From Rules to Reactions:

The Impact of Parental Mediation on Problematic Social Media Use in Adolescents

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Abstract (English)

As recent legislative attempts have been made to cut back youth's social media use to prevent negative outcomes, it is important to understand which types of parental mediation do and do not work in preventing risky social media use among adolescents. This study investigated the effects of two forms of parental restrictions; parental rules, and reactive mediation, on risky/problematic social media use (risky/problematic SMU) among Dutch adolescents. Longitudinal data from the Digital Youth project was used to study both the independent and combined effects of these parental strategies on risky/problematic SMU for two age groups (10-14 and 15-18 years old). Two waves, one year apart were used, including 1305 respondents. Logistic regression analysis revealed that parental rules had a negative effect on risky/problematic SMU, while reactive mediation had a positive effect. Additionally, reactive mediation did not enhance the effect of parental rules on risky/problematic SMU. Age did not significantly moderate the relationship between these parental strategies and risky/problematic SMU. These findings show the need to disentangle different strategies within parental mediation as they might have opposing effects on the development of risky/problematic SMU in adolescents. Parents should be carefully informed in their attempt to prevent the development of addictive social media symptoms in their children. Future research should further explore the effects of, and interplay between, different types of parental restrictions on children's social media use among different age groups.

*Keywords***:** risky/problematic SMU, parental rules, reactive mediation, adolescents, age

Abstract (Nederlands)

Recente beleidsvoorstellen die het gebruik van sociale media van jongeren terug moeten dringen om de negatieve gevolgen hiervan te voorkomen laten zien dat het belangrijk te begrijpen welke vormen van ouderlijke bemiddeling effectief zijn in het voorkomen van risicovol gebruik van sociale media (risicovol/problematisch SMG) onder adolescenten. Deze studie onderzocht de effecten van twee vormen van ouderlijke restricties; ouderlijke regels en reactieve bemiddeling, op risicovol/problematisch SMG onder Nederlandse adolescenten. Er werd gebruik gemaakt van longitudinale data van het Digital Youth-project om zowel de onafhankelijke als de gecombineerde effecten van deze ouderlijke strategieën op risicovol/problematisch SMG te bestuderen voor twee leeftijdsgroepen (10-14 en 15-18 jaar oud). Twee golven, een jaar uit elkaar, werden gebruikt, betreffende 1305 respondenten. Logistische regressieanalyse toonde aan dat ouderlijke regels een negatief effect hadden op de ontwikkeling van risicovol/problematisch SMG, terwijl reactieve bemiddeling een positief effect had. Reactieve bemiddeling versterkte het effect van ouderlijke regels op risicovol/problematisch SMG niet. Leeftijd had geen significante invloed op de relatie tussen deze ouderlijke strategieën en risicovol/problematisch SMG. Deze bevindingen wijzen erop dat verschillende aanpakken binnen ouderlijke bemiddeling apart bekeken moeten worden, omdat deze tegengestelde effecten kunnen hebben op de ontwikkeling van risicovol/problematisch SMG bij adolescenten. Ouders moeten zorgvuldig worden geïnformeerd in hun poging om de ontwikkeling verslavingssymptomen aan sociale media bij hun kinderen te voorkomen. Toekomstig onderzoek moet verder verkennen wat de effecten zijn van, en de wisselwerking tussen, verschillende soorten ouderlijke restricties met betrekking tot het gebruik van sociale media door kinderen in verschillende leeftijdsgroepen.

*Trefwoorden***:** risicovol/problematisch SMG, ouderlijke regels, reactieve bemiddeling, adolescenten, leeftijd

Introduction

In 2019, 96 percent of Dutch youth between 12 and 25 were online almost daily (CBS, 2020). Nearly all youth, 97 percent, have an account on one or multiple social network sites like Facebook. Thus, social media constitute a relevant part of youths' lives. As fun as social media can be, experts are also increasingly alarmed by the downsides social media can bring. Both excessive and problematic social media use is related to poor mental health outcomes and poor quality of sleep (Alonzo et al., 2021; Shannon et al., 2022). Currently, the Europarlement wants to prohibit tricks that make social media addictive (NOS, 2023). On the 12th of December, 2023, a large majority voted for a law that should disable parts of social media such as receiving likes and notifications as well as the possibility to scroll endlessly for European users. In other parts of the world, legislation goes even further. The American state of Utah recently accepted a law allowing parents to read their children's messages on Instagram and TikTok, requiring adolescents under 18 to have parental permission before they can log into social media (RTL, 2023).

These far-stretching restrictions raise questions about the effect of parental intervention on their child's social media use. Almost half of the parents view social media as a threat to their children (Jurriaan, 2024). With social media's growing impact on youths' lives, it is important to research what parental tactics protect their child from the downsides social media can have. Parents are interested in ways they can help prevent their child's social media use from becoming problematic, and parenting practices focusing on internet use are expected to play a role in this (Geurts et al., 2023). This research will focus on parenting practices referred to as restrictive mediation, such as rules on when and how long children can use social media (Koning et al., 2018). Problematic social media use (PSMU) is characterized by an inability to regulate social media use and being preoccupied with it (Griffiths et al., 2014). Although there is no diagnosis for social media addiction in the DSM-

5, this term is often measured with scales that look at addictive symptoms. Adolescents who report 6-9 out of 9 symptoms on this scale are classified as problematic users, but those who report more than one are already classified as at-risk social media users (de Boer et al., 2022). This study concluded that not only problematic users but also at-risk users have a higher chance of experiencing drawbacks from their social media use. This study will therefore look at both these groups as one, and use the term risky/problematic social media use (risky/problematic SMU) to define this behavior.

The literature has shown mixed results on the relationship between restrictive mediation and problematic social media use (Vossen et al, 2024). A possible explanation for these mixed findings is that restrictive mediation should not be considered a single factor. Geurts et al (2022) called for more research that untangles restrictive mediation into the individual effects of parental rules and reactive mediation. Parental rules are defined as the internet-specific rule-setting by parents in advance. For example, discussing when and how the child can use social media. In contrast, reactive mediation refers to impulsive, in-the-moment attempts to limit their child's social media use. For example, taking away the child's phone when a parent feels they spent too much time on it. Not entangling these two forms of parental restrictions could sketch a distorted picture of reality and explain the mixed results of previous research. This study will therefore differentiate between parental rules and reactive mediation.

A distinction can also be made within the age group of adolescents. None of the discussed literature so far has differentiated between different age groups within adolescence. This while there are important differences between young and middle adolescence in self-regulation (Tetering et al., 2020b). Adolescents receive less parental support as they grow older, and need this support less for their emotional adjustment (Meeus et al., 2004). In other words, adolescents become better at regulating their (impulsive) behaviors on their own as

they grow older. They simultaneously grow a larger need for independence and autonomy. This development could lead to differences in the effects of parental restrictions on risky/problematic SMU in different age groups of adolescents. This study will therefore look at two age groups of youth: adolescents aged 10-14 and adolescents aged 15-18.

Combining these insights, it is clear there is a need for more research on risky/problematic SMU among adolescents and research that disentangles different forms of parental restrictive mediation. This study will therefore look at both individual effects of parental rules and reactive mediation on risky/problematic SMU among adolescents, and their interplay with each other, as shown in Model 1. The research question hereby is: **What are the effects of parental rules and reactive mediation by parents on risky/problematic SMU among (two age groups of) adolescents, and to what extent is there an interplay between these two forms of parental mediation?**

Parental rules and risky/problematic SMU

Social media use does not always have to be a negative factor in the lives of adolescents. However, when its use starts to be problematic, it can negatively influence adolescents' well-being. A review of 42 articles on the topic of excessive social media use among youth concluded that it is linked to both poor mental health outcomes and poor quality of sleep (Alonzo et al., 2021). Another review consisting of 18 studies on problematic social media use also reported a negative relation to youths' mental health (Shannon et al., 2022). As mentioned, this research will focus on risky/problematic SMU, characterized by addictive symptoms with social media. Parents can influence the social media use of their adolescent children. This research focuses on two internet-specific parenting practices within restrictive mediation; parental rules and reactive mediation. Parental rules restrict youth from accessing social media whenever they want. Depending on the rules, parents will restrict the amount of

time their adolescent child spends on social media to some extent. As the intensity of internet use is positively related to the chance of addiction (Kuss et al., 2013), parental rules could work as a protective factor in social media as well. When parents restrict the time their adolescent child is allowed to access social media, their child will spend less time on social media. This could lower the child's chance of developing problematic social media use.

With this reasoning, you would expect the same effect of reactive mediation on the development of problematic social media use. When parents take away their child's phone in the moment, they spend less time on social media. This lower intensity of social media use can be expected to lead to a lower chance of developing risky/problematic SMU. In their overview of the literature, Vossen et al., (2024), however, did find a negative relation between rule setting and problematic social media use but found a positive relation between reactive restrictions and problematic social media use.

This positive relation could be explained through the self-determination theory, which poses that humans have three basic psychological needs: competence, autonomy, and relatedness (Ryan & Deci, 2002). When those are fulfilled, they lead to better mental health, and vice versa, when they are restrained, they lead to less motivation and well-being. Additionally, this theory deems the internalization of rules through children's upbringing crucial to personality development and individuals' adjustment (Soenens & Vansteenkiste, 2010). Positive parenting, characterized by supportiveness and communication (Seay et al., 2014), can satisfy these feelings of competence, autonomy, and relatedness for adolescents as it creates an optimal environment for the healthy development of children (Geurts et al., 2022).

A review of the definition of positive parenting included among other attributes 'leading the child'; setting developmentally appropriate boundaries and communicating (Seay et al., 2014). Parental rules, consisting of setting and communicating rules, could therefore be

seen as a positive parenting practice. This would mean that the psychological needs of adolescents from the self-determination theory are met. We can then again look at the assumption that adolescents who are allowed less time on social media, will have a lower chance of developing risky/problematic. It could therefore be hypothesized that parental rules have a negative effect on risky/problematic SMU in adolescents. A meta-analysis of parenting styles and internet addiction showed that aspects of positive parenting as emotional warmth and support were indeed negatively related to teenagers' internet addiction (Li et al., 2018). The first hypothesis is therefore:

H1: Parental rules will lower the chance of developing risky/problematic SMU in adolescents.

Reactive mediation and risky/problematic SMU

Reactive mediation on the other hand is characterized by impulsive restrictions towards the child, for example taking away their phone when a parent feels like their adolescent child has spent too much time on it. This kind of mediation could be classified as a less positive parenting practice as it does not give the child a voice. As discussed, can less positive parenting practices be expected to be less fulfilling when it comes to the psychological needs of the self-determination theory. The compensatory satisfaction theory in its turn argues that adolescents who do not feel satisfied in the context of their parents will search for other social contexts for this fulfillment, such as the internet or in this case, social media (Liu et al., 2016). This article found that the offline need satisfaction of adolescents negatively predicted problematic internet use. When parents restrict their children's social media use in the moment, the adolescents' psychological needs are not met, which can lead to them turning to social media despite the restriction. This enlarges their chance of developing risky/problematic SMU. The second hypothesis therefore is:

H2: Parental reactive mediation will increase the risk of developing risky/problematic SMU in adolescents.

Interplay parental rules and reactive mediation on risky/problematic SMU

Although reactive mediation on its own could be seen as a less positive parenting practice, combined with parental rules its effect could be very different. Seay et al (2014), not only stated that children should get age-appropriate boundaries but added that this should be done with discipline. If the rules set are not adhered to by the child, consequences to social media use could be beneficial by enforcing said rules. Reactive mediation concerning parental rules may involve the enforcement of these established rules. Conversely, reactive mediation outside the realm of parental rules might indicate a less positive and more impulsive parenting approach. Parental rules and reactive mediation combined could therefore be seen as positive parenting, which would mean the needs of the self-determination theory are satisfied. Parents both setting rules and disciplining the child in the moment restrict the time the adolescent can spend on social media at multiple points in the process. This limitation of the time the adolescent can spend on social media should lower the chance of them developing risky/problematic SMU. In other words, you could expect the relationship between parental rules and risky/problematic SMU to be positively influenced by reactive mediation. The hypothesis that goes with this:

H3: The effect of parental rules on risky/problematic SMU is stronger in combination with higher levels of reactive mediation

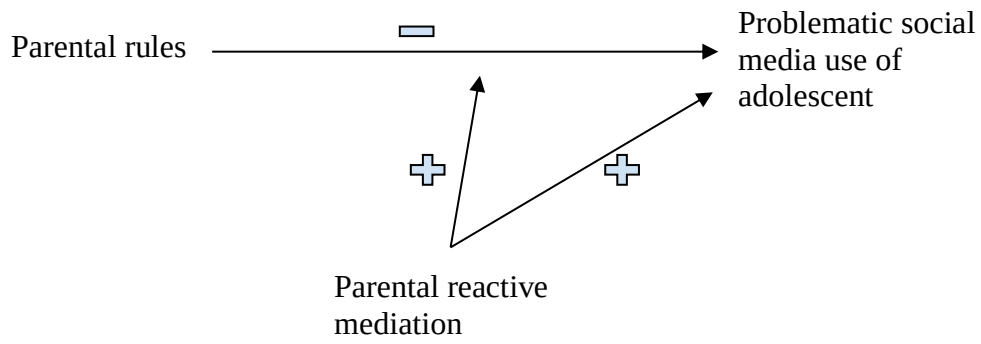
Effect of age

As adolescents grow older, they usually develop more self-control (Na & Paternoster, 2012; Meldrum et al., 2012). Low levels of self-control are related to internet addiction

(Ozdemir et al., 2014). At the same time, the self-control theory poses that rules are needed to develop more self-control. Building on to this, older adolescents who already possess more self-control might be less in need of external rules from their parents telling them what to do. You would expect that older adolescents who already have more self-control and are less prone to problematic social media use, are less dependent on rulesetting by their parents. Lee et al (2012) indeed found the effects of restrictive mediation are stronger for children with low self-control. Additionally, as children get older, they get more autonomous. Their willingness to accept their parents' rules and adhere to them could be reasoned to decline over time because of this. Again, this would point to younger children being more prone to the effects of parental rules and reactive mediation. For the two age groups, the hypothesis therefore is:

H4: The effects of parental rules and reactive mediation on risky/problematic SMU are stronger for the younger group than for the older group of adolescents

Model 1.



Sample

This study used data from the Digital Youth project, a longitudinal study among Dutch secondary school students with topics about online behaviour and mental health issues.

Schools in both urban and suburban areas were recruited and participating schools sent emails out to the parents of students for passive consent for their child to participate, meaning that parents who did not consent could indicate this. Data collection happened through an online self-report questionnaire during school hours. Five waves of data were collected between 2015 and 2019. This study uses two waves of data to study effect of parental rules and reactive mediation on risky/problematic SMU. The waves from 2017 and 2018 were used and will be referred to as T1 and T2. Out of the 2708 respondents who had filled out the questionnaire at T1, 1422 participants also did so at T2 (52.5%). The nonresponse was mainly due to school and class withdrawal or difficulty scheduling participation time. An attrition analysis was conducted to examine differences between the participants who filled out both waves and those who only did so at T1 to study a possible selection bias. An independent samples t-test showed significant differences for gender ($t=-2.53$, $p<0.012$), age ($t= 15.98$ $p < 0.001$), educational level ($t= -18.96$ $p < 0.001$), and parental rules ($t= 7.22$, $p<0.001$). A chi-square test did not find significant differences for risky/problematic SMU. This means that respondents who dropped out were more likely to be male, younger, have a lower educational level, and experience fewer parental rules.

After excluding participants who had not answered all relevant variable questions, the final sample consisted of 1305 respondents. The percentage of boys and girls was 50%. Respondents were on average 13.6 years old at T1, and 14.7 years old at T2. At T1, a third of the students were in vocational education (31%), 14.2% were in a mixed class of vocational education and high school, 40.5% followed mixed education between high school and pre-university, and 14.3% were in pre-university education. Almost all respondents were born in the Netherlands (95.6%).

Procedure and ethics

Both students and their parents received information about participating in the study. They both had passive informed consent: parents could deny participation beforehand and students could decide not to participate at the moment in class. They were also informed that data would be handled anonymously, that participation was voluntary, and that they could stop at any moment. The ethical board of the Faculty of Social Sciences at Utrecht University approved the data collection at the time of collection (FETC16-076 Eijnden) and the use of the data for this current study (FETC24-1354 Wesselink).

Operationalization

Risky/problematic SMU

Risky/problematic SMU was measured with a scale measuring Social Media Disorder (van den Eijnden, 2016). This scale contains nine items with "yes" or "no" questions based on the past year of the respondent. This scale was based on the DSM5 criteria for an Internet Gaming Disorder (Lemmens et al., 2015). Two examples of questions are "Did you, over the past year, often feel bad when unable to use social media?" "Did you, over the past year, often get into arguments with others about your social media use?". After calculating the sum of 'yes' answers each respondent had, two groups were distinguished, as the distribution of the scale was too skewed to perform a linear regression analysis. Respondents with 0-1 'yes' answers, making up around 70% of the population were coded zero (normative group) and respondents with 2 or more 'yes' answers were coded one (risky/problematic group).

Parental rules

Parental rules were measured using the scale for rule-setting from de Koning et al (2018). Items asked respondents how often they were allowed certain online activities on normal school days, with a five-point scale ranging from never (1) to very often (5). The five statements from de Koning et al were used, complemented by four more statements such as

"being allowed to use the internet or game as long as you want" and "being allowed to take my smartphone to my bedroom when going to sleep at night". The original statements from de Koning focused largely on using the internet, whereas the newer statements included statements specifically on a smartphone/tablet. All items were reversely coded so a higher score indicated more parental rules. Cronbach's alpha for parental rules at T1 was 0.86. Cronbach's alpha for parental rules at T2 was 0.87.

Reactive mediation

Reactive mediation was measured through four statements where respondents could say how often their parents reacted in a certain way when they wanted to use the internet, ranging from never (1) to more than five times a day (5) on a five-point scale. All statements included reactive behaviour parents could show, varying from "They tell me I'm not allowed to use the internet or game" to "They tell me my computer, tablet or smartphone should be OFF". Mean scores of this scale used from Koning et al., (2018) were computed. Cronbach's alpha for reactive mediation at T1 was 0.83. Chronbach's alpha for reactive mediation at T2 was 0.86.

Age

Respondents were asked how old they were in whole years. Answers differed from 11-17 years at T1, and 11-18 years at T2. Two age groups were made through a split at the median. At T2, 11-14 years comprised 48% of the sample. Therefore, this group was ascribed as the younger group, and 15–18-year-old students were assigned as the older group of adolescents.

Gender

Respondents were asked if they were a boy or a girl. Boy was coded 1, whereas girl was coded 2.

Educational level

Respondents were asked which secondary educational track they followed. They could choose from four options corresponding to the educational levels of the Dutch school system. Vocational education was coded “1” and pre-university was coded “5”.

Analysis strategy

To test the hypotheses, JASP was used. Descriptives of the variables were requested to check for normality, look at means, and spot outliers. A correlation analysis was performed to study relations between variables and test whether gender, age, and educational level could be confounders. Regression analyses were done as this study used a multivariate model. A logistic regression was performed as the dependent variable did not meet the assumption of normality for a linear regression. First, a model was estimated with the controlling variables for age, gender, educational level, and risky/problematic SMU at T1. The second model consisted of three steps, all including the controlling variables of the first model. Parental rules and reactive mediation were taken separately and finally together to test their independent as well as their dependent effect on risky/problematic SMU in the adolescent. This was to test the first and second hypotheses. In the third model, the interaction term between parental rules and reactive mediation was added to see if reactive mediation enhances the relationship between parental rules and risky/problematic SMU. This was done to investigate a possible moderation by reactive mediation and thereby test Hypothesis 3. The interaction term was made with centered variables for parental rules and reactive mediation. Again, controlling variables for age, gender, educational level, and risky/problematic SMU at T1 were added. Finally, in model four, three more interaction terms were added to test the fourth hypothesis. To see whether the different age groups influenced the model, a couple of interaction terms were made. First, an interaction term between age and parental rules was

made, then an interaction term between age and reactive mediation, and finally a three-way interaction term with reactive mediation, parental rules, and age was made.

Descriptives

Table 2.
Mean scores for parental rules and reactive mediation, and percentages for risky/problematic SMU (N=1305)

	M/%	SD	Min	Max
Parental rules T1	3.35	0.93	1	5
Parental rules T2	3.03	0.98	1	5
Reactive mediation T1	1.73	0.76	1	5
Reactive mediation T2	1.61	0.73	1	5
Risky/problematic SMU T1 (0-1 symptoms)	67.7	-	0	1
Risky/problematic SMU T2 (0-1 symptoms)	70.7	-	0	1

Table 3 *Correlations between demographic variables, parental rules, reactive mediation, and risky/problematic SMU*

	1	2	3	4	5	6	7	8	9
1. Gender[a] T1	-								
2. Age T1	-.071*	-							
3. Educational level T1	.138***	.223***	-						
4. Parental rules T1	-.005	-.304***	.013	-					
5. Parental rules T2	-.022	-.271***	-.042	.586***	-				
6. Reactive mediation T1	-.106***	-.165***	-.059*	.222***	.265***	-			
7. Reactive mediation T2	-.134***	-.178***	-.041	.225***	.260***	.484***	-		
8. Risky/problematic SMU T1	.059*	-.025	-.180***	-.120***	-.080**	.158***	.096***	-	
9. Risky/problematic SMU T2	.048	-.011	-.095***	-.104***	-.064*	.114***	.178***	.370***	-

Note. For gender, educational level, and risky/problematic SMU, Spearman's rho was used. Pearson's correlation coefficient was used for all other correlations. [a] Reference category = Boys. *p < 0.05. **p < 0.01 **p<0.001

Correlations

The correlations table shows no significant correlations between the controlling variables gender and age and risky/problematic SMU. It does show a positive, significant correlation between educational level and risky/problematic SMU, meaning that the higher the educational level, the lower the scores of risky/problematic SMU at both time points. Parental rules and reactive mediation are positively and significantly related. This means that adolescents who say their parents set rules on their internet use, also report high levels of in-the-moment restrictions. Risky/problematic SMU at T1 and T2 are highly positively related, meaning adolescents score consistently over time. Parental rules at T1 are negatively and significantly related to risky/problematic SMU at T2, meaning more rules correlate with fewer symptoms. Reactive mediation at T1 is positively and significantly related to risky/problematic SMU at T2. This means that a higher level of reactive mediation is related to higher levels of risky/problematic SMU in adolescents a year later.

Table 4.

Logistic regression analysis of parental rules and reactive mediation at T1, and risky/problematic SMU at T2 (N=1305)

						95% Confidence interval		*R2*
		Estimate	**Standard Error**	**p**	**Odds Ratio**	**Lower bound**	**Upper bound**	**Nagel kerke**
Step 1	Gender	0.160	0.133	.229	1.174	0.904	1.525	
	Age	0.005	0.058	.925	1.005	0.898	1.126	
	Educational level	-0.066	0.045	.141	0.936	0.857	1.022	
	Risky/problematic SMU	1.638	0.134	<.001	5.146	3.961	6.687	
Step 2a	Parental rules	-0.181	0.074	.014	0.834	0.722	0.965	0.007
Step 2b	Reactive mediation	0.253	0.086	.003	1.288	1.089	1.523	0.188

Step 2c	Parental rules	-0.244	0.077	.001	0.783	0.674	0.911	0.197
	Reactive mediation	0.315	0.088	<.001	1.371	1.154	1.628	
Step 3	Parental rules * reactive mediation	0.090	0.85	.289	1.094	0.927	1.292	0.199
Step 4	Age * parental rules	0.057	0.152	.707	1.059	0.786	1.427	0.199
	Age * reactive mediation	0.046	0.179	.797	1.047	0.737	1.488	
	Age * parental rules * reactive mediation	-0.076	0.179	.672	0.927	0.653	1.316	

Regression analyses

Logistic regression analysis was used to test the hypotheses. Step 1 showed the effects of the controlling variables on risky/problematic SMU at T2. Table 4 shows that only risky/problematic SMU at T1 showed a positive significant effect on risky/problematic SMU at T2. This means that students reporting more risky/problematic SMU symptoms at T1 are also more likely to report more risky/problematic SMU at T2.

Steps 2a and 2b show the separate effects of parental rules and reactive mediation on risky/problematic SMU T2. Parental rules at T1 show a decrease in risky/problematic SMU at T2, while reactive mediation at T1 predicts an increase in risky/problematic SMU at T2. Step 2c shows their effects when both are added to the model. This shows a significant negative effect of parental rules on risky/problematic SMU and a significant positive effect of reactive meditation on risky/problematic SMU. A negative effect of parental rules on risky/problematic SMU, meaning that students who reported less rule setting by their parents at T1 had more risky/problematic SMU symptoms at T2, was expected. Hypothesis 1 can therefore be accepted. A positive effect of reactive mediation on risky/problematic SMU was also expected, meaning Hypothesis 2 can be accepted. This means adolescents who reported more in-the-moment restrictions from their parents, showed more risky/problematic SMU symptoms a year later.

The interaction between parental rules and reactive mediation was not significant. This means Hypothesis 3 can be rejected. The results do not suggest that reactive mediation affects the strength of the relationship between parental rules and risky/problematic SMU.

Finally, none of the interactions with age in step 4 were significant. This means there are no significant differences found in age groups, neither for the direct effects of parental rules and reactive mediation at T1 on risky/problematic SMU at T2, nor for the interaction between parental rules and reactive mediation. This means Hypothesis 4 has to be rejected.

Discussion

This study aimed to understand the effect of two forms of parental restrictions, parental rules, and reactive mediation, on risky/problematic SMU in adolescents. The interplay of the two parental restrictions on risky/problematic SMU and two different age groups were also studied. The results showed that parental rules predict a decrease in risky/SMU one year later, meaning that adolescents who reported they had a lot of rules on screen time set by their parents, were less likely to report risky/problematic SMU later. Reactive mediation showed an increase in risky/problematic SMU, meaning that adolescents who reported that their parents restricted their screen time in the moment, were more likely to report risky/problematic SMU a year later.

The negative effect of parental rules on risky/problematic SMU aligns with research so far (de Koning, 2018, Geurts et al., 2022). This is unsurprising as de Koning used the same dataset with an earlier wave and Geurts used a comparable dataset though she used a cross-sectional design. However, their sample size was significantly smaller, meaning this study adds power to draw generalizable conclusions on all Dutch adolescents. The self-determination theory and positive parenting could explain the negative effect of parental rules on risky/problematic SMU. Practically, adolescents who are not allowed to use their phones all the time by their parents spend less time on social media. This lower intensity of use leads to a lower chance of developing risky/problematic SMU in turn. Additionally, as communicating clear rules by parents to their children can be seen as a positive parenting practice, adolescents are less likely to feel unfulfilled needs according to the self-determination theory. This means that adolescents will not try and complement their unfulfilled needs by using more social media (secretly).

The positive effect of reactive mediation on risky/problematic SMU is in line with previous research (Vossen et al., 2024). The level of risky/problematic SMU in adolescents

grows when they report a higher level of reactive mediation, meaning that it is indeed possible that it can do more harm than good. Reactive mediation, through being less of a positive parenting practice, could lead to children compensating for their unfulfilled psychological needs with more time on social media. This higher intensity of use poses them with a higher risk of developing risky/problematic SMU, leading to the opposite of the desired effect of parents who impose reactive mediation.

Correlations showed parental rules and restrictive mediation to be positively and significantly related, suggesting parents practice both types of restrictions similarly. This aligns with the existing literature (Geurts et al., 2022, de Koning et al., 2018), which found a positive, significant correlation between parental rules and reactive mediation as well. Both Geurts and de Koning used a dataset similar in age group, with adolescent-reported variables for reactive mediation and parental rules, among Dutch youth. However, Geurts's sample size was almost half the number of respondents, and de Koning's sample size was roughly a quarter of the sample used for this study, which means this research adds strength to generalize outcomes to a greater population.

Based on further analyses, it cannot be concluded that there is an interplay between parental rules and reactive mediation. There is yet not much research separating parental restrictions into parental rules and reactive mediation. Additionally, this research was the first to study their interplay with each other besides their respective effects on risky/problematic SMU. It would be interesting to see if future studies find similar results.

Finally, age does not seem to affect the respective effects of reactive mediation or parental rules or their interplay. No direct effect of age was found for risky/problematic SMU, meaning adolescents of all ages report risky/problematic SMU similarly. There were also no significant differences found between the younger and older groups of adolescents when looking at the effects of parental rules and reactive mediation on risky/problematic

SMU. This means this study cannot conclude that adolescents react differently to parental restrictions when they grow older. A possible explanation for the absence of age differences could be that in this study, the respective younger and older group did not have enough respondents to find significant results. Studies using larger datasets could therefore draw stronger conclusions on the effect of age on the relations between parental rules, reactive mediation and risky/problematic SMU.

For future research, it would be valuable to get data from the parents to prevent bias from the adolescents' experiences. Asking parents whether they are worried about their child developing risky/problematic SMU around the time their child gets a smartphone and looking at to what extent this influences both their parental mediation and the risky/problematic SMU of the child would provide interesting insights into the causality of the relation between parental rules and risky/problematic SMU. It could finally also be the case that parental rules and risky/problematic SMU influence each other simultaneously. Looking into this possible bi-directional relation would be interesting.

The current study has its strengths and limitations. The foremost strength of this study is the further disentanglement of restrictive mediation into parental rules and reactive mediation in relation to risky/problematic SMU. These forms of parental restrictions both seem to differently affect the development of risky/problematic SMU in adolescents, but the results did not suggest an interplay between reactive mediation and parental rules. Further research should keep reactive mediation and parental rules separate to better understand their respective effects. Different effects might need a translation into different advice on parenting practices. This could translate research into practical advice for parents on how to restrict their child's social media use effectively to prevent the development of risky or problematic use.

Another strength of this research is the differentiation between age groups. As adolescence is a period of many changes, it is important to study differences across time. This research did not find differences across ages, meaning the results should be generalizable to all Dutch high school students. This is again useful when advising parents.

A weakness of this study can be found in the operationalization of risky/problematic SMU. The data showed very skewed results: most respondents had zero to one symptom out of a maximum of nine. Therefore, all respondents who reported two or more 'yes' answers were classified as risky/problematic SMU. This division is quite harsh and might have harmed the accuracy of the measurement of risky/problematic SMU in the studied adolescents. Respondents who had very varying amounts of symptoms of risky/problematic SMU were pooled together, which might distort the interpretation of the results. For future research on this topic, a larger sample could help divide respondents into more than only an unproblematic and a problematic group. This would provide more insight into the effects of reactive mediation and parental rules on risky/problematic SMU as it would be possible to study between-group differences more accurately.

This study used self-reported data from Dutch adolescents. This means that answers were subjective and could be susceptible to distortions, making the used variables less valid and the research less generalizable and suitable for interpretation. Adolescents' perspectives on their own social media use and the restrictions their parents enforce on them are themes that could easily be perceived differently from reality. The results could therefore show an unrepresentative view of reality. For future research, it would be interesting to complement self-reported data of children with data from their parents to get a more complete view of the situation.

In conclusion, parents should be careful with how they impose restrictions on the social media use of their adolescent. Doing so in the heat of the moment could harm the child

more than it benefits them, while doing so beforehand could benefit the adolescent. Drawing on earlier research and the present study, taking away a phone suddenly or imposing other unexpected restrictions will cause adolescents to quicker develop problematic social media use, causing the opposite of the desired effect. Parental rules that are agreed upon beforehand seem to help reduce the development of risky/problematic SMU. In preventing the development of risky/problematic SMU in adolescents, parents and policymakers could benefit from more research disentangling the independent and dependent effects of parental rules and reactive mediation to be better informed on what strategies work. As parental rules and reactive mediation have opposite effects, it is important to keep them separate as pooling them together might show distorted outcomes. These efforts should contribute to fewer adolescents developing risky/problematic SMU, benefitting most importantly their mental health.

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Appendix 1: reflection on interdisciplinarity

The problem of risky/problematic social media use (risky/problematic SMU) among adolescents is multifaceted, involving psychological, social, and technological dimensions. Using theoretical insights from multiple disciplines, such as psychology, sociology, and communication studies, provides a complete understanding of this issue. Psychology provides insight into individual behavior and mental health, sociology offers a perspective on social influences and family dynamics, and communication studies look at social media platforms. Integrating these perspectives helps understand the interplay between the individual, their social contexts, and technological influences in their contribution to risky/problematic SMU.

Psychology is crucial for understanding the cognitive and emotional mechanisms underlying risky/problematic SMU. The self-determination theory from psychology highlights the importance of fulfilling basic psychological needs (competence, autonomy, and relatedness) for mental health. This theory helps explain why certain parental mediation strategies might be more effective than others. Insights from sociology are essential to examine how in this case family dynamics affect adolescents' social media use. The compensatory satisfaction theory, which posits that unmet needs in the offline world lead to increased online activity, is a valuable sociological concept that helps explain why reactive parental mediation might be counterproductive. Communication studies provide a deep understanding of social media's design and its impact on user behavior. It is crucial to understand how social media can be addictive in order to understand the symptoms of risky/problematic SMU in adolescents. Drawing on these disciplines is meaningful because it addresses the research topic: the effects of parental rules and reactive parental mediation on risky/problematic SMU among adolescents. It provides a complete view that considers psychological needs, social influences, and the role of technology.

Insights from stakeholders outside academia, such as parents, policymakers, and social media platform developers, are important for a practical understanding of the problem. The firsthand experience of parents with adolescents' social media habits and the challenges of enforcing rules provides insights beyond the experiences of the adolescents themselves. They can offer valuable feedback on what does and does not work in real-life scenarios. For future research, gathering data from parents would be valuable to get a more objective view of adolescents' social media use. The perspective of policymakers is also crucial for understanding possibilities in the field of policy and the potential for policy interventions. The recent legislative efforts in Europe and Utah, where social media platforms get restrictions to protect their users, show the need to address risky/problematic SMU through policy. Additionally, understanding the design choices of social media designers and the potential for creating less addictive apps and tools within apps is essential for developing prevention and long-term solutions to the development and persisting of risky/problematic SMU.

While an interdisciplinary approach is highly beneficial for this research, a monodisciplinary approach can still be legitimate if focused deeper on specific aspects of the problem. For example, a solely psychological study could offer interesting insights into the individual mental health impacts of risky/problematic SMU. However, it might miss the broader social and technological context.

Using multiple research methods can lead to a deeper understanding of risky/problematic SMU. Their combination can help look at different dimensions of the problem.

Quantitative questionnaires can provide large-scale data on the prevalence and patterns of social media use and its correlation with mental health outcomes. The size of the dataset would allow for drawing generalizable conclusions on bigger populations.

Qualitative interviews and focus groups can additionally offer in-depth insights into the personal experiences of adolescents and their parents, which allows us to get a fuller understanding of the problem. Finally, controlled experiments could test the effects of specific mediation strategies on social media use and psychological well-being.

Analyzing the problem at multiple levels, such as individual, familial, and societal, can provide a deeper understanding of risky/problematic SMU. Examining the individual level through personal traits, psychological needs, and behavioral patterns offers insight into why some adolescents are more at risk of developing risky/problematic SMU. Exploring family dynamics, parenting styles, and mediation strategies thereby reveals how the immediate social environment influences social media use. One step further from the individual, considering broader social norms, peer influences, and policy contexts on a societal level could help understand the external factors that affect adolescent behavior. Joint analysis of these levels is meaningful because it provides a comprehensive understanding of risky/problematic SMU, which can be used for more effective interventions.

In conclusion would an interdisciplinary approach, integrating psychology, sociology, and communication studies, along with stakeholder perspectives and multiple research methods, offer an extremely comprehensive understanding of problematic social media use among adolescents. Although it might be hard to realize all these different methods and views into a feasible research design, its results would give interesting insights that could be used to better preventions and interventions targeted at lowering the number of adolescents dealing with risky/problematic SMU.