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Spontaneous approach reactions toward social media cues

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ABSTRACT

Why is it difficult to resist social media temptations? One reason might be that social media users have strong and spontaneous approach reactions to social media cues. In the present study, daily Facebook users ($N = 228$) completed a Stimulus-Response Compatibility (SRC) task, which assessed their spontaneous approach reactions to Facebook cues. Results showed that participants were faster in approaching than avoiding Facebook related (vs. control) pictures, regardless of their general tendency to experience Facebook self-control failures. Thus, contrary to expectations, spontaneous approach reactions to social media cues were not related to people's daily experienced social media self-control failure.

1. Introduction

Each day, a considerable amount of time people used to spend on work, study and other important obligations is now occupied by social media use (Sonnentag & Pundt, 2017). The increase in social media engagement has raised public concern regarding its impacts on people's everyday life (e.g., Burke, Marlow, & Lento, 2010). When the desire to use social media matches people's primary goal (e.g., browsing Facebook pages to relax after work), it could benefit a variety of need satisfaction processes and could have positive potential for people's daily lives (Oh, Ozkaya, & LaRose, 2014; Whiting & Williams, 2013). However, when the desire to use social media conflicts with other important goals or obligations (e.g., checking Facebook vs. studying to get a good grade), it could become a temptation that disturbs people from these goal-pursuit activities.

In order to resist social media temptations, people need self-control, which refers to the capacity to suppress a desire which conflicts with a primary self-regulatory goal or standard (Hofmann, Reinecke, & Meier, 2017). However, exerting self-control on media use when necessary has become a challenge (Hofmann et al., 2017; Reinecke, Hartmann, & Eden, 2014). Many people report that they have frequently failed to control their (social) media use when goal-conflict occurred (Hofmann, Vohs, & Baumeister, 2012).

Social media self-control failure describes the state in which people fail to control their social media use when it conflicts with other important goals (e.g., study, work, chores), delays other tasks or makes them use time less efficiently (Du, van Koningsbruggen, & Kerkhof, 2018). Different from more pathological forms of media use, such as compulsive Internet use (Greenfield, 1999), problematic Internet use

(Caplan, 2003) and addictive social media use (Andreassen, Torsheim, Brunborg, & Pallesen, 2012), it is a more commonly perceived self-control problem (Du et al., 2018). Even in the absence of pathological features, experiencing such failure could have negative impacts, such as increased stress (Meier, Reinecke, & Meltzer, 2016) and decreased wellbeing (Reinecke & Hofmann, 2016). Thus examining this daily experienced social media self-control failure and its underlying mechanism is of significant importance. We formulated the following research question:

Why do people fail to control their social media use even when realizing that other important goals will be set aside?

We propose that one reason could be a social media induced impulsive behavioral tendency. Mobile smart devices and omnipresent online accessibility help to shape a graphically-rich and media-rich environment, where people could constantly perceive being surrounded by online information (Vorderer, Krömer, & Schneider, 2016). No matter when and where, social media cues seem to ubiquitously influence and direct people's daily behaviors. For example, visual cues (e.g., Facebook logo) guide people to share or like, and audio cues (e.g., push-notifications) remind people to respond immediately. This might suggest that, living in a media-saturated environment, people's media behavior might be triggered in a more impulsive way (van Koningsbruggen, Hartmann, & Du, 2018). Importantly, it might also underpin frequently occurring social media self-control failure. Therefore, the present study aimed to examine the association between impulsive behavioral approach tendencies and social media self-control failure.

In the current literature, much research has explored factors related to impulsive processes as possible antecedents of self-control problems.

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Most of the studies were based on self-reported measures, such as habit strength (Meier et al., 2016; Schnauber-Stockmann, Meier, & Reinecke, 2018), affectivity (Gervasi et al., 2017), and impulsivity (Mottram & Fleming, 2009). While these findings provided important knowledge about people's tendencies to act in an impulsive way, and how this relates to media-related self-control problems, these self-reported measures are a relatively indirect way of learning about the impulsive processes that are assumed to play a role. Particularly regarding impulsive approach reactions, adopting a more implicit, process-oriented measurement method might provide more direct insights into how impulsive processes relate to social media self-control failures.

1.1. Spontaneous approach reactions to social media cues

To understand impulsive social media use and self-control failure in a goal-conflict situation, a dual-system model of behavior might provide a reasonable theoretical framework. Dual-system models such as the Reflective-Impulsive Model (Strack & Deutsch, 2004) propose that human behaviors are directed by the joint operation of two systems: the reflective and the impulsive system. Within the reflective system, people process stimuli according to their relevance for long-term goals through deliberative reasoning, which is assumed to result in controlled forms of behavior (Hofmann, Friese, & Strack, 2009b). In contrast, within the impulsive system, people process stimuli according to their affective and motivational relevance through the process of spreading of activation in an associative network, which is assumed to result in impulsive behavior (Hofmann et al., 2009b). Usually, the two systems work compatibly, and people experience no conflict or challenge (e.g., acting on the impulse to check Facebook when deliberately looking for entertainment). However, when people face a goal-conflict dilemma, such as using social media versus finishing work before a deadline, the two systems become competitive in directing people's behaviors. At this moment, behavioral outcomes are determined by the activation strength of the two systems: whether one system overrides another (Hofmann et al., 2009b; Strack & Deutsch, 2004). One possible reason why social media users often fail to control their social media use might be that they have developed strong associative networks within the impulsive system that are easily activated when exposed to social media-related cues.

As stated by the Reflective-Impulsive Model (Hofmann et al., 2009b; Strack & Deutsch, 2004), impulses arise in the impulsive system by the activation of associative clusters in long-term memory that have been formed gradually through constant stimuli input. Due to repeated use of social media in a media-rich environment, social media users, for instance, might develop an associative cluster connecting the concept of social media, the experience of positive affect, and the behavioral schema that has generated the positive affect (e.g., tapping on the Facebook app icon on your tablet). Once such a cluster has been established, the cluster can be spontaneously reactivated by external or internal cues (e.g., seeing the Facebook logo or thinking about checking Facebook).

Exposure to social media cues in another situation might reactivate this “social media-cluster” and, accordingly, trigger a spontaneous (i.e., unintentional) *affective* reaction and a corresponding behavioral *approach* reaction toward these cues, resulting in impulsive use of social media (Hofmann et al., 2009b; van Koningsbruggen, Hartmann, & Eden, 2017). Previous research indeed suggests that exposure to social media cues appears to trigger spontaneous affective reactions among social media users (van Koningsbruggen, Hartmann, Eden, & Veling, 2017). Specifically, the study by van Koningsbruggen et al. (2017) applied an implicit task (i.e., the affect misattribution procedure; Payne, Cheng, Govorun, & Stewart, 2005) to assess people's feelings of pleasantness toward a neutral pictography. In each trial of the task, participants were presented with a prime cue (75 ms) of a Facebook picture or a control picture (i.e., office supplies), followed by a blank screen (125 ms) and a neutral cue (i.e., a Chinese pictography, 100 ms).

They were asked to rate the pleasantness of the neutral pictography. Results revealed that frequent Facebook users had more pleasant ratings toward the pictography if they were primed with Facebook cues, while occasional Facebook users had no difference in their ratings given different prime cues. This study suggests that frequent social media users displayed stronger spontaneous affective reactions toward social media cues. Moreover, these stronger spontaneous affective reactions, in turn, were associated with the inclinations to the immediate reward from social media, implying that they may contribute to social media self-control failure (van Koningsbruggen et al., 2017).

Although spontaneous affective and approach reactions usually co-occur, it has also been argued that the two processes might only be loosely connected (Finlayson, King, & Blundell, 2007). Thus, they might play different roles in explaining self-regulatory problems in terms of their relevance for behavioral enactment (Veenstra & de Jong, 2010). While affective reactions mainly capture the automatically triggered hedonic states, approach reactions are more sensitive to the initiation of predisposed behaviors (Berridge, 2009). Although the affective reaction is essential for a full sense of reward, it needs to be translated into motivation to influence behavior (Berridge, 2009). Approach reactions make such translation more likely by increasing the salience of incentives and thoughts of execution (Berridge, 2009). Therefore, the question that is central to our paper is whether spontaneous *approach* reactions to social media cues are related to social media self-control failure.

The role of spontaneous approach reactions to tempting cues has been studied in the context of health-related behaviors, such as giving in to food temptations (Veenstra & de Jong, 2010), sexual interest behavior (Hofmann, Friese, & Gschwendner, 2009a) and alcohol consumption (Barkby, Dickson, Roper, & Field, 2012; Field, Kiernan, Eastwood, & Child, 2008; Wiers, Dictus, Houben, Van den Wildenberg, & Rinck, 2009). In general, these studies suggest that people who more often (vs. less often) fail in exerting self-control over impulsive behaviors show stronger spontaneous approach reactions to tempting (vs. non-tempting) cues (e.g., binge drinkers or unsuccessful dieters show stronger approach reactions to beer- or food-related stimuli). In the same vein, failure to exert self-control over social media use might thus be linked to stronger spontaneous approach reactions to social media (vs. control) cues.

Therefore, the main objective of the present study was to examine whether people who more often fail to control their social media use also have stronger spontaneous approach reactions to social media cues. Examining differences in approach reactions between users who more versus less often fail in controlling their social media use, enables us to identify whether approach reactions contribute to social media self-control failure. By taking this approach, we follow many previous studies that investigated precursors of self-control failure (e.g., Barkby et al., 2012; Veenstra & de Jong, 2010). Specifically, we argue that the repeated use of social media and the experience of gratifications derived from this use, generate a strong impulsive system, which enables the interconnected “impulsive clusters” to rapidly activate the impulse toward using social media. The resulting stronger spontaneous approach reactions toward social media cues should lead to more difficulty in exerting self-control over social media use. Taking one of the most widely used social media platforms—Facebook—as an example (Smith & Anderson, 2018), in the present study, we tested the hypothesis that:

People who more (vs. less) often fail in controlling their Facebook use (i.e., who score high on Facebook self-control failure) will show stronger spontaneous approach reactions to Facebook cues.

2. Method

Prior to data collection, the main hypothesis, research design, and data analytical plan (including the exploratory analyses) were registered on AsPredicted (aspredicted.org/7gd8p.pdf). Materials and

anonymized raw datasets are available online at <https://osf.io/6c3bw/>.

2.1. Participants and procedure

Participants were recruited from the UK, US, Canada and Australia from an online participant pool (Prolific, <https://www.prolific.ac/>; for evidence regarding the quality of Prolific data, see Peer, Brandimarte, Samat, & Acquisti, 2017). We recruited participants who were between 16 and 60 years old, owned a Facebook account, and used Facebook at least once a day (cf. Du et al., 2018). We aimed at recruiting 250 participants. The sample size was calculated based on the expectation of a small to medium effect size ($f = 0.25$) for F-test and an adequate power (0.80) to prevent making a type 2 error. This expectation was based on a study that found a correlation between spontaneous approach reactions and alcohol consumption of 0.28 (Field, Caren, Fernie, & De Houwer, 2011) and another study that reported correlations between spontaneous affective reactions and Facebook use that were 0.18 and 0.31 (van Koningsbruggen et al., 2017). Following similar screen-out criteria as in previous research (Du et al., 2018), of the 251 participants that started the study, nine participants were excluded: those who were aged above 60 or below 16 ($n = 0$), and/or who did not use Facebook one or more times on a typical day ($n = 5$), and also those without a Facebook account or did not finish the survey ($n = 4$). Additionally, 14 participants were identified as outliers on the reaction time task and were also excluded (see data analytical plan). The final sample consisted of 228 participants (116 men and 112 women) with an age range of 18–60 years ($M = 34.8$, $SD = 11.2$). The most frequent means of accessing Facebook was the mobile phone (50%), compared with tablet (7%), laptop (26%) and desktop computer (17%).

The study was programmed in Qualtrics and Inquisit 4. After providing consent, participants received instructions to complete the task that assessed their approach reactions to Facebook cues. Next, participants were instructed to fill in self-reported questionnaires regarding their Facebook cravings, feelings of guilt and enjoyment related to Facebook use, wellbeing, Facebook use, Facebook self-control failure and fear of missing out. Apart from the task assessing approach bias, for the current paper we only used the measures of Facebook use and Facebook self-control failure.¹ Finally, participants provided their demographic information, and received 1.25 GBP for their participation. The average time of completion of the study was 15.64 min ($SD = 1.74$).

2.2. Materials

To select stimuli for the Stimulus-Response Compatibility (SRC) task to assess participants' approach reactions to social media cues, we conducted a pilot study among 50 Facebook users, recruited at the Prolific participant pool employing similar recruitment criteria as in the main study (30 male and 20 female, $M_{\text{age}} = 29.8$, $SD_{\text{age}} = 9.7$, $\text{Range}_{\text{age}} = 18\text{--}56$ years). Participants were instructed to rate 25 Facebook-related pictures (e.g., a Facebook logo, a Facebook page on a computer screen, and a Facebook page on a mobile phone screen) and 25 office supply-related pictures (e.g., a stapler, a USB key, and a notebook). As in previous research (e.g., van Koningsbruggen et al., 2017), office supply-related pictures were selected as control stimuli. All pictures were collected online or came from a previous study (van

¹ The measures of Facebook cravings, feelings of guilt and enjoyment related to Facebook use, wellbeing, Facebook use, percentage of Facebook self-control failure and fear of missing out were collected to examine whether their correlations with Facebook self-control failure could replicate findings from similar projects (Du et al., 2018; van Koningsbruggen et al., 2017). Additionally, we also explored whether the associations between approach reactions and the outcome measures were moderated by Facebook self-control failure. In the supplementary material, we briefly presented the measures we used, the analysis and results.

Koningsbruggen et al., 2017). Each picture was followed by three questions: (1) "Please rate the extent to which you find the picture visually appealing. Provide your rating without regard to whether you like the specific object featured;" (2) "Please rate the extent to which you find the picture complex in terms of the quantity of details and the intricacy with the object of the lines. Provide your rating without regard to whether you like the specific object featured;" (3) "Please rate the extent to which you are familiar with the object featured on the picture." Answers were provided on a 9-point Likert scale from 1 = Not at all appealing/complex/familiar to 9 = Very appealing/complex/familiar. We matched the Facebook and control-related pictures according to ratings of visual appeal (Facebook: $\alpha = 0.93$, $M = 5.01$, $SD = 1.61$; control: $\alpha = 0.89$, $M = 4.43$, $SD = 1.14$), complexity (Facebook: $\alpha = 0.95$, $M = 3.43$, $SD = 1.62$; control: $\alpha = 0.92$, $M = 3.76$, $SD = 1.35$), and familiarity (Facebook: $\alpha = 0.92$, $M = 7.76$, $SD = 1.18$; control: $\alpha = 0.90$, $M = 6.71$, $SD = 1.16$). For each Facebook-related picture, no significant difference was found on the three dimensions with its corresponding control-related picture (see supplementary information). Based on Field et al. (2011), the two groups of pictures were matched on color, lightness and saturation in Adobe Photoshop CC 2017. All pictures were resized to 93 mm high \times 123 mm wide.

2.3. Measures

2.3.1. The SRC (Stimulus-Response Compatibility) task

Spontaneous approach reaction was assessed using an implicit measure, the SRC task (Barkby et al., 2012; Field et al., 2011). In an SRC task, participants typically use a keyboard to move a manikin towards or away (instructions differ across experimental blocks) from target and control cues (i.e., pictures) that appear on a computer screen. Stronger spontaneous approach reactions to target cues are reflected by faster reaction times to approach, and longer reaction times to avoid the target cues. In the present study, we used the SRC task adapted from Barkby et al. (2012) and Field et al. (2011). The SRC task contained 2 blocks: the Approach Facebook block and the Avoid Facebook block. In each block, 14 Facebook-related pictures and 14 control-related pictures were presented twice in random order. In each trial, participants first saw a black screen (1000 ms), followed by a Facebook- or control-related picture appearing in the center of the computer screen, together with a manikin above or below the picture. The task for participants was to use the arrow keys on the keyboard to move the manikin toward or away from the picture as quickly as possible. In the Approach Facebook block, they were required to move the manikin toward the picture if it was Facebook-related, and move it away from the picture if it was control-related. Conversely, in the Avoid Facebook block, they were required to move the manikin toward the control-related pictures, and move it away from the Facebook-related pictures. If the movement was correct, the manikin would "run" to the margin of the screen or to the picture for 1000 ms, and the next trial would start subsequently. If the movement was not correct, a "×" would appear on the screen for 1000 ms (see Fig. 1). Before each block, 8 practice trials were presented. For each trial, the manikin would appear once above and once below the picture. For each participant, the order of Approach/Avoid Facebook blocks was counterbalanced. Odd-numbered participants completed the Approach Facebook block first while even-numbered participants completed the Avoid Facebook block first.

2.3.2. Facebook self-control failure

The 3-item Social Media Self-Control Failure-scale was adapted to the Facebook context to assess Facebook self-control failure (Chen & Zheng, 2019; Du et al., 2018; Halfmann & Rieger, 2019). Participants were asked "How often do you give in to a desire to use Facebook even though your Facebook use at that particular moment: 1) ... conflicts with other goals (for example: doing things for school/study/work or other tasks)? 2) ... makes you use your time less efficiently? 3) ... makes you delay other things you want or need to do?" Participants rated each

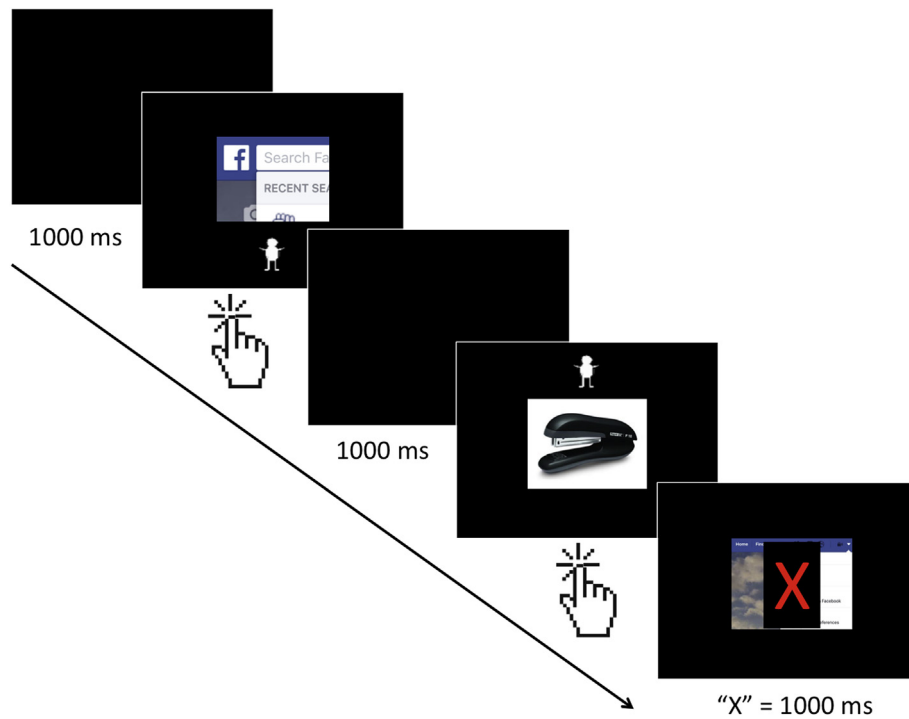


Fig. 1. A SRC task trial with a Facebook-related picture and a correct response, followed by a trial with a control-related picture and an incorrect response.

item on a 5-point scale (1 = almost never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often; $M = 2.60, SD = 0.97, \alpha = 0.90$).

2.3.3. Facebook use

We assessed participants' Facebook use with two questions measuring both the time and frequency of use. Participants first responded to the question "On average, approximately how many minutes per day do you spend on Facebook?" (1 = 10 min or less, 2 = 11–30 min, 3 = min, 4 = 1–2 h, 5 = 2–3 h, 6 = 3 + hours $Mdn = 2.50, Mode = 2.00$), and then to the question "On average, how often do you visit Facebook?" (1 = Less than once a day, 2 = Once a day, 3 = 2–3 times a day, 4 = Once an hour, 5 = 2–3 times an hour, 6 = More than 3 times an hour $Mdn = 3.00, Mode = 3.00$).

2.4. Data analytical plan

Data analyses were conducted with IBM SPSS Statistics version 23.0. Following the pre-specified data analytical plan, first, participants who did not meet the recruiting criteria were excluded. Next, we processed the SRC-data by excluding trials with error responses, trials with a reaction time (RT) faster than 200 ms, slower than 3000 ms, and trials with a $RT \pm 3 SDs$ of the individual mean. Finally, fourteen participants with a high rate of missing data due to errors and outliers ($> 20\%$) were removed. After applying these rules (adopted from Field et al., 2011) we calculated mean RTs.

Then the Approach Facebook RT and Avoid Facebook RT for each participant were calculated (based on Field et al., 2011). The Approach Facebook RT equals the mean RT of approaching Facebook-related pictures and avoiding control-related pictures; the Avoid Facebook RT equals the mean RT of avoiding Facebook-related pictures and approaching control-related pictures. In addition, we also calculated a "Facebook approach bias" score by subtracting the Approach Facebook RT from the Avoid Facebook RT, such that positive scores indicate faster RTs when required to approach (rather than avoid) Facebook-related pictures. In other words, it represents the "bias" to stay focused on Facebook cues.

To test the hypothesis whether people who often fail to control their

Facebook use also showed stronger spontaneous approach reactions toward Facebook cues, we first compared the RT by conducting a repeated measure general linear model (GLM) analysis with response type as within-subject factor (Approach Facebook RT vs. Avoid Facebook RT) and Facebook self-control failure as a continuous predictor (standardized; with means for Facebook users who often and those who less often give in to a temptation to use Facebook estimated at +1 SD and -1 SD, respectively). Then we added the counterbalance condition (Approach Facebook block first vs. Avoid Facebook block first) as between-subject factor into the GLM model to see if counterbalance affected the results.

3. Results

3.1. Descriptive analyses

Summary statistics and the correlation matrix of the main variables are presented in Table 1. The Approach Facebook RT was positively related to the Avoid Facebook RT, and negatively related to the Facebook approach bias scores. This indicates that participants' Approach Facebook RT and Avoid Facebook RT varied in the same direction.

Table 1

Means, standard deviations, reliabilities, and bivariate correlations for the main study variables.

	Approach Facebook	Avoid Facebook	Approach bias	Facebook SCF
Approach Facebook	–			
Avoid Facebook	.83**	–		
Approach bias	-.35**	.22**	–	
Facebook SCF	.04	.02	-.04	–
M	842.11	891.21	49.10	2.60
SD	218.06	209.22	123.90	0.97
α/r	–	–	–	0.90

Note. $N = 228$, Facebook SCF = Facebook self-control failure.

** $p < .01$.

Participants who spent more time in approaching Facebook cues also spent more time in avoiding them. Moreover, participants who reacted faster (i.e., shorter RT) in approaching Facebook cues had a stronger Facebook approach bias. Conversely, the Avoid Facebook RT was positively related to the Facebook approach bias, which indicates that participants who reacted faster (i.e., shorter RT) in avoiding Facebook cues showed weaker Facebook approach bias. Moreover, according to the results, 161 participants had a bias score greater than zero, meaning that 161 participants showed approach bias toward Facebook cues, and 67 participants had neutral or negative scores, indicating no approach bias. However, no significant correlation was found between Facebook self-control failure scores and the Approach Facebook RT, the Avoid Facebook RT, or the Facebook approach bias.

3.2. Spontaneous approach reactions to Facebook cues and Facebook self-control failure

Results from the repeated measure GLM showed that the main effect of response type was significant ($F(1, 226) = 35.70, p < .001$, partial $\eta^2 = 0.136$). Participants were faster in approaching Facebook-related pictures ($M = 842.11, SD = 218.06$) compared to avoiding Facebook-related pictures ($M = 891.21, SD = 209.22$). The main effect of Facebook self-control failure was not significant ($F(1, 226) = 0.17, p = .680$, partial $\eta^2 = 0.001$). In addition, the predicted interaction between response type and Facebook self-control failure was not significant ($F(1, 226) = 0.33, p = .568$, partial $\eta^2 = 0.001$).

To test if counterbalancing influenced these results, we conducted a similar GLM analysis including the counterbalance condition as between-subjects factor. Again, results showed a main effect of response type ($F(1, 224) = 36.43, p < .001$, partial $\eta^2 = 0.140$). Participants were faster in approaching Facebook-related pictures ($M = 842.11, SD = 218.06$) compared to avoiding Facebook-related pictures ($M = 891.21, SD = 209.22$). The main effect of Facebook self-control failure was not significant ($F(1, 224) = 0.75, p = .784$, partial $\eta^2 = 0.000$). The results also revealed a significant two-way interaction between the response type and the counterbalance condition ($F(1, 224) = 8.33, p = .004$, partial $\eta^2 = 0.036$). In both counterbalance conditions, participants were faster in approaching (vs. avoiding) Facebook-related pictures, but this effect was stronger for participants who completed the Approach (vs. Avoid) Facebook block first (Approach Facebook block first: $F(1, 224) = 40.16, p < .001$, partial $\eta^2 = 0.152$; Avoid Facebook block first: $F(1, 224) = 4.91, p = .028$, partial $\eta^2 = 0.021$, see Table 2 for comparisons between two counterbalance conditions). Importantly, no other effects were significant (response type \times FBSCF interaction: $F(1, 224) = 0.37, p = .543$, $\eta^2 = 0.002$; counterbalance \times FBSCF interaction: $F(1, 224) = 2.83, p = .094$, partial $\eta^2 = 0.012$; counterbalance \times response type \times FBSCF interaction: $F(1, 224) = 0.38, p = .846$, partial $\eta^2 = 0.000$), see Table 2.

Bivariate correlations showed that there was no significant correlation between Facebook approach bias and Facebook self-control failure (Fig. 2), thus disconfirming our main hypothesis. We further examined whether counterbalance condition moderated the association between Facebook approach bias and Facebook self-control failure. Using the PROCESS macro in SPSS (Model 1, version 3.3; Hayes, 2012),

the results showed no moderation effect of counterbalancing on the association between Facebook approach bias and Facebook self-control failure, $b = 0.00, SE = 0.00, t(224) = 0.38, p = .70, 90\% CI [-0.002, 0.003]$.

3.3. Exploratory analyses

We conducted an exploratory analysis regarding the association between spontaneous approach reactions to Facebook cues and Facebook self-control failure. Originally, in testing our main hypothesis, we calculated Approach Facebook RTs and Avoid Facebook RTs by averaging the reaction times within blocks (following Field et al., 2011). However, this calculation did not separate specific cue types (i.e., Facebook pictures vs. control pictures) and movement types (i.e., approaching vs. avoiding). Thus, we could not decide whether the faster overall Approach Facebook RTs should be accounted for by different cue types or different movement types. Therefore, instead of comparing RTs between the Approach Facebook blocks and the Avoid Facebook blocks, we compared the RTs for the different cue types versus movement types in both blocks.

Using a repeated measure GLM with cue types (Facebook vs. control) and movement types (approach vs. avoid) as within-subjects factors, we found that the main effect of cue-type was significant ($F(1, 227) = 58.92, p < .001$, partial $\eta^2 = 0.206$). Participants reacted faster to Facebook cues ($M = 850.73, SD = 203.47$) than to control cues ($M = 883.79, SD = 211.77$). The main effect of movement-type was also significant ($F(1, 227) = 143.26, p < .001$, partial $\eta^2 = 0.387$). Participants were faster in approaching ($M = 841.71, SD = 211.01$) than avoiding pictures ($M = 892.82, SD = 204.17$). Moreover, the interaction between cue-type and movement-type was also significant ($F(1, 227) = 35.09, p < .001$, partial $\eta^2 = 0.134$). When exposed to Facebook cues, all participants were faster in approaching ($M = 800.83, SD = 222.87$) than avoiding the pictures ($M = 900.64, SD = 208.46, F(1, 227) = 109.98, p < .001$, partial $\eta^2 = 0.326$). However, when exposed to control cues, no significant difference was found between approaching ($M = 882.58, SD = 221.54$) and avoiding the pictures ($M = 885.00, SD = 223.27, F(1, 227) = 0.07, p = .788$, partial $\eta^2 = 0.000$, see Fig. 3).

4. Discussion

Social media self-control failure is a non-pathological and frequently occurring problem, which many social media users experience. Living in a media-saturated environment, examining impulsive social media use might be crucial in understanding such self-control failure. In the present study, we examined whether spontaneously triggered approach reactions to social media cues were associated with people's daily experienced social media self-control failure. Specifically, by employing an implicit measure (i.e., the SRC task), we investigated Facebook users' spontaneous approach reactions to Facebook cues and their associations with Facebook self-control failure.

We expected that participants who often fail to control their Facebook use would be more likely to show stronger spontaneous approach reactions to Facebook cues than those who less often fail. Results showed that all participants were faster in approaching

Table 2 Comparison between Approach Facebook RT, Avoid Facebook RT in different counterbalance conditions.

Counterbalancing	ApproachFB RT (ms)		AvoidFB RT (ms)		F (1, 224)	p	partial η^2
	M	SD	M	SD			
First ApproachFB	812.27	225.91	884.48	217.47	40.16	< .001	.152
First AvoidFB	872.47	206.35	898.05	201.21	4.91	.028	.021

Note. ApproachFB RT = Approach Facebook reaction time, AvoidFB RT = Avoid Facebook reaction time, First ApproachFB = participants who completed the Approach Facebook block first, First AvoidFB = participants who completed the Avoid Facebook block first.

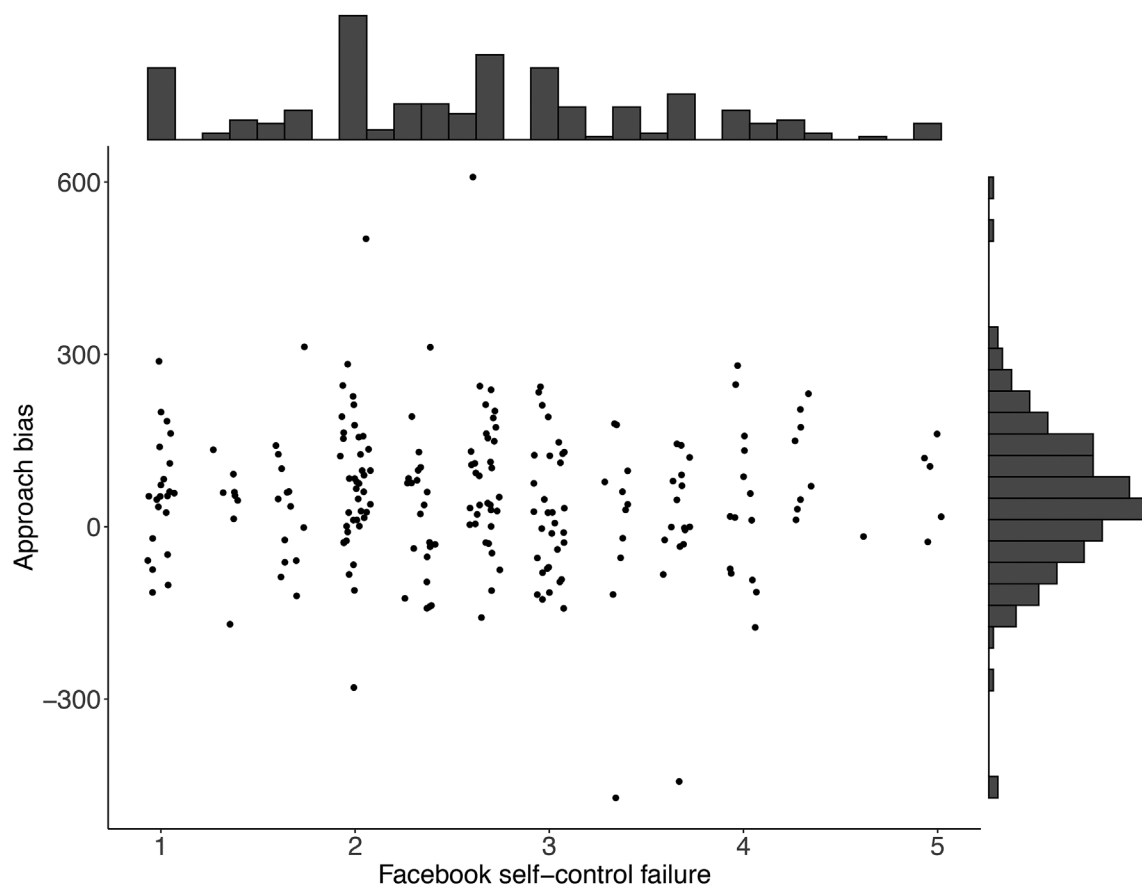


Fig. 2. The relationship between Facebook self-control failure and approach bias scores.

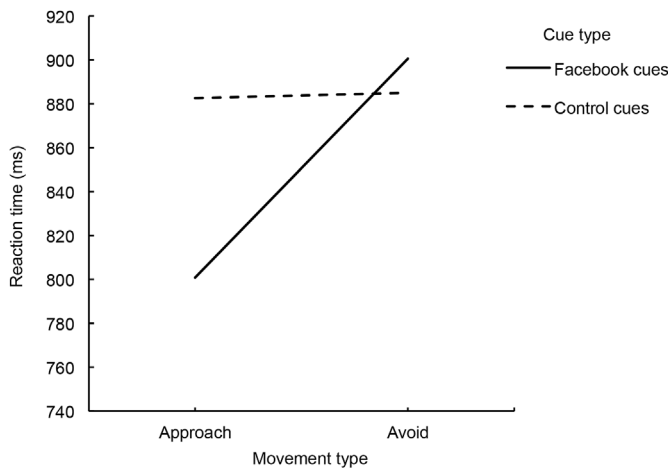


Fig. 3. Approach and avoid RTs to Facebook-related pictures and control pictures.

Facebook pictures (while avoiding control pictures) than avoiding Facebook pictures (while approaching control pictures). Exploratory analyses further underscore that this approach-avoidance tendency was specific to Facebook-related approach reactions: Facebook pictures triggered faster approach reactions than avoidance reactions, whereas there was no difference between approach and avoidance reactions to control pictures. Together, these results suggest that social media users indeed show spontaneous approach reactions to social media cues. However, and contrary to our preregistered main hypothesis, the results did not suggest that the approach reactions to social media cues were stronger for participants who often (vs. less often) fail in controlling

their social media use. That is, all participants showed strong approach reactions to Facebook cues, regardless of their levels of (general) Facebook self-control failure. The current findings appear to be inconsistent with previous research showing that self-reported indicators of approach reactions (e.g., media habit strength) are related to media-related self-control failures (e.g., procrastination; Meier et al., 2016; Schnauber-Stockmann et al., 2018).

Does not observing the predicted difference in approach reactions to social media cues between participants who often versus less often fail in controlling their social media use mean that spontaneous approach reactions do not contribute to social media self-control failure? We think such a conclusion would be premature for two reasons. First, several studies examining other behaviors do suggest that people who more often fail in their self-control (e.g., problematic alcohol drinkers or dieters) show stronger spontaneous approach reactions to tempting stimuli (e.g., beer or high-fat food; Field et al., 2008; Veenstra & de Jong, 2010). Thus, not detecting a difference in the current study does not automatically imply that the proposed hypothesis should be rejected in general.

Second, the current study only assessed approach reactions immediately upon stimulus exposure, ignoring the possibility that impulsive reactions might be regulated within an extremely short amount of time (Hofmann, van Koningsbruggen, Stroebe, Ramanathan, & Aarts, 2010). In the domain of eating and dieting behavior, for instance, Hofmann et al. (2010) found that, after food pre-exposure, both normal eaters and restrained eaters (who often fail in their eating-related self-control) showed an immediate impulsive reaction to food cues using an inter-stimulus-interval (ISI) of 100 ms. However, while restrained eaters still showed a “delayed” impulsive reaction (measured with an ISI of 1000 ms), normal eaters showed a decline in their impulsive reaction. Translated to the current study context, it could be that social media

users who often fail in controlling their social media use display spontaneous approach reactions to social media cues that persist over time, while those who less often fail, more easily down-regulate their immediate approach reactions. Thus, by adding trials to the SRC-task that also capture a more “delayed” approach reaction (by varying the moment at which participants have to respond), differences in spontaneous approach reactions to social media cues might emerge as a function of participants’ levels of social media self-control failure. This possibility could be tested in future research.

In addition, a relationship between spontaneous approach reactions and social media self-control failure might particularly occur when control resources are low. The Reflective-Impulsive Model (Hofmann et al., 2009; Strack & Deutsch, 2004) proposes that when people have sufficient control resources available, the reflective system (e.g., people’s reasoned actions) will drive their behavior. However, when the available control resources are low, impulsive processes, such as the approach reactions studied in the current paper, will drive people’s behavior. Indeed, research has shown that impulsive processes are more likely to influence behavior when people, for instance, experience a high cognitive load or when their self-regulatory resources are depleted (Frieze, Hofmann, & Wänke, 2008). It could thus be the case that we did not observe a relationship between spontaneous approach reactions to social media cues and social media self-control failure because participants in the current study had sufficient control resources available. Future research could therefore include a manipulation of control resources to further investigate this possibility. Related to this, it would be important to include self-reported measures like media habit strength to disentangle when explicit indicators versus process-measures of approach reactions predict social media self-control failure.

A limitation of the current study is its cross-sectional nature. Future research could, for instance, study the relationship between spontaneous approach reactions and social media self-control failure by using a longitudinal design to increase certainty about the causal order. Next, we only used stimuli related to Facebook. To what extent the current findings can be generalized to other social media stimuli should thus be tested in future research. Third, our control pictures of office supplies were selected by their match with Facebook pictures, based on appeal, complexity and familiarity, as well as picture color, lightness and saturation. However, office supplies are usually seen in a working context. Participants in general, or those with negative feelings towards work specifically, might have felt more negative toward the office control stimuli which may unintentionally have facilitated avoidance reactions to the control stimuli (and at the same time thus boosting the difference with the target stimuli). In other words, the office control stimuli might not have acted as perfect ‘neutral’ control stimuli. However, the results showed no difference between approach and avoidance reactions to the office control pictures, suggesting that the choice for the control pictures did not affect our main conclusions. Nevertheless, future studies should employ different control stimuli (i.e., unrelated to the work context) in order to test the generalizability of the current results. Finally, we sampled daily Facebook users and our participants reported a relatively low level of Facebook use. Therefore, the extent to which the findings can be generalized to non-daily or more heavy Facebook users should be examined in future studies.

5. Conclusion

The present study tried to answer the research question why social media temptations are difficult to resist when people have other important things to do. By employing an SRC task, we demonstrated that, exposure to social media cues triggers daily social media users’ spontaneous approach reactions. However, this occurred regardless of their (general) level of social media self-control failure.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chb.2019.08.028>.

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