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Adolescent gaming and parent–child emotional closeness: bivariate relationships in a longitudinal perspective

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Abstract

The aim of this study was to add knowledge of the longitudinal associations between gaming and emotional closeness between parents and their children. We hypothesized that parent–child emotional closeness was linked to less gaming activity over time and that more gaming activity was linked to less parent–child emotional closeness over time. We also tested the moderating effect of child gender on these anticipated links. This study involved a sample of Swedish adolescents, spanning the developmental years from age 12.5 to 17, and included data from two time points (T1; year 2013 and T2; years 2017/2018) with $N = 782$ participants (T1 Mage = 12.10, $SD = 0.40$; 49.6% girls). Utilizing a series of Cross-Lagged Panel Models, we found that emotional closeness to both mother and father predicted less time spent on gaming over time. More time spent on gaming predicted less emotional closeness to mother over time. Additionally, gaming activity among girls was specifically related to less emotional closeness to their father over time. Strengthening parent–child relationships and emotional bonds may be crucial in safeguarding adolescents from developing habits of excessive gaming that could potentially pose problems for their psychosocial development.

Keywords Adolescents · Gaming · Parent–child emotional closeness · Bivariate relationships · Longitudinal design

With the development of interactive digital techniques and online games, the practice or activity of playing computer or video games i.e., gaming, has become a common leisure activity among adolescents. Nevertheless, there exists a significant variation in the amount of time spent on gaming and its impact on the everyday functioning of adolescents (Panagiotidi, 2017). Building on earlier studies, we understand that the parent–child relationship plays a crucial role in the healthy and positive development of the child (e.g., Bretherton, 1992). Consequently, the emotional quality of this relationship could potentially influence how much time the adolescent spends on gaming and vice versa, that the time spent on gaming might also impact the parent–child relationship. While research on gaming is growing, there is still limited understanding of the extent to which parent–child relationships contribute to adolescent gaming. Moreover, excessive gaming activity, characterized by spending a substantial amount of time gaming, is closely associated with child gender as it tends to be more prevalent among boys than girls (Choo et al., 2010). To obtain a stronger picture of adolescent gaming and its correlates, understanding the interaction between parent–child relationships and gaming among both boys and girls is needed. Therefore, the purpose of this study was to investigate the links among adolescent time spent on gaming and the emotional closeness to the mother and the father, and to explore whether there is a moderating role of adolescent gender in these links.

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Gaming as an everyday activity

Gaming, or playing video or computer games, has become a common leisure activity among children and youth. Studies have shown that adults spend an average of nine hours per week on gaming, and that children and adolescents spend even more time on the activity (Panagiotidi, 2017). In Sweden, 48% of the 13-year-olds and 35% of 17-year-olds, to a large extent boys, play computer games more than three hours a day (Swedish Media Council, 2021).

Given the general increase in gaming among children and youth, gaming as a time-consuming leisure activity has puzzled the adult world. Specifically, parents and professionals who work with children and youth express concern about the negative effect that gaming may have for child and youth development (André et al., 2020, 2022). Therefore, child and youth health institutions are increasingly providing recommendations for acceptable amounts of screen time, including gaming (AACAP, 2020). Research in the field is, however, not consistent regarding concerns related to gaming.

Gaming as a positive activity

Gaming, as an activity, could be linked to more positive developmental outcomes for children and adolescents. For example, as many of the online games include social interaction with other gamers, gaming can be linked to a higher sense of belonging in a group (Sharabi & Margalit, 2011). Moreover, some studies suggest that gaming can contribute to the development of executive functions, such as higher logical capacity and vocabulary (Gnambs & Appel, 2017) as well as higher overall cognitive functioning (Sauce et al., 2022). Gaming can also be an activity that brings families together. For example, in a study involving parents of children of about the age of 11, the findings suggested that engaging in co-playing activities within families contributed to increased family satisfaction and closeness (Wang et al., 2018). Similar results were found by Coyne et al., (2011) where co-playing with parents had a negative association to internalizing and aggression in girls. To some extent, gaming can also help gamers to relax (King & Delfabbro, 2018) and to cope with certain situations in times of boredom, stress, or loneliness (Vadlin et al., 2016). This was particularly recognized by the World Health Organization (WHO, 2021) during the COVID-19 pandemic as it encouraged gaming to keep people safe while connected to each other. However, health professionals were also encouraged to raise awareness of how increased gaming during the pandemic could contribute to the development of gaming problems (Ko &Yen, 2020).

Gaming as a problematic activity

Contrary to the view of gaming as a social and relaxing activity (e.g., King & Delfabbro, 2018), alarming reports from studies worldwide suggest that excessive gaming could be related to poorer developmental outcomes, such as lower impulse control and reduced school performance (Choo et al., 2010). Further, studies show that gaming can pose a risk to adolescent mental health as excessive gaming has been associated with problematic gaming, which is linked to poorer psychological health (i.e., increased mental illness and lower life satisfaction) and less face-to-face sociability among adolescents (Männikkö et al., 2015). The links between problematic gaming and increasing externalizing problems such as aggressiveness and behavioral disorders, and internalizing problems, such as anxiety and depression have also been found (Lobel et al., 2017). These issues are more commonly observed in boys than in girls, as consistent gender differences have been identified, with a higher proportion of boys categorized as problematic gamers compared to girls (André et al., 2021; Choo et al., 2010; Gentile, 2009).

The available evidence on prospective risks with gaming was reflected in the introduction of 'Gaming disorder' in the 11th revision of the *International Classification of Diseases* (ICD-11; WHO, 2019; WHO, 2021), characterized by impaired control over gaming, giving precedented priority to gaming over other activities, withdrawal symptoms, and continuation of gaming despite negative consequences, including impairment in different areas of functioning. With this new diagnosis it is more important than before to gain more knowledge about risks and protective factors such as, for example, parenting.

The role of parent–child relationships for adolescent adjustment

In this section, parent–child relationship and its link to adolescent adjustment will be introduced through three thematic lenses: firstly, through the attachment perspective and emotional bond between the parent and the child; then through the parental strategies perspective; and lastly, through the reciprocal perspective where adolescent behavior also affects the parent–child relationship.

Although child development happens in mutual interaction with parents (Sameroff, 2010), parents are the key socializing agents in their children's proximal environment. The quality of the relationship, and the attachment between child and parent, is of great importance for the child's future positive development (Bretherton, 1992). Attachment theory describes the invisible emotional bond that exists between the child and the parent, and how important attachment is

both for the child's survival and for the child's understanding of himself and the outside world. The affiliation can be divided into two main categories: safe and insecure. When the child feels safe, the parent–child relationship is characterized by emotional closeness and, when feeling unsafe, by emotional distance. Further, studies on pre-school children have also revealed gender differences where mother-daughter dyads showed higher emotional closeness compared to mother-son dyads (Benenson et al., 1998). The emotional closeness between children and their parents has also been mapped in a Swedish survey where adolescents were asked who they would talk to if they felt sad. The results show that they preferred to talk their mother (46%), then a friend (22%), or no one at all (17%). Only seven per cent said they preferred to talk to Dad when they were sad (Kamratposten, 2018). Help seeking preferences among adolescents were explored through focus group interviews in the Netherlands and the findings suggest that adolescents primarily chose informal help sources, such as friends and the internet, when confronted with mild emotional and behavioral problems. When the problems were more severe, adolescents more often chose to seek help from a trusted person, such as a mentor at school or a parent (van der Toren et al., 2019).

Indeed, parents are essential for children's development both in childhood and adolescence, and strong emotional bonds have a well-known positive effect on adolescent adjustment (Moretti & Peled, 2004; Attar-Schwartz 2015). For example, Kapetanovic and Skoog (2021) claim that the effect of parenting practices on adolescent functioning is dependent on the quality of family emotional climate, and thus emotional bonds between parents and their adolescent children. While parental monitoring is generally seen as a key measure for positive developmental outcomes of children and adolescents (Racz & McMahon, 2011), Kapetanovic and Skoog (2021) suggest that monitoring is only efficient when parent–child emotional bonds are strong. Thus, strong family emotional bonds seem to be central for development of positive psychosocial outcomes in children and adolescents.

It is important to note that parenting is not stable, and that children and adolescents play an important role for the quality of parent–child relationships and interactions. Indeed, parents and adolescents are involved in a chain of actions and reactions and in such a way they influence each other and their behaviors (e.g., Sameroff, 2010). Research that has addressed the reciprocal associations between parenting and adolescents' behavior suggests that adolescents' behavior is predictive of changes in parenting more robustly than the other way around (Kerr et al., 2012). Scholars suggest that although parents do have impact on their children's behavioral development, when adolescents express maladaptive behaviors, such as norm-breaking behaviors, parents are likely to withdraw from warm and responsive parenting over time, possibly because they become more insecure in their own ability to influence their adolescents (Glatz et al. 2011). On the other hand, when adolescents are willing to communicate with their parents, that stimulates more engagement from parents (Kapetanovic et al., 2019), which could play role for development of more close emotional bonds. In other words, parents and adolescents are dependent on each other and they influence each other, which is why it is critical to address the reciprocity in their interactions and behaviors.

Parent–child relationship and gaming

Given the critical role that parent–child relationships and interactions play for adolescent functioning, it is also likely that bonds between parents and their adolescent children are important in terms of gaming. The correlational studies suggest that hostility in parent–child relationships (Kwon et al., 2011) and poor communication between parents and their adolescents (Punamäki et al., 2009) are some of the parenting factors linked to more problem gaming in adolescents. Moreover, the results from interviews with Swedish adolescents diagnosed with Internet Gaming Disorder show that parent–child relationships are strained, although they improve when adolescents reduce their gaming (Gurdal et al., 2023). Although research on parenting and gaming in a longitudinal perspective is scarce, it is suggested that parental support, but not parent–child relationship, is related to less gaming problems over time (She et al., 2022). On the other hand, another 3-wave study with Chinese adolescents, showed that parent–child relationship, in particular relationship to father, had protective effect on development of problem gaming, while also gaming had negative effect on the quality of parent–child relationship over time (Su et al., 2018). Given the results from the study by Su et al (2018) it is possible that parents have an impact on development of problem gaming in adolescents, while these activities may also elicit changes in parenting and parent–child relationships. However, given the somewhat inconsistent results in the previous longitudinal studies there is a need to explore the idea of reciprocity in associations between parent–child relationships and adolescent time spent on gaming. In addition, it is yet to be explored whether these potential links differ by the gender of the parent as well as the gender of the child.

The current study

The aim of this study is to contribute to the knowledge about the potential associations between adolescent gaming and emotional closeness to the mother and the father. The

research questions are: 1) How is adolescent gaming at T1 associated with emotional closeness to the mother/father at T2 (and vice versa)? 2) Are the potential links in mother and father models moderated by adolescent gender? Based on the aforementioned principles from attachment theory (e.g., Bretherton, 1992) and the transactional model of child development (Sameroff, 2010), as well as empirical evidence for an association between problematic gaming and the quality of the parent–child relationship (Su et al., 2018), we hypothesized a reciprocal association between gaming and parental emotional closeness. Specifically, we hypothesized that parental emotional closeness at T1 would be linked to less gaming activity at T2 and that more gaming activity at T1 would be linked to less parental emotional closeness at T2. Due to limited previous research, we employed an explorative approach to the potential mother/father and gender effects.

Method

This study was performed using data originally collected within the framework of the five-wave program Longitudinal Research on Development in Adolescence (LoRDIA) which focused on social, behavioral, and psychological developmental trajectories from age 12–18 in a general population. LoRDIA started in 2013 in four small and medium-sized municipalities (10,000–38,000 inhabitants) in southern Sweden. All children in two school-year cohorts were invited to participate. For a detailed description of the program and procedure, see Boson et al. (2016) and Kapetanovic et al. (2020).

Procedure

The first data collection (T1) was in 2013, when the participants from the two age cohorts were about 12 and 13 years old, respectively. They were followed up yearly until 2017 and 2018, when the participants were about 17 years old. Some weeks before the start of the first data collection, all caregivers and children received an information letter that briefly explained the purpose of the study. Passive consent from the caregiver was requested for the children's participation when under 15 years (i.e., no active "no" response). An active written consent (i.e., active yes/no response) was nevertheless requested from the adolescent. The participants completed the questionnaires during school hours in their classrooms, while project researchers were present to answer questions. The survey, consisting of about 350 questions in total, took approximately one to two hours to complete. Absent students got their questionnaire posted to their home by regular mail. Out of all 2,150 invited, 1,885 (88%) agreed to participate with parental acceptance and they constitute the LoRDIA study population. Those who declined participation showed no differences in demography (gender and immigration status) or school performance (merit rating and attendance) (Kapetanovic et al., 2020). Comprehensive data collections were conducted annually in three or four waves for the respective cohorts up to grade 9 at about age 15. During these years, the data collection had a high turnout, with 96% participating at least once and 70–85% on each occasion. Wave 5 questionnaires were collected in the autumns of 2017 and 2018, respectively, when the two cohorts were in their second year of upper secondary school and approximately 17 years old. In Wave 5, slightly more than half (i.e., 63%) of the original study population participated. Internal attrition analyses from one of the original studies within the LoRDIA project, presented by Boson et al. (2016), indicate that especially boys with externalizing problems dropped out over time.

Participants

This study used longitudinal data from two data collections: Wave 1, i.e., when adolescents were about 12 years of age, and Wave 5, i.e., when adolescents were about 17 years of age. From now Wave 1 is referred to as time point 1 (T1) and Wave 5 as time point 2 (T2). The analytical sample consisted of adolescents who at baseline responded to questions about gaming, $N = 782$ (50.4% boys). Most lived with both parents (79.5%) and were of Swedish ethnicity (70.8%). Most of the adolescents (64.5%) reported having as much money as their classmates, while 17.3% reported that their family had more money than their classmates' families, and 15.7% reported that their family had less money than the families of their classmates. The mean ages of the participants were T1: $M = 12.10$ years ($SD = 0.40$); T2: $M = 16.92$ years ($SD = 0.37$).

Measures

Gaming

Time involved in gaming activity was measured with a single item question at T1 and T2: Approximately how many hours do you play computer games or video games (or similar on mobile) on a normal weekday? Answers were scored on a 4-point Likert scale from 1 = Almost never or never, 2 = Less than an hour every day, 3 = About 1–2 h every day, and 4 = More than 1–2 h every day.

Parent–child emotional closeness

A scale, developed by Biesecker (2007) and used in Tilton-Weaver et al. (2010) and Kapetanovic and Skoog (2021), assessed the extent of child's emotional closeness to mother and father separately. The items of the scale are: 1) I know Mom/Dad is there when I need her/him, 2) I feel like I can try new things because I know Mom/Dad supports me, 3) I am happy to share my private thoughts and feelings with Mom/Dad, 4) When I'm angry, sad, or worried, mom/dad makes me feel better, and, 5) Mom/Dad encourages me to make my dreams come true. Answers were scored on a 3grade Likert-scale from 1 = No, 2 = Sometimes and, 3 = Yes. The internal properties were satisfactory with Cronbach alpha for the mother scale (T1: 0.78, T2: 0.85) and for the father scale (T1: 0.81, T2: 0.85). Adolescent gender was entered as "1" for girl and "2" for boy.

Statistical analyses

First, we tested whether the missing data was missing at random. Missing data analysis showed that Little's MCAR (missing completely at random) was significant (p = 0.009); however, the normed chi-square (χ2/df) was low (96.029/66 = 1.45), implying a low violation of the MCAR assumption. Further attrition analyses showed that 63% of the original sample (N = 1515) continued to provide data at T2. Attrited adolescents did not significantly differ from the retained adolescents in terms of gender, mother/father-child emotional closeness, or gaming. Next, we conducted *t*-tests for analyzing potential gender differences in terms of mother/father closeness and gaming. We calculated effect sizes (Cohens *d*) to add qualitative value to the results. An effect size of ± 0.2 to 0.3 can be interpreted as "small," around ± 0.5 as "medium," and ± 0.8 or more as "large" (Cohen, 1988). We also calculated bivariate correlations between the study constructs.

In the next step, we implemented structural equation modelling using AMOS 28.0. We utilized full information maximum likelihood (FIML) estimation. Such a procedure accounts for missing data and it is possible to produce unbiased parameter estimates and bias-corrected confidence intervals (Byrne, 2013). We fitted separate measurement models to evaluate autoregressive cross-lagged associations between each parent–child connectedness measure (i.e., mother/father-child connectedness) and adolescent gaming. Thus, the latent construct of T1 parent–child connectedness was regressed on T2 adolescent gaming, and T1 adolescent gaming was regressed on T2 parent–child connectedness. Evaluation of model fit was based on recommended fit index cut-off values (CFI > 0.90, TLI > 0.95, RMSEA < 0.08 (Byrne, 2013). Finally, we conducted multi-group analyses in the separate models to test whether the links between parent–child connectedness and adolescent gaming were moderated by adolescent gender. A constrained model, where effects are equivalent across groups, was compared with an unconstrained model with freely varying effects using χ2-difference tests. A significantly better fit of the unconstrained model (as indicated by significant $\Delta\chi$2) would indicate a moderation effect (Byrne, 2013).

Results

The bivariate correlations among the study's variables are shown in Table 1. T1 and T2 mother–child emotional closeness were negatively correlated with T1 and T2 gaming. T1 and T2 father-child closeness were negatively correlated with T1 gaming, yet not with T2 gaming.

Independent sample *t*-tests (see Table 2) showed that adolescent girls ($M = 0.91$ $SD = 0.15$) reported higher T1 mother–child emotional closeness ($t(772) = 2.35$ $p = 0.019$) than adolescent boys ($M = 0.89$ $SD = 0.15$). In addition, adolescent boys (T1: $M = 3.13$ $SD = 0.82$; T2: $M = 2.81$ $SD = 1.06$) reported higher T1 gaming ($t(780) = -11.98$ $p < 0.001$) and T2 gaming ($t(436) = -11.04$ $p < 0.001$) in

Table 1 Means, standard deviations, and correlations between mother/father-child emotional closeness, gaming, and adolescent gender

	1	2	3	4	5	6	7
1. Gender	-	-0.084*	-0.041	0.394**	-0.031	0.063	0.468**
2. T1 MCEC		-	0.765**	-.109**	0.362**	0.354**	-0.133*
3. T1 FCEC			-	-0.114**	0.279**	0.450**	-0.102
4. T1 Gaming				-	-0.131**	-0.119*	0.438**
5. T2 MCEC					-	0.676**	-0.136**
6. T2 FCEC						-	-0.041
7. T2 Gaming							
Mean	-	0.90	0.88	2.75	0.86	0.82	2.26
SD	-	0.14	0.16	0.95	0.15	0.16	1.15

*$p < 0.05$ **$p < 0.001$; MCEC = mother–child emotional closeness; FCEC = father-child emotional closeness

Table 2 Group mean differences between mother–child/father-child emotional closeness, gaming, and adolescent gender

	Girls		Boys	*t*-test (2-tailed)	Effect size
Measure	*n*	M (*SD*)	*n*	M (*SD*)	*p*	Cohen´s *d*
T1: Emotional closeness to						
Mother	386	0.91 (0.15)	388	0.89 (0.15)	0.019*	0.169
Father	376	0.88 (0.16)	383	0.87 (0.17)	0.261	0.082
T2: Emotional closeness to						
Mother	235	0.86 (0.16)	238	0.86 (0.14)	0.498	0.062
Father	232	0.82 (0.17)	232	0.84 (0.14)	0.176	-0.126
T1: Time involved in gaming activity	388	2.38 (0.93)	394	3.13 (0.82)	< 0.001**	-0.857
T2: Time involved in gaming activity	223	1.73 (0.99)	215	2.81 (1.06)	< 0.001**	-1.056

An effect size of ± .2 to .3 can be interpreted as "small," around ± .5 as "medium," and ± .8 or more as "large" (Cohen, 1988)

* $p < 0.05$ ** $p < 0.001$

comparison to adolescent girls (T1: $M = 2.38$ $SD = 0.93$; T2: $M = 1.73$ $SD = 0.99$).

Links between parent–child emotional closeness and adolescent gaming

The two-wave cross-lagged model with mother–child emotional closeness and adolescent gaming had acceptable model fit ($\chi^2(43) = 170.257$ $p = 0.000$; TLI = 0 0.953; CFI = 0.969; RMSEA = 0.056). As shown in Fig. 1, T1 mother–child emotional closeness was negatively linked to T2 gaming (β = -0.08 $p = 0.015$) and T1 gaming was negatively linked to T2 mother–child emotional closeness (β = -0.08 $p = 0.043$), suggesting reciprocal associations between mother–child emotional closeness and adolescent gaming.

In addition, the two-wave cross-lagged model with father-child emotional closeness and adolescent gaming also had acceptable model fit ($\chi^2(42) = 113.180$ $p < 0.0001$; TLI = 0.976; CFI = 0.985; RMSEA = 0.042). Figure 2 shows that T1 father-child emotional closeness was negatively linked to T2 gaming (β = -0.09 $p = 0.005$), while the link between T1 gaming and T2 father-child emotional closeness was not significant.

In the next set of analyses, we tested the moderating role of adolescent gender on the links between mother–child/father-child emotional closeness and adolescent gaming. The multi-group analyses revealed that gender moderated the links between T1 gaming and T2 father-child emotional closeness ($\chi^2\Delta(1) = 4.985$ $p = 0.026$). While this link was not significant for adolescent boys (β = -0.02 $p = 0.707$), the link was significant and negative for adolescent girls

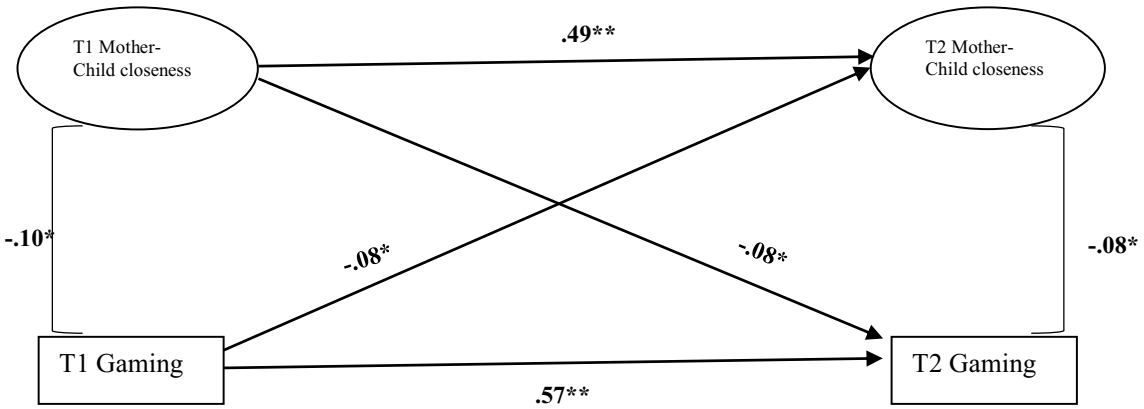

Fig. 1 Cross-lagged links between mother–child emotional closeness and adolescent gaming. Note: * < 0.05 ** < 0.001

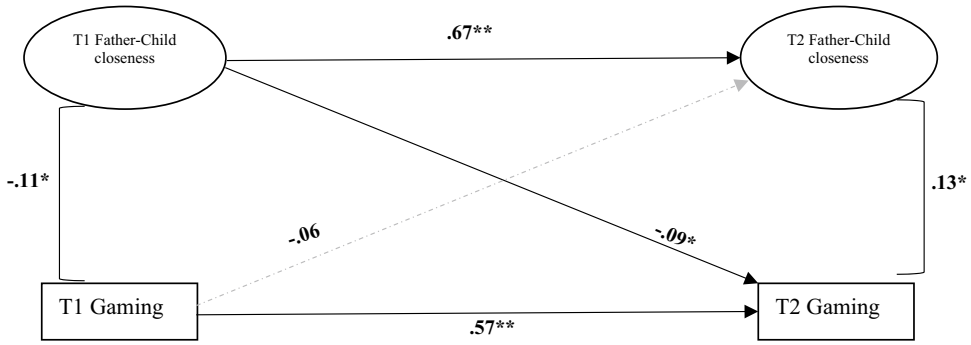

Fig. 2 Cross-lagged links between father-child emotional closeness and adolescent gaming. Note: * < 0.05 ** < 0.001

(β = -0.12 $p = 0.004$) suggesting that T1 gaming is linked to less father-child emotional closeness in adolescent girls, yet not in adolescent boys. No other links were moderated by gender.

Discussion

In this study, we have addressed the question of longitudinal associations between adolescent gaming and emotional closeness to the parents. The theoretical framework is grounded in attachment theory (e.g., Bretherton, 1992) and the transactional model of child development (Sameroff, 2010), and the results from previous research (Su et al., 2018). We hypothesized reciprocal associations between the constructs such that parental emotional closeness at T1 would be linked to less gaming activity (i.e., less time spent on gaming) at T2 and that more gaming activity at T1 would be linked to less parental emotional closeness T2. We conducted separate models for mothers and fathers and explored potential moderating effect of gender on the specified links to gain more in-depth knowledge about the relationship between emotional bonds and time spent gaming.

Associations between parent–child emotional closeness and gaming

Our findings suggest that less gaming activity particularly when children are in their early adolescence, is related to greater emotional closeness. In a longitudinal manner, we found that links between mother–child emotional bonds and gaming were negative and reciprocal, indicating that closer emotional mother–child bonds were related to less time spent gaming, and vice versa, that more time spent on gaming was linked to lower mother–child emotional bonds over time. Contrary to the mother model, the links between father-child connectedness and gaming were unidirectional, showing that higher emotional bonds between fathers and children were linked to less gaming over time. Gaming was not, however, linked to less father-child closeness over time. The explanation for these links needs further exploration but, tentatively, it is possible that other mechanisms in mother/father-child relationship, such as parents' involvement and attitudes towards gaming, would explain the links between parent–child relationship and gaming (Coyne et al., 2011; Wang et al., 2018). Our data does not include that kind of variable. However, another Swedish study on parental mediation of gaming and internet use concluded that parents are involved in their adolescents' gaming and internet use mainly by restricting access to these media (Eklund & Helmersson Bergmark, 2013). Mothers are generally more restrictive than fathers and have negative views of gaming as an activity (Choo et al., 2015). In addition, if fathers are more supportive of an activity such as gaming, they may show more interest in gaming than mothers. Thus, time spent on gaming might not be an issue of conflict in the father-child relation as it could be in the mother–child relationships. Instead, co-playing might contribute to parent–child emotional closeness (as seen in Coyne et al., 2011 and Wang et al., 2018). These thoughts need to be explored further in relation to mothers and fathers separately.

The adverse associations between parent–child closeness and gaming can be explored in the context of high-quality relationships, where the bond with either the mother or the father plays a role in shaping future behaviors and activities. In comparison to adolescents with poor parent–child bonds, adolescents who perceive having positive parent–child relationships, including feeling confident in sharing information with their parents (Kapetanovic & Skoog, 2021), generally have healthier psychosocial development (Moretti & Peled, 2004). In that sense, more positive parent–child bonds would be protective of spending excessive time on gaming. On the contrary, for adolescents who cannot turn to their parents, especially mothers, during the challenging times of adolescence, gaming can provide an alternative social context. In this context, adolescents may form close connections with others who share similar interests, creating an alternative reality that could have both positive and negative implications for their psychosocial development. Although there is an ongoing debate about the extent to which excessive time spent on gaming is harmful to adolescent development (e.g.,

Sauce et al., 2022; Vadlin et al., 2016), gaming can offer an alternative reality and a sense of security that may influence adolescent interactions with others, including their parents.

Moderation by adolescent gender

In line with the previous findings (e.g., Choo et al., 2010), we found that boys report more time spent gaming than girls both during early and late adolescence. This implies that gaming in our sample seems to be a gendered activity. Relationships between parents may differ depending on child gender (Benenson et al., 1998), as also shown in our study. Therefore, we wanted to investigate whether the links between parent–child closeness and gaming differed between boys and girls. Indeed, we found that gaming among girls was related to less emotional closeness with their father over time, which was not evident for boys' gaming. Why such a moderating effect is only evident in girls is puzzling. Given gaming being a gendered activity, the effect that gaming has on the relationship with the father may also be gendered. Thus, as men generally play computer games to a higher extent than females (Swedish Media Council, 2021), it is possible that fathers are more supportive of boys' gaming than of girls' gaming. In turn, unsupportive parenting would have adverse effect on parent–child relationship over time. We also speculate whether it is possible that fathers spend more joint time gaming with sons than with daughters, which could potentially explain these findings. In fact, there are some differences in the preference of gaming activities among boys and girls, as well as among male and female gamers in general. While girls tend to spend time on games with more adventure and less action and fighting, and game to learn new things (Sjöberg, 2002), boys enjoy strategic games and roleplay as well as interactive games like Fortnite, Minecraft, and FIFA (Swedish Media Council, 2023). As similar preferences are evident among adult males and females (Leonhardt & Overå, 2021), it is possible that fathers and daughters do not game together in the same way as fathers and sons, which in turn would have impact on their future relationship. Future research needs to further explore such an idea.

Implications

Despite the vast interest in children and adolescents´ screen behavior in both popular science and more clinical and scientific contexts, to date there is neither consensus regarding what is acceptable screen-time, including gaming. Indeed, professionals who work with children and adolescents express concerns about the effect that gaming may have for child and adolescent development (e.g., André et al., 2022). The results from our study provide important knowledge about the interaction between parent–child relationships and adolescent gaming, and hence the importance of understanding the child interaction with the proximal social context in which adolescent behaviors develop. Gaming is a large part of children's lives today; hence, parents should actively engage in their children's gaming activities, by trying out games together with the child or just stay updated on the current games of use and their content as means to strengthen the family bonds (Coyne et al., 2011; Wang et al., 2018). As our results show, parents and their emotional relationships with their children play a role for how much time adolescents spend on gaming, while also gaming has a bearing on parent–child relationships over time. Although we do not know what mechanisms may drive these associations, the knowledge resulting from our study may serve as a basis for developing preventive efforts and treatment programs. Up to date, most treatment programs for problematic gaming have focused only on the child or adolescent (André et al., 2023; Gentile et al., 2017; Zajac et al., 2017, 2020) but our findings indicate that a child´s gaming habits are not only attributed to the child themselves, but to the family as a system. Parents and the family are important protective factors for adolescent development and previous research have shown that treatment for problematic gaming becomes more effective when parents are involved, such as in the multidimensional family therapy approach (MDFT; Bonnaire et al., 2019). Therefore, clinical interventions should not only focus on the child but rather involve the family to strengthen the emotional closeness.

Limitations

This study should be interpreted considering its limitations. The measures used were based on self-reports, which implies a risk of recall bias. Further, only the adolescent/child perspective is considered, which means that we do not have the parental perspective on the emotional closeness between them and the child. The study also has significant internal attrition due to drop-out from the first data collection at 12.5 years of age to the last when they were approximately 17 years old. However, our analyses showed that attrited adolescents did not significantly differ from the retained adolescents in terms of gender, mother/father-child emotional closeness, or gaming. Moreover, our measure for gaming was only one item showing the extent of gaming activity and not necessarily problematic gaming. As the measures of interest to our study were not collected in all study waves, we were not able to control for gaming or parent–child connectedness at Wave 2 to 4. Given the

significant gap between the timepoints, it is possible that there are other confounding factors and mechanisms that could explain the links between the variables in the study.

Conclusions

Although the research on gaming is still in its early stage, our findings suggest that emotional closeness in the parent–child relationship is linked to less time spent on gaming over time while the amount of time the adolescent spends on gaming is linked to poorer mother–child, but not father-child emotional bond over time. Moreover, to what extent adolescents play computer games has a bearing on parent–child relationship over time. This is particularly true in terms of adolescent relationships to mothers. Even though girls spend less time gaming than boys, girls' gaming, but not boys', is linked to poorer father-child relationship over time, suggesting gaming and its' effects on parent–child relationship being somewhat gendered. In addition, the quality of parent–child relationship with high connectedness between mother/father and the adolescent is protective of excessive time spent on gaming over time. Strengthening parent–child relationship and their emotional bonds could be key to protect adolescents from excessive gaming, that may become problematic for adolescent psychosocial development.

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Data availability The dataset analysed during the current study is available from the corresponding author on reasonable request.

Declarations

Ethical approval information Ethical approval for the LoRDIA project was obtained from the Regional Research Ethics Board in Gothenburg: Sept. 25, 2013 (No. T362–13); May 20, 2014 (No. T446-14) and July 31, 2015 (No. T553-15).

Competing interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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