison, Myaing, & Christakis, 2013; Vaala & Hornik, 2014). For example, parents who value their young children's familiarity with technology are also more likely to allow their children to use screens. However, other evidence shows that children up to 7 years of age were more likely to use touchscreens but no other screen-related device if the parent found the media helpful

in providing moments of calm for the child (Nikken & Schols, 2015). In summary, most research shows that parental attitudes are behaviorally relevant and consequently related to children's screen time.

1.4. Interaction of parenting stress and parental attitudes

These findings demonstrate that the consideration of environmental factors such as parental stress and parental attitudes can be valuable for understanding children's early screen time. However, studies have yet to examine how parenting stress and parental attitudes interact as predictors of children's screen time. Thus, the question arises which parents are more likely to use children's screen time as a stress reduction coping strategy. The literature cited above suggests that parental attitudes toward young children's screen media use is a predictor of young children's screen time. Therefore, parents who have more positive attitudes toward their children's screen use appear to be more likely to rely on screens for their children when they are stressed. This suggests that parental attitudes may moderate the link between parenting stress and children's screen time. In particular, parenting stress may be assumed to be more likely to lead to the use of screen time as a coping strategy if parents have a positive attitude toward young children's screen media use, because its effects on their children's development is viewed more positively. In contrast, parenting stress may not be linked to more screen time in parents whose attitude toward young children's screen media use is more negative, because if they evaluate screen time as a risk factor for their children's development, they are more likely to use other coping strategies.

1.5. The present study

This study² addresses this research gap by examining the role of parental attitudes in moderating the association between parenting stress and young children's screen time cross-sectionally at four measurement time points over a 10-month period. Therefore, we pose one research question and derive three hypotheses from the current state of research:

Is the relationship between parenting stress and children's screen time moderated by parental attitudes towards children's screen media use in early childhood?

H₁. Parenting stress is positively associated with children's screen time.

H₂. Positive parental attitudes toward young children's screen media use are positively associated with children's screen time.

H₃. Positive parental attitudes toward young children's screen media use positively moderate the association between parenting stress and children's screen time.

2. Methods

2.1. Sample and procedure

The sample consisted of parents of children who were up to 36 months of age at the beginning of the study in February 2021. Parents with multiple children were invited to focus their participation solely on their youngest child. Recruitment took place between January and May 2021 through a variety of channels, such as newsletters from nonprofit organizations dedicated to the well-being of children, posts in social media, advertisements and articles in parenting magazines, and flyers

² In this paper, the term "children's screen time" is used to refer to the outcome variable, which includes the children's engagement with screens measured in time. The term "parental attitudes" refers to the approval or disapproval of children's use of screen media in the first 4 years of life. It is in these senses that we refer to parental attitudes towards young children's screen media use.

distributed at daycare centers, pediatricians, and maternal and paternal counseling centers. Of the total of 474 registered participants, 12 did not participate in any of the four diary weeks and thus were excluded from further calculations, resulting in a final sample of $N = 462$. The numbers of participants remained relatively stable across the four measurement time points: $n = 406$ at T1, $n = 454$ at T2, $n = 422$ at T3, and $n = 430$ at T4. The number of participants at T2 was higher than at T1 because recruitment was not completed until May 2021. Of the parents who registered before the first diary week ($n = 408$), 366 (90%) participated in all four waves of assessment, 20 (5%) participated in three, 15 (4%) in two, and 7 (2%) in one. Of the parents who registered after the first diary week ($n = 54$), 47 (87%) participated in three waves of assessment, 3 (6%) participated in two, and 4 (7%) in one. However, a test for all relevant variables³ revealed that participants who completed⁴ the study did not differ from those who did not in educational level, household income, parenting stress, parental attitudes, or children's screen time at T1. Therefore, the data were assumed to be missing at random, and the full information maximum likelihood method was used for analyses. Approximately 70% of the participants and roughly 59% of their partners hold at least a university degree. At baseline, the majority of participants resided in Switzerland ($n = 455$), some in Germany ($n = 5$), Georgia ($n = 1$), and Mexico ($n = 1$). For more information on the

Table 1
Descriptive statistics.

	T1	T2	T3	T4
Time point	Mar 21	Jun 21	Sep 21	Jan 22
<i>n</i>	406	454	422	430
Children				
Mean Age (SD)	1.28 (0.61)	1.51 (0.64)	1.76 (0.65)	2.09 (0.65)
Sex (female)	50%	51%	50%	50%
Siblings (SD)	0.60 (0.74)	0.64 (0.75)	0.69 (0.77)	0.72 (0.75)
Participants				
Mean Age (SD)	35.77 (4.10)	36.00 (4.22)	36.30 (4.14)	36.59 (4.13)
Sex (female)	93%	93%	93%	93%
Education (\geq Uni)	71%	70%	69%	70%
Mean Annual Income (SD)	59,458 (29,816)	59,863 (29,379)	59,419 (29,125)	59,558 (29,396)
SSS Education	7.35 (1.33)	7.38 (1.23)	7.33 (1.31)	7.36 (1.30)
SSS Money	6.11 (1.41)	6.12 (1.37)	6.12 (1.35)	6.15 (1.33)
SSS Occupation	6.93 (1.59)	6.97 (1.6)	6.94 (1.58)	6.98 (1.53)
Partner				
Mean Age (SD)	37.76 (5.09)	37.95 (5.11)	38.22 (5.09)	38.51 (5.00)
Sex (female)	7%	7%	8%	7%
Education (\geq Uni)	59%	59%	58%	59%
Mean Annual Income (SD)	92,416 (32,426)	91,808 (32,622)	90,939 (31,676)	91,618 (32,137)

Note. Age in years; Sex assigned at birth; Income in CHF, mean of the annual household income; Subjective socioeconomic status (SSS) was measured with an adjusted form of the German version of the MacArthur scale (Adler, Epel, Castellazzo, & Ickovics, 2000; Hoebel, Müters, Kuntz, Lange, & Lampert, 2015) asking participants to place themselves on a 10-rung "social ladder" in the categories of education, money, and occupation. Uni = University.

³ The manifest mean variables used were of parental stress, parental attitudes, and children's screen time at T1.

⁴ Participants who registered for the study before the first diary week and completed a total of four diary weeks and participants who registered for the study after the first diary week and completed a total of three diary weeks were all considered.

sample, see Table 1.

The present study includes data from the research project "Children and Digital Media" (KiDiM-study), conducted in Switzerland. Four waves of data assessment were conducted in March 2021 (T1), June 2021 (T2), September 2021 (T3), and January 2022 (T4). The study was approved by the Ethics Committee of the University of Zurich. Participants were offered various incentives to take part in the study: (1) a surprise gift (magnet with study logo) for registering to participate in the study; (2) the opportunity to take part in a raffle after each diary week, in which $3 \times \text{CHF } 100$ and $10 \times$ an institute's journal on issues related to early childhood were to be won; (3) and the possibility to participate in the main raffle at the end of the study, in which a voucher worth CHF 300 for an activity of one's choice was to be won. In addition, parents received individualized feedback about their children's activity and development, if they desired. All parents were extensively informed about the study aims and procedures and gave their informed consent to participation. Because participation in the study involved the parents in observation and documentation tasks, participants were always addressed as co-researchers in a citizen science approach. At each measurement point, a diary week was conducted during which nine online questionnaires were administered consecutively. Questionnaires were administered through LimeSurvey. Each primary diary week started on a Friday and was announced two days prior by email. A substitute diary week was held one week later for those participants who had not been able to participate in the primary week. A diary week included a questionnaire on Friday, seven daily reviews of children's activities and selected focus topics on Saturday through Friday, and a closing questionnaire on Saturday. Every day at 6 p.m., parents received an individualized link to an online questionnaire and were asked to complete it on the same day after their child fell asleep. Participants who were unable to complete the questionnaire by 10 a.m. the next morning were reminded by email and asked to complete the questionnaire for the previous day. Any participants who did not complete the first three questionnaires were excluded from participation in this primary diary week on the fourth day, Monday, and instead invited to participate in the substitute diary week starting the following Friday. Any participants who did not complete the first three questionnaires of the substitute diary week were again excluded from participation on the fourth day, Monday. Furthermore, another questionnaire was sent to participants in February at the beginning of the study (T0), or directly after study registration if study enrollment was later than February, to collect demographic information. Each participant was assigned an individual token, a sequence of letters and numbers, at the beginning of the study, and this token was used to merge the data from the four waves. The study was conducted in German.

2.2. Measures

The following section describes the measures used in this paper. An overview of these measures, their items, and their query timing can be found in Table A.1 in Appendix A.

2.2.1. Children's screen time

Children's screen time was carefully determined from various data sources. We used single items, as has been done in other research (e.g., Benita, Gordon-Hacker, & Gueron-Sela, 2020; Dynia, Dore, Bates, & Justice, 2021; Levelink et al., 2020; Lin et al., 2020), at different time points with different online questionnaires during the diary week, which aligns with current approaches (e.g., Barr et al., 2020), and supplemented with additional activity-specific subquestions to test for convergence of responses. This approach is a strength of our study. In this way, the convergent validity of the various measurements can be ensured, which is in line with current approaches for measuring screen time of young children (e.g., Barr et al., 2020). Three sources were used to measure children's screen time: (1) In the initial questionnaire of the diary week, one question asked about the child's average daily screen

time in the previous week with a response format of 0–12 h in 0.25-h increments. (2) During the diary week, on days 1, 3, 5, and 7, we asked how much time the child had spent with a screen that day. The response format was again from 0 to 12 h in 0.25-h increments. On each of these days, if the child had spent any time with a screen, the participants were asked which media content the child had consumed. Participants were asked to specify the three most frequent media content types and the corresponding screen time per type. If the participant indicated three media content types, we then asked whether the child engaged with any other media content types and if so, we asked the participants to specify the screen time for these other media content types. The response format for screen time of each content type ranged from 0 to 120 min in 1-min increments. During the data cleaning process, the time the child was reported spending with a screen on an average day was compared to the sum of the times reported for each media content type. Wherever differences of ≥ 0.25 h occurred, the sum of the screen times per media content type was used because this response format was assumed to be more accurate. If a difference of ≥ 0.25 h occurred because the participant did not know which media content type the child had engaged with or for how long, the information related to duration from the initial question was used for subsequent calculations. (3) In the final questionnaire, we asked how much time the child spent (a) watching videos, including television (e.g., YouTube, cartoons), (b) looking at digital photos, pictures, and picture books, and (c) playing with interactive apps and puzzles during the diary week. Options (b) and (c) were asked about children older than 3 months of age. The data for these three items' duration of use were summed to create a new variable representing the average daily screen time for the diary week. All variables of children's screen time mentioned were checked for outliers during the data cleaning process. Suspiciously high values (≥ 4.5 h of screen time per day) were checked against the time data on other days and diary weeks and defined as missing values if inconsistencies of ≥ 6 h were found. McDonald's omega of children's screen time was $\omega_{T1/T2/T3/T4} = 0.79/.80/.90/.92$.

2.2.2. Parenting stress

To assess parenting stress, we selected items from the Parental Stress Questionnaire (PSQ; Domsch & Lohaus, 2010). The PSQ was developed to assess the subjective parental stress experience as well as a range of stress and stress-relief factors related to parenting. The questionnaire consists of four scales: parental stress experience, role restriction, social support, and partnership. To manage the size of the questionnaire battery, five items selected from the parental stress experience subscale (17 items) were included in the questionnaire: original items no. 2, 4, 12, 14, and 18. Participants rated each item on a Likert scale ranging from 1 (disagree) to 6 (agree). The response format of this scale was adapted to the response format for the other questions in the online questionnaires. In this study, McDonald's omega for the parenting stress scale was $\omega_{T1/T2/T3/T4} = 0.80/.84/.85/.84$.

2.2.3. Parental attitudes

Parental attitudes toward young children's screen media use were assessed using three self-developed items: "I find it good when [Child's first name] uses screen media.", "It is important for children to learn how to use screen media responsibly as early as possible.", and "Children must learn to use screen media as early as possible.". The first item was inspired by an item from a study of parents' attitudes toward digital technology (Shin & Li, 2017) and aimed to assess the parental attitude towards children's screen media use in a more general manner. The second and third items ask about parents' attitudes toward children's early screen media competences, with one referring to technical media skills and the other to self-regulatory media skills, including responsible use of screen media. These items were developed both from the finding that parents who have more positive attitudes toward digital technologies are more likely to allow their children to learn from and engage with them (Nikken & Oprea, 2018), and from the argument that it is

important to promote digital literacy earlier in life rather than later (Rogow, 2015). Items were again rated on a Likert scale ranging from 1 (disagree) to 6 (agree). At T1 and T2, the question introduction “To what extent would you agree with the following questions?” was used without reference to a specific time frame because we assumed that the questions were answered with reference to the present time. However, feedback from study participants suggested that a temporal reference point would provide more clarity. For this reason, at the measurement time points T3 and T4, we stated in the introduction that the questions refer to the present time point. McDonald’s omega for these three items was $\omega_{T1/T2/T3/T4} = 0.62/.65/.66/.69$, which indicates a rather low internal consistency. However, this was likely due to the items intentionally measuring different aspects of the construct and therefore differing more strongly. When capturing a broad attitude construct, moderate internal consistency should not be seen as a limitation, because it is important for construct validity that intercorrelations are not too high (Stadler, Sailer, & Fischer, 2021; Steger, Jankowsky, Schroeders, & Wilhelm, 2022; Taber, 2018).

2.3. Analysis strategy

To tame the complexity of our analysis strategy, it was necessary to reduce the number of items for children’s screen time. Thus, we averaged the four adjusted variables from the reviews for days 1, 3, 5, and 7, which resulted in three indicators for the latent variable representing screen time: (*st1*) the child’s daily average screen time in the previous week; (*st2*) the averaged variables from the daily reviews, representing the daily average screen time of the child in the diary week; and (*st3*) the average daily screen time for the diary week calculated from screen-related activities. The mean and variance of the latent variable was estimated without over-representing an arbitrarily chosen indicator by using the effect coding method (Little, 2013). We modeled children’s screen time as a latent variable; because the similarity of corresponding indicators was very high, they could be considered interchangeable items. Further, we considered parenting stress and parental attitude as manifest variables and used the means of the corresponding items to form the manifest constructs. We chose manifest modeling for these two variables because these items differed more strongly in content from each other. They were intended to measure broader constructs and therefore cannot be seen as interchangeable, which is an important theoretical assumption for typical reflective latent variables (White et al., 2022). This approach also reduced the complexity of modeling the interaction between the manifest effects of parenting stress and parental attitudes on children’s screen time.

Finally, to analyze the data for our research question and hypotheses, a trivariate latent-manifest model with interaction was estimated for each measurement point to assess the concurrent relationships (see working model in Fig. 1).

To check the robustness of educational level, we computed an additional analysis with weighted data⁵ for the distribution of educational level in the Swiss population of parents with at least one child under 3 years of age.

Four model fit indices were taken into account: The ratio between the chi-square (χ^2) and degrees of freedom (*df*), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and

⁵ According to the Federal Statistical Office, 43.4% of all women and 35.4% of all men with at least one child under the age of 3 years in a household had at least a university or university of applied sciences degree in 2021. To carry out the weighting, these figures were set in relation to our sample (93% women, 7% men: $43.4\% \times 0.93 = 40.36\%$; $35.4\% \times 0.07 = 2.48\%$) to obtain the total number of participants with at least a university or university of applied sciences degree ($40.36\% + 2.48\% = 42.84\%$). Finally, the ratio of 42.84% was used to weight the distribution of educational levels present in the sample ($\geq 70.35\%$ university or university of applied sciences degree).

the standardized root mean square residual (SRMR).

We included four covariates in all models: child’s age, participant’s education level, gross household income, and number of siblings, all measured at baseline (T0). The participant’s educational level and the number of siblings were included as interval-scaled variables. The gross annual household income⁶ consisted of the sum of the gross annual income of the participants and their partners.

3. Results

3.1. Descriptive statistics

Descriptive statistics and bivariate correlations of the variables included in this study are provided in Tables 2 and 3, respectively. From T1 to T4, the correlation of children’s screen use was $r = 0.67$, indicating moderate to strong stability in individual differences in this variable over the course of 10 months. For significant differences in children’s screen time between measurement time points, see Table S.1 in the Supplement.

3.2. Concurrent relations

At each measurement point, the models were found to fit the data accurately. Information on the model fit indices and the standardized results can be found in Fig. 2 and Table A.2 in the Appendix, respectively. The analyses show that parenting stress was positively related to children’s screen time at all measurement points, although the relation was only marginally significant at T2: Parents with higher stress levels tended to allow their young children more screen time than parents with lower stress levels. Effect sizes ranged from $\beta = 0.11$ to $\beta = 0.20$. Further, parental attitudes were found to be related at each of the four measurement time points, with effects ranging from $\beta = 0.32$ to $\beta = 0.39$, indicating that children’s screen time was higher with more positive parental attitudes toward young children’s screen media use. Furthermore, a positive interaction effect between parenting stress and parental attitudes was found at T1 and T4, but not at the other measurement time points (see Fig. 3). At T1, for instance, parents with negative attitudes⁷ towards young children’s screen media use allowed their children about 9.5 min⁸ screen time when they experienced low levels of stress and about 10 min when they experienced high levels of stress. In contrast, parents with a positive attitude towards young children’s screen media use allowed their children about 17.5 min screen time when they experienced low levels of stress and about 28 min when they experienced high levels of stress. T4 shows the same pattern: Parents with negative attitudes towards young children’s screen media use allowed their children about 5 min screen time when they experienced low levels of stress and about 8.5 min when they experienced high levels of stress. Conversely, parents with a positive attitude towards young children’s screen media use allowed their children about 17 min screen time when they experienced low levels of stress and about 33.5 min when they experienced high levels of stress. Further, as for the control variables, children’s age was moderately positively associated with children’s screen time, $\beta_{T1/T2/T3/T4} = 0.31/.32/.25/.21$ ($p < .001$). Participants’ educational level showed little association ($\beta_{T1/T2/T4} = -0.07/-0.04/-0.05$, all $p > .10$; $\beta_{T3} = -0.10$, $p = .065$) with children’s screen time. Participants’ gross household income ($\beta_{T1/T2/T3/T4} = 0.08/.08/.01/-$

⁶ To avoid irritations in the model estimation, the number of annual gross household income was divided by 100,000.

⁷ The term “negative attitude” here means -1 standard deviation (-1 SD) from the mean, and “positive attitude” means $+1$ standard deviation ($+1$ SD) from the mean. For parenting stress, “high levels” means $+1$ SD from the mean and “low levels” means -1 SD from the mean.

⁸ The minutes given in this section are calculated from estimates with reference to the interaction graphs in Fig. 3.

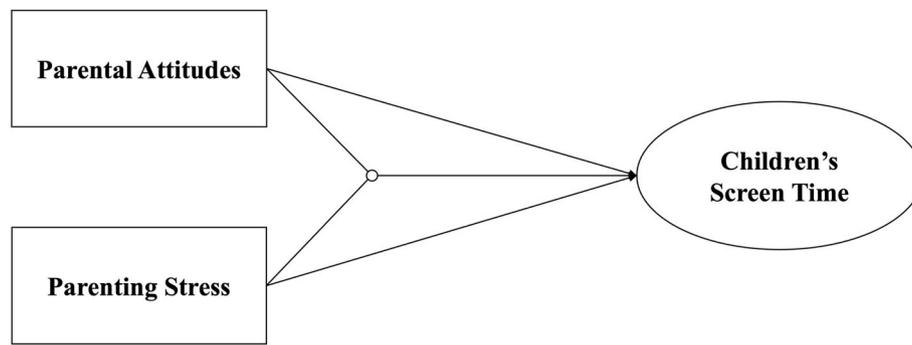


Fig. 1. Working model of the moderation model.

Table 2
Descriptive statistics of the relevant constructs.

Variable	n	M	SD	Md	Min	Max
<i>Children's screen time</i>						
T1	405	11.28	19.72	1.25	0.00	145.00
T2	451	12.26	17.96	5.00	0.00	120.00
T3	422	13.85	21.40	6.00	0.00	135.00
T4	428	20.02	25.71	12.86	0.00	203.57
Age <4 months	22	1.86	4.44	0.00	0.00	20.00
Age 4–9 months	168	4.41	10.22	0.00	0.00	60.00
Age 10–18 months	573	7.17	13.58	1.25	0.00	100.00
Age 19–24 months	430	16.03	21.18	10.00	0.00	140.00
Age 25–30 months	318	22.74	26.54	15.00	0.00	203.57
Age 31–36 months	144	27.59	27.45	19.29	0.00	145.00
Age 37–42 months	41	27.06	26.31	18.57	0.00	120.00
Age 43–48 months	10	41.76	32.91	30.50	15.00	127.50
<i>Parenting stress</i>						
T1	396	2.06	0.89	1.80	1	5.6
T2	429	2.26	0.99	2.00	1	5.8
T3	400	2.37	1.00	2.20	1	5.6
T4	401	2.46	0.99	2.20	1	6
<i>Parental attitudes</i>						
T1	401	2.53	1.08	2.33	1	6
T2	444	2.51	1.06	2.33	1	6
T3	412	2.71	1.19	2.67	1	6
T4	418	2.72	1.13	2.67	1	6

Notes. Md = Median; Children's screen time is here presented in two ways: (1) by time of measurement and (2) by age category, each in minutes. The mean values are calculated from the manifest variables.

0.01; all $p > .10$) and the number of siblings ($\beta_{T1/T2/T3/T4} = 0.00/.00/.01/.02$; all $p > .10$) also showed little association with children's screen time. Furthermore, when data were weighted by the distribution of educational levels in the Swiss population of parents with at least one child under the age of 3 years, the effects' patterns remained the same (see Table A.3 in Appendix A).

Table 3
Descriptive statistics and bivariate correlations among study variables.

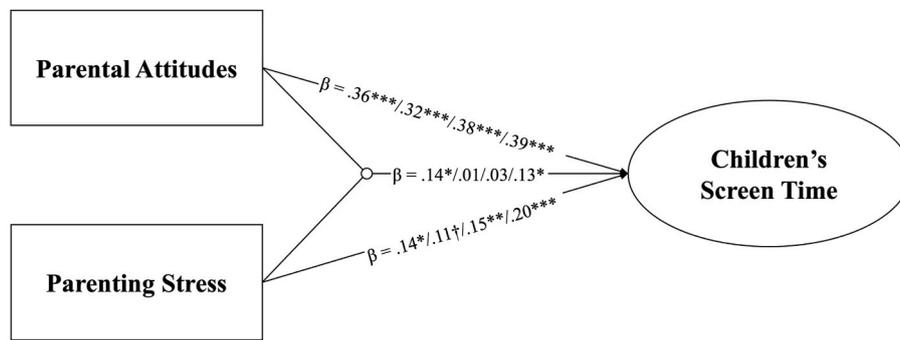
Variable	n	1	2	3	4	5	6	7	8	9	10	11
1. Screen Time T1	405	–										
2. Screen Time T2	451	.76***	–									
3. Screen Time T3	422	.72***	.77***	–								
4. Screen Time T4	428	.67***	.72***	.83***	–							
5. Parenting Stress T1	396	.30***	.31***	.39***	.33***	–						
6. Parenting Stress T2	429	.22***	.23***	.27***	.28***	.72***	–					
7. Parenting Stress T3	400	.14**	.17***	.24***	.23***	.69***	.77***	–				
8. Parenting Stress T4	401	.16**	.19***	.23***	.27***	.63***	.68***	.72***	–			
9. Parental Attitudes T1	401	.38***	.37***	.33***	.37***	.16**	.10*	.07	.06	–		
10. Parental Attitudes T2	444	.39***	.34***	.33***	.38***	.22***	.15**	.07	.05	.60***	–	
11. Parental Attitudes T3	412	.39***	.36***	.41***	.41***	.16**	.09	.10	.05	.53***	.67***	–
12. Parental Attitudes T4	418	.36***	.35***	.37***	.43***	.20***	.12*	.08	.07	.59***	.70***	.66***

* $p < .05$; ** $p < .01$; *** $p < .001$.

4. Discussion

The present study explored the moderating role of parental attitudes toward young children's screen media use in the association between parenting stress and children's screen time. Confirming our hypotheses H₁ and H₂, findings suggest a positive relationship both between parenting stress and children's screen time and between parental attitudes and children's screen time. Additionally, our findings revealed that parental attitudes strengthened the relationship between parenting stress and children's screen time at two of four measurement time points, which is why we conclude our hypothesis H₃ is partially supported. Here, we first discuss the descriptive results and then the inferential statistical results and contextualize each in turn. Subsequently, the strengths and weaknesses of the present study are discussed, followed by a conclusion and directions for future research.

The descriptive results show that children as young as a few months old already have contact with screen media, and by the age of 19–24 months, they spend an average of 16 min a day with a screen. From age 24–48 months, daily screen time descriptively increased from 23 to 42 min. It should be noted here that the increase in screen time in our cross-sectional evaluation is descriptive and does not indicate a longitudinal increase in individual children. The daily screen time of the children in our sample was about half that of a recent study from Germany (Kieninger et al., 2021), in which the daily screen time of 2- to 3-year-old children was reported to be 59 min on average. Given that young children of parents with lower socioeconomic status, as measured by education level and household income, tend to spend more time in front of a screen (Duch et al., 2013), part of difference between these findings could be because our sample consisted predominantly of participants with a high level of education. However, Kieninger et al. (2021) also noted that the representativeness of their sample was limited because of high educational levels, which makes a plausible explanation for this deviation challenging to formulate. Another reason may have been the topic and research procedures of the present study. Participants knew



Note. Adjusted for child's age, siblings, participants' educational level, and annual household income.

$\dagger p < .10$; $* p < .05$; $** p < .01$; $*** p < .001$

Fig. 2. Standardized Results of the Cross-Sectional Models on Children's Screen Time.

Note. Adjusted for child's age, siblings, participants' educational level, and annual household income. $\dagger p < .10$; $* p < .05$; $** p < .01$; $*** p < .001$.

that the study was about young children's use of screen media. This fact may have had a preventive effect such that parents allowed their children less screen time during the measurement time points (Martin, Bednarz, & Aromataris, 2021). Descriptive data for children's screen time at the four measurement time points showed that screen time was higher at T4 than at T1–T3. Possible reasons for this could be external factors, such as the colder season of the year at T4 (e.g., Atkin, Sharp, Harrison, Brage, & van Sluijs, 2016) or the omicron wave of federal responses to Covid-19, which included restrictions on indoor and outdoor meetings with family and friends (e.g., Guan et al., 2020). Furthermore, the parents in our sample leaned towards a negative attitude toward young children's screen media use. However, parental attitudes changed over time to a more positive attitude. This is in line with recommendations to allow longer screen use for children as they grow older (e.g., Canadian Paediatric Society, 2017; World Health Organization, 2019). Our findings further showed that parenting stress appeared to increase over time. Such an increase in parental stress could be a sign of an increase in child behavior problems (Abidin, 1990, 2012; Diener & Swedin, 2020). This is unexpected because longitudinal studies have shown that parenting stress tends to decrease during early childhood (Stone, Mares, Otten, Engels, & Janssens, 2016; Williford, Calkins, & Keane, 2007); the explanation for this is that children's behavioral challenges tend to decrease during this time as they become more independent. Consequently, as parents need to spend less energy on monitoring and regulating their children's emotions during the day, parenting stress may decrease (Williford et al., 2007).

4.1. Parenting stress and children's screen time

The inferential statistical findings showed that more parenting stress was associated with more screen time for children. Therefore, our hypothesis H₁, which assumed a positive relationship between parenting stress and children's screen time, was confirmed. This positive relationship is consistent with results from previous cross-sectional research into the role of parenting stress (Beyens & Eggermont, 2017; Shin et al., 2021) and other kinds of stress experiences in parents (Duch et al., 2013; Nabi & Krcmar, 2016; Parks et al., 2016; Thompson & Christakis, 2007) on young children's screen time. This positive relationship has several potential explanations. Because parenting behaviors are disrupted by parenting stress (Warren & Aloia, 2019), parents may deviate from their usual rules or limits on screen media use and allow their children more screen time in the short term to reduce their own stress levels. In fact, this explanation is consistent with research that has examined the relationship between parental stress and children's screen time.

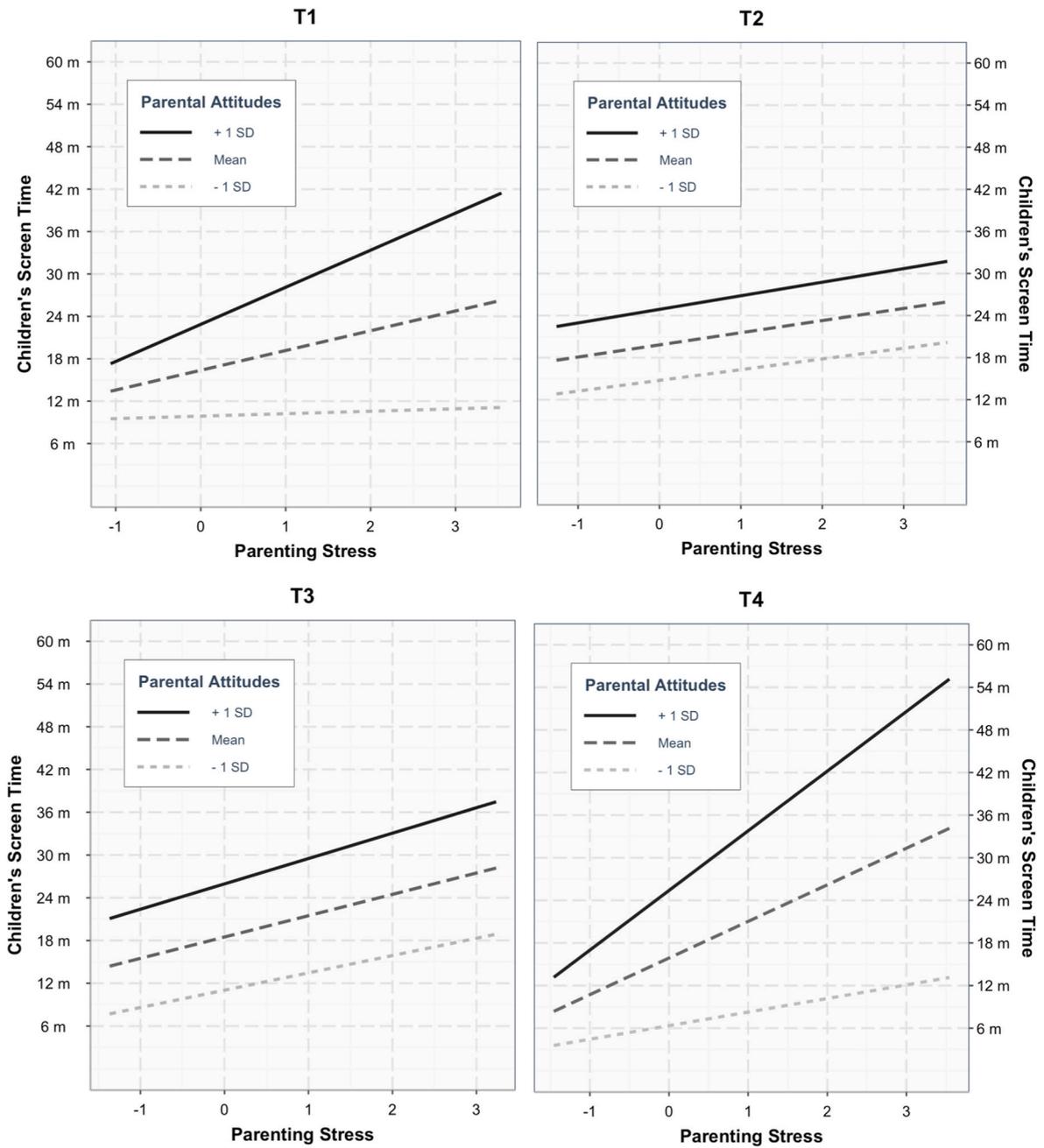
Consequently, parenting stress may make enforcing rules for children's screen time more difficult for parents. Indeed, limiting children's screen time may itself create a stressful situation that can lead to further parent-child conflict (Coyne et al., 2017) and thus increase parenting stress. Parents may also intend to protect their children from possibly inappropriate parental behaviors that can be triggered by stress by allowing their children screen time to gain some respite for themselves (e.g., Parks et al., 2016). In addition, screen media may also be consciously considered as a tool for problem-oriented coping with parenting stress and used accordingly. This could in part be due to the lack of alternative coping strategies available to parents at the time they experience stress, such as expressing feelings, taking time out, meditating, playing outdoors, enjoying humor, focusing on the positive, and seeking social support. Finally, it may also be due to the perception of screen media as an effective tool for keeping children quiet and therefore preferred when coping with stress.

4.2. Parental attitudes and children's screen time

Our results suggest that a more positive parental attitude toward young children's screen media use is strongly associated with more screen time for children, which is also consistent with previous research (Böcking & Böcking, 2009; Cingel & Krcmar, 2013; Duch et al., 2013; Lauricella et al., 2015; Nevski & Siibak, 2016; Njoroge et al., 2013; Vaala & Hornik, 2014). Consequently, our hypothesis H₂ was confirmed. Consistent with previous research (Cingel & Krcmar, 2013; Lauricella et al., 2015), we find parental attitudes to be a major contributor to children's screen time. Parents with more positive attitudes toward young children's screen media use may encourage or allow their children more screen media, whereas parents with more negative attitudes toward young children's screen media use may establish and enforce more rules for minimizing or regulating use. This might be because young children rely greatly on their parents in their first years of life.

4.3. The moderating role of parental attitudes

We were able to show that more positive parental attitudes toward young children's screen media use strengthen the positive association between parenting stress and children's screen time. This result indicates that parents with a more positive attitude toward young children's screen media use may allow their children more screen time in the short term to cope with stressful parenting situations than parents whose attitudes are more negative. In other words, parents are more likely to use screen media for their children during increased parenting



Note. Values of parenting stress and parental attitudes were mean centered and adjusted for child's age, siblings, participants' educational level, and annual household income.

Fig. 3. Interaction Between Parenting Stress and Parental Attitudes on Children's Screen Time at T1, T2, T3, and T4.

Note. Values of parenting stress and parental attitudes were mean centered and adjusted for child's age, siblings, participants' educational level, and annual household income.

stress if their attitudes toward young children's use of screen media are more positive. However, because this positive moderation effect was significant only at T1 and T4 and effects were very close to zero at T2 and T3, hypothesis H₃ can only partially be accepted. This variation across the time points could be explained by the seasons. The effect could be found in March 2021 in rather cold temperatures and changeable weather conditions in early spring and the following January 2022 in cold winter weather, but not in the intervening months of June 2021 in warm summer weather and September 2021 in generally warm temperatures and changeable fall weather conditions. This variation may occur because parents see fewer opportunities to cope

with stressful situations during colder seasons when less time can be spent outside. Another reason could be the effects of the Covid-19 pandemic. Covid-related federal protective measures included restrictions on family and friends gathering both indoors and outdoors, the closure of sports and recreation facilities, and quarantine and isolation instructions. These restrictions were more stringent at T1 and T4 in Switzerland and may have negatively impacted joint family activities and maintaining children's daily routines, which has been shown to be linked to parents' well-being (Adams, Smith, Caccavale, & Bean, 2021). In addition, parents spent more time at home during the colder months of the year, which may also have led to a stronger association between

stress and children's screen time in parents with more positive attitudes toward young children's screen use.

4.4. Strengths and limitations

The present study has several strengths, including a large sample from different Cantons in Switzerland and four measurement time points with little attrition between them. A possible reason for the low attrition could be the citizen science approach we adopted. The feedback received from participants indicated clearly that many were proud to be active co-researchers in our research project. Further, children's screen time was thoroughly measured from multiple data sources. This innovative approach to collecting media exposure data used online questionnaires and 24 h-recall diaries following recent recommendations by the Comprehensive Assessment of Family Media Exposure (Barr et al., 2020). Furthermore, as few studies to date have examined the relationship between parenting stress, parental attitudes toward young children's screen media use, and the screen time of children under the age of five, this study contributes to our knowledge base on the short-term influences of parenting stress and parental attitudes on children's screen time throughout the first years of life. Finally, the study not only examined the association between parenting stress and children's screen time in isolation but also sought to investigate the underlying mechanisms by including parental attitudes toward young children's screen media use as a moderator. This adds to our understanding of when and why parents allow their children screen time as a strategy for coping with parenting stress. A more comprehensive understanding of the reasons why parents allow their children screen time provides a basis for designing appropriate and effective support for parents, such as alternative suggestions for coping with parenting stress and reflecting on attitudes toward young children's screen media use.

However, there are also some limitations that need to be considered: First, the study was conducted only in Switzerland. Since only one of the four national languages of Switzerland (German, French, Italian, Rhaeto-Romanic) was included, the sample can only be assumed to reflect German-speaking Switzerland. A study that included data from several European countries found that young children of parents with migrant backgrounds tended to have higher screen time than young children with parents without migrant backgrounds (Iguacel et al., 2018). Thus, the limitation of this study to the German language may have resulted in a less diverse sample. Second, the broad data collection combining multiple approaches required substantial time and effort from the parents. Nonetheless, 89% of the study participants completed all the diary weeks. We can therefore assume that the participants' intrinsic motivation in this sample was rather high. Furthermore, individuals with limited resources, such as lower socioeconomic status, are underrepresented in the study, and such status is related to higher levels of parenting stress (Diener & Swedin, 2020; Steele et al., 2016) and more children's screen time (Duch et al., 2013). We also note a bias towards a generally well-educated sample: about 70% of the participants and about 59% of their partners have a university degree. However, when the data are weighted by the distribution of educational attainment in the Swiss population of parents with at least one child under the age of 3 years, the pattern of the effects remain unchanged. In addition, we cannot exclude the possibility of a certain self-selection bias in the study sample. Our sample may overrepresent parents who felt comfortable reporting on their children's screen time, whereas other parents who may feel insecure or even guilty about their child's screen time may not have participated. A study with parents in control groups who were repeatedly asked about their children's screen use reported that participating in the study might have mildly affected their attitudes and allowance towards their children's screen time (Martin et al., 2021). Furthermore, most of the study participants were women (93%), indicating that the present results likely relate mainly to mothers. However, this strong preponderance of one gender in our sample in no way weakens the validity of our findings because the mothers in our sample

had more contact with the child than the fathers and were therefore able to make more valid statements about their children's screen time and development and their own stress levels and attitudes (see Table A.4 in the Appendix). Further, the cross-sectional results presented here are correlative in nature; thus, the direction of effects cannot be determined. It is therefore also conceivable, for example, that children's screen time influences parental attitudes toward young children's screen media use. Parents may change their attitudes to better match their children's screen time, for instance to decrease cognitive dissonance (Perlovsky, 2013). In addition, parental stress, parental attitudes, and children's screen time were assessed with parental self-reports. Moreover, to measure parental attitudes, we used a self-developed scale with three items, all of which were positively worded. We avoided negatively worded items because these can trigger increased method variance and substantially reduce item discrimination (Lindwall et al., 2012; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Sliter & Zickar, 2014). In general, an inherent difficulty with studies relying on self-reports is that they are potentially subject to social desirability bias (Paulhus, 2017). In our study, no social desirability scale was used to measure social desirability bias. However, several precautions were taken to mitigate social desirability: First, we collected data through online surveys, as it has been shown that participants in telephone and face-to-face surveys are more likely to try to please the interviewer by guessing which answers are acceptable (Grimm, 2010). In particular, children's screen time was measured several times during the diary week to control for recall errors and social desirability. Second, we designed the online questionnaire so that respondents could always skip an item if preferred. Importantly, we also emphasized that the data would be treated confidentially and processed in anonymized form (Grimm, 2010).

4.5. Conclusion and directions of further research

Overall, both parenting stress and parental attitudes toward young children's screen media use were associated with children's screen time. In addition, more positive parental attitudes toward children's screen media use in early childhood tended to strengthen the link between parenting stress and children's screen time. The findings from our study indicate that young children's screen media use may play an important role in helping parents cope with parenting stress. Consequently, screen media may be used as a modern pacifier (Elias, Lemish, Dalyot, & Floegel, 2021; Elias & Sulkin, 2017; Lev & Elias, 2020) by some parents. Accordingly, recommendations for screen media use during childhood that simply limit children's screen time may be insufficient in supporting parents (e.g., World Health Organization, 2019). It is possible that, in certain cases, recommendations may even add to parental stress, because they may be well aware of such recommendations yet be unable to adhere to them as a result of both the stress itself and the lack of alternative strategies. Since parenting stress is associated with a lack of resources to cope with the demands of parenting (Diener & Swedin, 2020; Neece, Green, & Baker, 2012), parents with higher levels of parenting stress logically need additional resources and information on alternative coping strategies to help them play their role as parents. Therefore, providing parents with a portfolio of alternative parenting stress reduction techniques may increase the likelihood that parents will find a coping strategy that meets their specific needs and circumstances. For example, strategies, such as taking a different perspective on the situation (e.g., Troy, Shallcross, & Mauss, 2013), seeking social support (e.g., Barlow, Smailagic, Huband, Roloff, & Bennett, 2012; Furlong et al., 2012), reviewing one's own parenting practice (e.g., Knerr, Gardner, & Cluver, 2013), or engaging in play time with the child (Lin, 2010) may be helpful in improving parent-child relationship and thus mitigating parenting stress (see P-C-R theory; Abidin, 1990, 1997, 2012; Diener & Swedin, 2020). In addition, recommendations may play an important role in shaping parental attitudes, especially when they are disseminated by global institutions such as the World Health Organization (2019). Therefore, it is important to provide parents with

differentiated and evidence-based recommendations that do justice to the complexity of the issue and the specific contexts of diverse families. Accordingly, to provide parents with more differentiated recommendations for their children’s screen use, future research should continue to (1) identify the individual and situational factors that may influence children’s screen use. (2) Additionally, contextual factors of children’s screen media use, such as parental co-viewing vs. viewing alone, and content-related factors, such as non-educational vs. educational content, seem to influence child development more than the mere time spent with screens (e.g., [Guellai, Chopin, Somogyi, & Esseily, 2022](#)). Consequently, future research should focus on such factors and thus continue to assess the moderating role of individual and contextual factors on the effect of screen time on young children’s development. (3) Lastly, future research should continue to focus on examining the key determinants of parenting stress, including characteristics of the parent, the child, and their relationship (P–C–R theory; [Abidin, 1990, 1997, 2012](#); [Diener & Swedin, 2020](#)), which will allow for the development of appropriate interventions and recommendations for parents with the aim to improve the parent-child relationship and reduce parenting stress.

Author contribution statement

Valérie Brauchli contributed to the study design, data collection,

data modeling, and wrote a first draft of all sections of this manuscript. Fabio Sticca is Principal investigator of the study, developed the study design, oversaw study implementation and data collection. He oversaw data modeling, contributed to the conceptual development of this manuscript, and edited all sections of this manuscript. Peter Edelsbrunner contributed to the data modeling and edited all sections of this manuscript. Agnes von Wyl provided conceptual input to the development of the manuscript and edited all sections of the manuscript. Patricia Lannen is co-investigator of the study. She contributed to the study design and study implementation, contributed to the conceptual development of the manuscript, and edited all sections of the manuscript. All the authors reviewed a final draft of the manuscript and approved the submitted version.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chb.2023.108057>.

Appendix A

Table A.1
Measures and Items

Manifest/ latent variable	Item	Assessment Questionnaire	Introduction/Introductory question	Question	Answer format
ST	st1	Initial questionnaire	Now think about the past week. On average, how much of the day do the following descriptions apply to [Child’s first_name]?	[Childs_first_name] was engaged with a screen (e.g., smartphone, tablet, computer, television)?	In hours; quarter steps (0–12 h; 0.25 h steps)
	st2	Daily review (day 1) Daily review (day 3) Daily review (day 5) Daily review (day 7)	To how much time do the following descriptions of today apply to [Child’s first_name]?	{Child’s first_name} was engaged with a screen (e.g., smartphone, tablet, computer, television)?	In hours; quarter steps (0–12 h; 0.25 h steps)
	st3	Closing questionnaire	Now think about the past week. On average, how long a day did your child engage in ...	view digital photos/pictures/picture books watching videos (e.g., YouTube, cartoons), television playing with interactive apps (e.g., puzzles, Talking Tom)	In hours; quarter steps (0–12 h; 0.25 h steps)
Manifest/ latent variable	Item	Assessment Questionnaire	Introduction/Introductory question	Question	Answer format
ATT	att1	T1/2/3: Daily review (day 2)	T1/2: To what extent would you agree with the following questions?	I find it good when [Child’s first_name] uses screen media.	Likert scale 1–6;
	att2	T4: Initial questionnaire	T3/4: Below we ask you questions about screen media. Please pay attention to the following when answering the questions: - Always refer to [Child’s first_name] and - the present time. - For the questions that explicitly ask about other people’s children, they should be children who are about the same age as [Child’s first_name]. - There is no right or wrong when answering the questions. Therefore, answer the questions as spontaneously as possible.	It is important for children to learn how to use screen media responsibly as early as possible. Children must learn to use screen media as early as possible.	1 not true - 6 true
	att3		To what extent would you agree with the following questions? Please indicate to what extent you agree with the following statements.	[Child’s first_name] is exhausting.	Likert scale 1–6;
PS	ps1	Daily review (day 6)			

(continued on next page)

Table A.1 (continued)

Manifest/latent variable	Item	Assessment Questionnaire	Introduction/Introductory question	Question	Answer format
	ps2			I often argue with [Child's first name]. (excluded from further calculations)	1 not true - 6 true
	ps3			When interacting with [Child's first name], I tend to react impatiently.	
	ps4			I have situations several times a day where I get annoyed with [Child's first name].	
	ps5			[Child's first name] exhibits behaviors that bother me.	

Table A.2
Standardized Model Results Predicting Children's Screen Time

Variable	T1 ^a		T2 ^b		T3 ^c		T4 ^d	
	β	SE	β	SE	β	SE	β	SE
Parenting stress	.14*	.07	.11†	.06	.15**	.06	.20***	.05
Parental attitudes	.36***	.05	.32***	.05	.38***	.05	.39***	.04
Parenting stress* parental attitudes	.14*	.06	.01	.05	.03	.06	.13*	.05

Note. Adjusted for child's age, siblings, participants' educational level, and annual household income.

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

^a $n = 462$; $\chi^2 = 17.137$; $df = 20$; CFI = 1.00; RMSEA = .000; SRMR = .024.

^b $n = 462$; $\chi^2 = 17.836$; $df = 20$; CFI = 1.00; RMSEA = .000; SRMR = .021.

^c $n = 462$; $\chi^2 = 19.478$; $df = 20$; CFI = 1.00; RMSEA = .000; SRMR = .019.

^d $n = 462$; $\chi^2 = 30.038$; $df = 20$; CFI = .987; RMSEA = .033; SRMR = .018.

Table A.3
Standardized Results of the Cross-sectional Models on Children's Screen Time with Weighted Data

Variable	T1 ^a		T2 ^b		T3 ^c		T4 ^d	
	β	SE $_{\beta}$						
Parenting stress	.17*	.07	.11†	.07	.16*	.06	.23***	.05
Parental attitudes	.36***	.05	.32***	.05	.39***	.06	.38***	.05
Parenting stress* parental attitudes	.13*	.06	.01	.05	.02	.06	.12†	.06

Note. Adjusted for child's age, siblings, participants' educational level, and annual household income.

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

^a $n = 462$; $\chi^2 = 17.714$; $df = 20$; CFI = 1.00; RMSEA = .000; SRMR = .025.

^b $n = 462$; $\chi^2 = 18.763$; $df = 20$; CFI = 1.00; RMSEA = .000; SRMR = .023.

^c $n = 462$; $\chi^2 = 20.419$; $df = 20$; CFI = .999; RMSEA = .007; SRMR = .019.

^d $n = 462$; $\chi^2 = 33.350$; $df = 20$; CFI = .982; RMSEA = .038; SRMR = .019.

Table A.4
Proportion of Housewives and Househusbands and Degree of Employment

Participants	n	%
Housewife/househusband		
Yes	116	25.11%
No	340	73.59%
Missing	6	1.30%
Employment level		
100%	19	4.11%
80–99%	54	11.69%
60–79%	117	25.32%
40–59%	125	27.06%
20–39%	43	9.31%
<20%	12	2.60%
Missing	92	19.91%
Partner		
Housewife/househusband		
Yes	25	5.41%
No	418	90.48%
Missing	19	4.11%

(continued on next page)

Table A.4 (continued)

Participants	n	%
Employment level		
100%	206	44.59%
80–99%	171	37.01%
60–79%	34	7.36%
40–59%	13	2.81%
20–39%	6	1.30%
<20%	4	0.87%
Missing	28	6.06%

Note. N = 462; housewife/househusband = full time.

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