Too Much or Too Little Messaging? Situational Determinants of Guilt About Mobile Messaging

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Mobile messaging has been associated with guilt. Guilt about too much messaging may result from self-control failures during goal conflicts. Conversely, guilt about too little messaging may result from violating the salient norm to be available. This research considers both boundary conditions of guilt about mobile communication—goal conflicts and availability norm salience—simultaneously for the first time. We conducted two preregistered experiments to investigate their interplay. Results from a vignette experiment, but not from a laboratory experiment, support the hypotheses that goal conflicts trigger guilt about using messengers and that guilt about not using messengers arises if the availability norm is salient. In both studies, using messengers elicited more guilt than not using messengers. The boundary conditions did not interact in influencing guilt. Overall, this research emphasizes the importance of self-control, norms, and usage contexts when studying effects of mobile media use on emotional well-being.

Lay Summary

In this article, we examine feelings of guilt about the use of mobile messaging. On the one hand, we assume that guilt can arise if we message too much when we should be doing something else. On the other hand, we may feel guilty about too little messaging, i.e., when others expect us to be readily available via messaging, but we do not meet that expectation. These two assumptions were supported as seen in the results of an experiment where the participants were asked to imagine messaging (or not using messaging) in certain situations. However, in a second experiment where the participants actually experienced situations that we assumed would cause guilt, the expected feelings of guilt did not occur. In both studies, using messaging when the individual should have been doing something else caused stronger feelings of guilt than not being available for messaging. Previous research suggests that the resulting feelings of guilt can reduce our well-being. We therefore discuss our findings in terms of how users can avoid the negative effects of messenger use on their well-being.

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Mobile messengers such as WhatsApp enable users to be permanently connected with others (Vorderer, Hefner, Reinecke, & Klimmt, 2018). This offers numerous possibilities to increase well-being, for instance, by making social support more available (for an overview, see Reinecke, 2018). However, one of the problematic outcomes associated with the use of interpersonal media are feelings of guilt, which can contribute to negative effects of messenger use on overall emotional well-being (e.g., Hall, 2017). Why could interpersonal media use elicit feelings of guilt? A number of studies have addressed this question through the lens of self-control (e.g., Panek, 2014). They suggest that individuals often impulsively strive for hedonically pleasant experiences, leading to situations in which their media use conflicts with primary goals, for instance, a work task (for an overview, see Hofmann, Reinecke, & Meier, 2017). Such failures of self-control have been shown to cause guilt about entertainment media (e.g., Reinecke, Hartmann, & Eden, 2014) and social media use (Panek, 2014). One shortcoming of this line of work, however, is that it has largely overlooked that not only too much but also too little interpersonal media use can lead to guilt. In the past years, constant availability has become a social norm, driving individuals to answer messages and calls quickly (e.g., Bayer, Campbell, & Ling, 2016; Ling, 2016). Prior studies indicate that guilt arises when individuals violate this norm (e.g., Hall, 2017; Thomée, Dellve, Härenstam, & Hagberg, 2010).

Thus, in order to explore more comprehensively how mobile messaging influences feelings of guilt, two competing mechanisms need to be considered: the experience of goal conflict and violations of the availability norm. The aim of this research is therefore to elucidate how goal conflict and availability norm salience interact in influencing how users feel about their messaging behavior. To this end, we integrate the so far separate research areas of self-control and the availability norm, using a self-determination theory lens (SDT; Ryan & Deci, 2000a). Based in SDT, the following section explains how goal conflicts and availability norm salience may cause feelings of guilt by distinguishing between intrinsic and extrinsic types of motivation. Subsequently, we address whether users feel responsible for goal versus norm violations and the conditions under which such violations appear more legitimate. The hypotheses and research question derived from this literature review will be tested based on two preregistered studies—an online vignette experiment and a laboratory experiment.

Guilt about messaging: a distinction between intrinsic and extrinsic motivation

Guilt about messenger (non-)use

Self-conscious emotions such as guilt arise if individuals evaluate whether their behavior is congruent with their own goals, including compliance with personally relevant norms (Tracy & Robins, 2004). Whereas goal congruence causes positive self-conscious emotions such as pride, goal incongruence leads to negative self-conscious emotions such as shame and guilt (Tracy & Robins, 2004). Specifically, *guilt* has been defined as the painful feeling "associated with the recognition that one has violated a personally relevant moral or social standard" (Kugler & Jones, 1992, p. 318). How guilty do individuals feel about their messaging behavior? Extensive correlational research has studied how spending time in front of smartphone screens or social media affects well-being, identifying small aggregate negative or curvilinear effects—using smartphones and social media too much is associated with slightly reduced (emotional) well-being (e.g., Orben & Przybylski, 2019; Meier & Reinecke, 2020). To the best of our knowledge, however, such effects have not been investigated with regard to

situational guilt, that is, guilt about the frequency of messenger use during a particular time period (e.g., while carrying out a specific task). In addition, while correlational research suggests that using messengers too little may evoke guilt as well (e.g., Hall, 2017; Hall & Baym, 2012), this has not been addressed experimentally. Given the lack of prior evidence on these relationships, our research explores how strongly users feel guilty about using (**RQ1a**) and not using (**RQ1b**) mobile messengers. Importantly, the definition of guilt (Kugler & Jones, 1992; Tracy & Robins, 2004) implies that messenger use per se—whether one uses messengers frequently or rarely—should not have a direct effect on guilt. Instead, to feel guilty, individuals must experience certain *boundary conditions*. Concerning messaging, this could be a goal conflict or a violation of the availability norm. These conditions will be explicated below, based on the distinction between intrinsic and extrinsic motivations for messenger use derived from SDT (Ryan & Deci, 2000a).

Differentiating intrinsic and extrinsic motivations for messenger use

Theoretical conceptualizations of self-control (Hofmann, Friese, & Strack, 2009) and the availability norm (Bayer et al., 2016) provide competing explanations for guilt experiences in the context of messenger use (i.e., goal conflict vs. norm violation). In order to differentiate and systematize the psychological pathways leading to guilt about messaging, we explicate the underlying motivational mechanisms connected to self-control failure and compliance with the availability norm based on SDT. SDT is concerned with the question of what motivates human behavior and makes a distinction between autonomous and controlled types of behavior (Ryan & Deci, 2000a). While autonomous behavior is characterized by feelings of free choice, controlled types of behavior are "accompanied by the experience of pressure and control" (Ryan & Deci, 2000b, p. 65). The prototype of autonomous motivation is called *intrinsic motivation*, referring to behaviors individuals engage in because they promise to satisfy their basic needs for relatedness, competence, and autonomy (Ryan & Deci, 2000b). The counterpart of intrinsic motivation is *extrinsic motivation*. Extrinsically motivated behavior is carried out because it has a benefit beyond the behavior, such as avoiding punishment or receiving a reward (Ryan & Deci, 2000b). SDT distinguishes between different types of extrinsic motivation with varying degrees of autonomy, that is, the extent to which individuals perceive their behavior as volitional versus controlled (Deci & Ryan, 2008). According to the theory, social contexts enabling basic need satisfaction facilitate the internalization of external controls, leading to a higher degree of autonomy (Deci & Ryan, 2008). In the following, we will argue that when navigating between using versus not using messengers in a given situation, individuals struggle with balancing these competing motivational forces (i.e., intrinsic vs. extrinsic motivation), potentially eliciting guilt.

Boundary conditions for guilt about messenger (non-)use

Self-control research suggests that guilt arises when individuals fail to regulate their behavior towards long-term goals and give in to short-term temptations instead (Hofmann et al., 2017). To explain why individuals frequently fail to exert self-control over media use, researchers have pointed to their intrinsic motivation to use media (e.g., Hofmann et al., 2017). They assume that media use provides immediate pleasure because it often satisfies basic needs, for instance, the need for relatedness (e.g., van Koningsbruggen, Hartmann, & Du, 2018). Research to date draws a complex picture of when and how mobile messaging or texting enables need satisfaction. For example, a study by Park, Lee, and Chung (2016) revealed that the number of text messages sent and received, but not the time spent for texting, was associated with higher levels of perceived intimacy and relationship satisfaction, which decreased feelings of loneliness. The authors assume that this is due to the fact that individuals want

to see that their communication partner also invests time. In addition, perceived expectations to text and reply to messages may both contribute to and hinder relationship satisfaction because it can lead to pleasant feelings of relational dependence but also to unpleasant feelings of overdependence (Hall & Baym, 2012). This overdependence should impede the fulfillment of the need for autonomy (Halfmann & Rieger, 2019; Ryan & Deci, 2000a). Despite the possible impairments, overall, individuals seem to benefit from messaging in terms of their need for relatedness: Results from a meta-analysis suggest that instant messaging is linked to reduced loneliness (Liu, Baumeister, Yang, & Hu, 2019). Researchers studying self-control over media use have argued that because of such positive experiences of need satisfaction, individuals learn to associate media use with pleasure (Hofmann et al., 2017; van Koningsbruggen, Hartmann, Eden, & Veling, 2017). As a consequence, they often unconsciously prefer media use over other tasks or long-term goals (e.g., van Koningsbruggen et al., 2018). The motivation and capacity to exert self-control enable individuals to resist such media temptations (Hofmann et al., 2009). However, feelings of guilt arise if self-control fails and individuals perceive a goal conflict between their media use and a competing goal or task (Tracy & Robins, 2004). The more incompatible two goals appear, the stronger the perceived conflict should be. Based on this reasoning, we assume that the strength of goal conflict moderates the influence of the frequency of messenger use on guilt in such a way that when goal conflict is high, using messengers more frequently will lead to higher levels of guilt than when goal conflict is low (**H1**).

While self-control research assumes that individuals engage autonomously in media use to experience pleasure, research on the availability norm points to the fact that others' social expectations influence how we use interpersonal media such as mobile messengers (e.g., Hall & Baym, 2012). Following Bayer et al. (2016), the *availability norm* represents a social norm, defined as "the perceived social consensus regarding which (. . .) behaviors are appropriate" (Paluck & Shepherd, 2012, p. 899). This norm demands regular mobile checking behavior to verify whether one has received messenger notifications (Bayer et al., 2016). The motivation to comply with the availability norm has not yet been systematically explicated, however. Below, we therefore extend prior theorizing by drawing on the SDT construct of extrinsic motivation to clarify how guilt arises in reaction to violations of the availability norm.

Compliance with the availability norm is likely guided by extrinsic motivation. Prior studies show that communication partners sanction delayed responses (Kalman & Rafaeli, 2011) and that individuals experience social pressure to be available to others (Halfmann & Rieger, 2019; Hall, 2017). In addition, as discussed earlier, previous research indicates that mobile messaging can enable basic need satisfaction, even if this depends on certain conditions (e.g., Liu et al., 2019; Park et al., 2016). It is therefore possible that users partially internalize the demand to be available, meaning they pressure themselves to answer calls or messages quickly (Ling, 2016). Feelings of guilt may arise if fulfilling a communicative demand is linked with individuals' perceived self-worth (Deci & Ryan, 2008). Consequently, individuals can feel guilty about violating their own internalized norm to be available. Although SDT only mentions feelings of guilt in the context of such introjected behavior (Deci & Ryan, 2008), research on norm compliance indicates that individuals feel guilty about norm violations even if they have not internalized the respective norm (e.g., Bamberg, Hunecke, & Blöbaum, 2007). Compliance research argues that social norms have an informational function, as they help to detect interpersonal (not just intrapersonal) transgressions (Bamberg et al., 2007). With regard to mobile messaging, we can thus assume users may feel guilty about disappointing their communication partners' expectations by not regularly checking messengers.

Indeed, a number of studies indicate that individuals feel guilty about not checking interpersonal channels or responding late to calls or messages (Hall, 2017; Hall & Baym, 2012; Thomée et al., 2010).

Whether and how strongly guilt occurs should then depend on the salience of the availability norm. A social norm may only guide behavior if it is *salient*, meaning in the cognitive focus of the individual (Kallgren, Reno, & Cialdini, 2000). Hence, when individuals feel that they should be available to others in a particular situation, this means that the availability norm is salient (Bayer et al., 2016). Results from Lee et al. (2019) suggest that the salience of the availability norm varies by relationship partner and situation. For instance, they found that involvement in an activity increases response times and that individuals read messages from close, strong-tie contacts more quickly than from other contacts. Bayer et al. (2016) developed a theoretical model describing how the availability norm becomes salient in everyday life. According to the authors, *social network expectations* increase norm salience (Bayer et al., 2016). An example for a network expectation would be the knowledge that a communication partner wants to coordinate plans. In addition, the authors suggest that *connection cues* increase sensitivity to the availability norm. This includes, inter alia, technical cues like a notification sound and spatial cues such as seeing someone using a smartphone (Bayer et al., 2016). Overall, it can be concluded that the salience of the availability norm varies between situations, depending on the above-mentioned factors. When the availability norm is highly salient, but individuals choose not to use messengers, they should perceive a norm violation that causes guilt (Tracy & Robins, 2004). We therefore hypothesize that the salience of the availability norm moderates the influence of the frequency of messenger use on guilt in such a way that when norm salience is high, using messengers less frequently will lead to higher levels of guilt than when norm salience is low (**H2**).

In sum, whereas goal conflicts are likely to trigger guilt about too much messenger use, a high salience of the availability norm should cause guilt about too little messenger use.

A question of responsibility: legitimizing too much or too little messaging

Because feelings of guilt are unpleasant, individuals have an interest in avoiding or at least minimizing them (Baumeister, Stillwell, & Heatherton, 1994). Importantly, the extent to which guilt arises depends on how *responsible* individuals feel for the behavior that caused harm or damage (Miceli & Castelfranchi, 1998). Pointing to external causes for the behavior in question is one of the strategies by which individuals avoid or mitigate guilt (Baumeister et al., 1994; Tracy & Robins, 2004). Guilt is assumed to decrease when individuals conclude they could not prevent the negative consequences of their behavior because they had a duty or were pressured to behave as they did (Miceli & Castelfranchi, 1998). Consistent with this, research in several domains suggests that external causes reduce the perceived responsibility for the behavior in question and, hence, guilt (e.g., Sheldon & Schachtman, 2007; Weiner & Graham, 1989). Applied to our research, it is likely that individuals do not feel overly bad about too much or too little messaging if they can attribute this behavior to an external cause.

When are these external causes present? Pursuing important goals (e.g., work tasks) usually represents a duty and is linked to social norms which, for example, determine how long it should take to achieve these goals (Giguère, Sirois, & Vaswani, 2016). In addition, as explained above, individuals feel pressured to comply with the availability norm. The availability norm is "always in effect" (Bayer et al., 2016, p. 138)—even when individuals want or have to pursue an important goal. Consequently, individuals are often challenged to do both at the same time—pursue their goal and comply with the availability norm. Following these lines of thought, in situations where both goal conflict and availability norm salience are high, external causes that can "excuse" or justify individuals' mobile messaging behavior are present.

This means that, firstly, individuals should feel less responsible for violating the availability norm if they pursued an important goal. Prior studies indicate that users feel obliged to give communication partners plausible reasons why they have responded late to calls or messages (e.g., Thomée et al., 2010). They may be aware that they can justify a late reply by stating that they have pursued an important goal. Secondly, individuals should feel less responsible for engaging in messenger use despite experiencing a conflict with a primary goal if they simultaneously experience high availability norm salience. Similarly, Sonnentag, Reinecke, Mata, and Vorderer (2018) suggest that individuals use availability expectations as excuses for delaying aversive work tasks. Based on these considerations, we hypothesize that there is a three-way interaction between the frequency of messenger use, goal conflict, and availability norm salience: When norm salience is high, experiencing a high level of goal conflict and using messengers more frequently will lead to lower levels of guilt than when norm salience is low (**H3a**). When goal conflict is high, experiencing high norm salience and using messengers less frequently will lead to lower levels of guilt than when goal conflict is low (**H3b**).

Study 1

Method

To provide a first preliminary test of our hypotheses and research questions, we conducted an online vignette experiment ($N = 315$). We preregistered hypotheses, sample size justification, analysis plan, and exclusion criteria before data collection.[1]

Materials and procedure

We employed a $2 \times 2 \times 2 \times 2$ mixed factorial experimental design using vignettes. Vignettes are short descriptions of concrete situations, followed by questions that elicit a judgment from the participant (Atzmüller & Steiner, 2010). Each participant was confronted with eight text vignettes, which systematically varied three within-subjects factors: strength of goal conflict, salience of the availability norm, and messenger use. Regarding messenger use, depending on the condition, participants imagined either that they would check messengers in the described situation or that they would not check messengers. To manipulate goal conflict, the vignettes varied two primary goals that were assumed to stand in low (reading fiction during leisure time) versus high conflict (studying for an important exam) with messenger use. To our best knowledge, Bayer et al.'s (2016) assumption that network expectations and connection cues increase sensitivity to the availability norm has not been systematically tested yet. We therefore tested these two ways of manipulating availability norm salience between subjects. The factor was either manipulated by social network expectations (i.e., no specific expectation vs. expecting to be contacted by a friend) or by technical cues (i.e., smartphone notifications not received vs. received). Participants were randomly assigned to one of the two vignette versions (network expectations vs. technical cues) and then responded to each of the eight scenarios within the respective condition.

Participants

Participants were recruited through the SoSci Panel, a scientific online access panel with more than 90,000 German-speaking subscribers (Leiner, 2016). An a priori power analysis for the planned within- and between-subjects analyses of variance (ANOVAs) revealed that 327 participants are needed to detect a small to medium effect size of $f = .20$. To compensate for a potential sample shrinkage of 10–20% due to our preregistered exclusion criteria, we intended to collect data from 400

participants. The data were collected in December 2018 and January 2019. Overall, 400 people participated in the study, of whom we retained 315 valid cases after applying the preregistered exclusion criteria (e.g., reasonable survey time). Participants' age ranged between 18 and 60 years ($M = 25.17$, $SD = 5.56$). They were predominantly female (61%) and all used mobile messengers.

Measures

Alongside each vignette, participants were asked to respond to a set of questions measuring perceived norm compliance ("With this smartphone use behavior, I meet the expectations of potential communication partners"; $M = 4.06$, $SD = 1.75$), strength of goal conflict ("In this situation, the way I use my smartphone stands in conflict with what I am primarily doing"; $M = 4.08$, $SD = 2.46$), and guilt ("In this situation, I feel guilty with regard to the way I use my smartphone"; $M = 3.44$; $SD = 2.18$). Participants answered on a scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Additional measures not used in this manuscript can be found in the preregistration.

Results

Strength of guilt

To answer RQ1a and RQ1b, we compared mean levels of guilt between the messenger use conditions. The data indicated that participants who imagined not to use messengers experienced low guilt ($M = 2.43$, $SD = 1.75$), whereas those who imagined to use messengers reported stronger guilt ($M = 4.45$, $SD = 2.09$), $t(314) = -18.83$, $p < .001$.

Manipulation checks

ANOVAs were conducted using the afex package in *R*, orthogonal contrasts, and type III sums of squares (Singmann et al., 2019). Bonferroni-Holm corrected pairwise comparisons were calculated as post hoc tests, using Satterthwaite approximations for degrees of freedom. To test whether the manipulation of availability norm salience was successful, we compared ratings on perceived norm compliance. Results from a mixed-design ANOVA with vignette version as between-subjects factor revealed an interaction between the within-subjects factors norm salience and messenger use, $F(1, 313) = 111.60$, $p < .001$, $\eta_{\mathrm{p}}^2 = .26$. Perceived compliance for not using messengers was significantly lower in the high (e.g., network expectations: $M = 2.86$, $SD = 1.49$) than in the low (e.g., network expectations: $M = 3.39$, $SD = 1.50$) norm salience condition. This was true in the network expectations version, $t(603) = 0.54$, $p < .001$, and the technical cues version, $t(603) = 0.38$, $p = .001$. Hence, both versions successfully induced norm salience. There was a significant three-way interaction between the factors, $F(1, 313) = 5.44$, $p = .020$, $\eta_{\mathrm{p}}^2 = .02$. However, there were no significant differences between the vignette versions concerning not using messengers under low ($p = 1.000$) or high norm salience ($p = .335$). We thus analyzed data from the two vignette versions together. A within-subjects ANOVA was conducted to test how the goal conflict and messenger use conditions influenced perceived goal conflict. There was a significant interaction between the two factors, $F(1, 314) = 84.22$, $p < .001$, $\eta_{\mathrm{p}}^2 = .21$. The manipulation was successful as perceived goal conflict about messenger use was significantly higher in the high ($M = 6.32$, $SD = 1.23$) than in the low ($M = 5.20$, $SD = 1.87$) conflict condition, $t(623) = 1.11$, $p < .001$.

Hypotheses tests

As shown in Table 1, results from a three-way repeated-measures ANOVA revealed significant main effects of goal conflict, norm salience, and messenger use on guilt. Furthermore, there were significant

Table 1 Study 1: Three-Way Repeated-Measures ANOVA Results for Effects on Guilt in Reaction to Vignette Scenarios

Predictor	$df_{\text{numerator}}$	$df_{\text{denominator}}$	F	η_{p}^2	p
Conflict	1	314	150.25	.32	<.001
Salience	1	314	11.17	.03	.001
Messenger use	1	314	354.62	.53	<.001
Conflict × salience	1	314	0.10	.00	.750
Conflict × messenger use	1	314	167.97	.35	<.001
Salience × messenger use	1	314	102.66	.25	<.001
Conflict × salience × messenger use	1	314	1.71	.01	.190

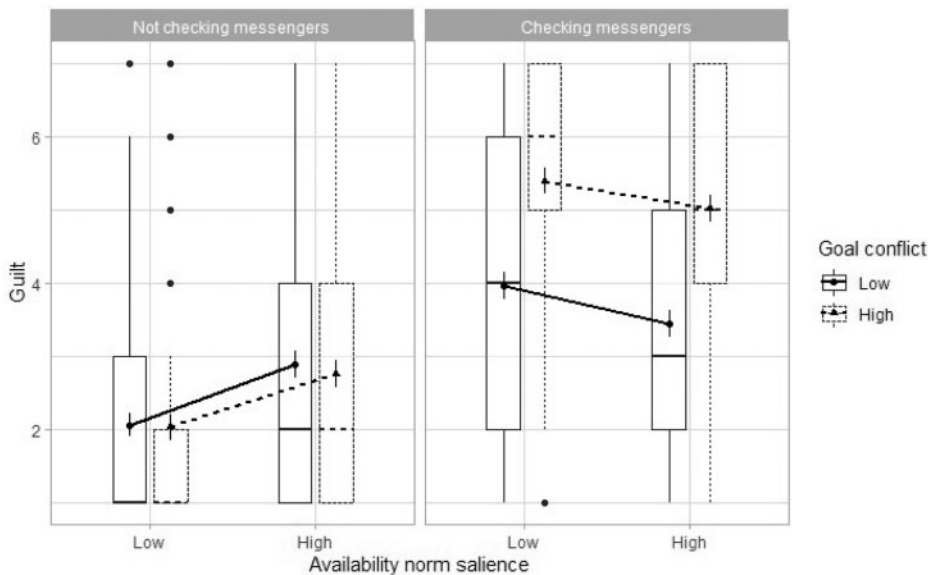*Note.* Based on $N = 315$ participants.

Figure 1 Mean differences in feelings of guilt between the conditions of the vignette experiment ($N = 315$). There was no significant three-way interaction between goal conflict, norm salience, and messenger use.

interactions between goal conflict and messenger use as well as between norm salience and messenger use. Post hoc analyses revealed that using messengers led to higher levels of guilt under high ($M = 5.20$, $SD = 1.85$) as compared to low ($M = 3.69$, $SD = 2.04$) goal conflict, $t(627) = 1.51$, $p < .001$. The results thus confirmed H1. Supporting H2, not using messengers caused higher levels of guilt when norm salience was high ($M = 2.82$, $SD = 1.83$), as compared to low ($M = 2.04$, $SD = 1.58$), $t(607) = 0.78$, $p < .001$. Finally, the three-way interaction between goal conflict, norm salience, and messenger use was not significant and post hoc analyses did not reveal significant changes in guilt as hypothesized in H3a and H3b. Figure 1 shows the interaction plot for the factors examined.

Discussion

Results from Study 1 confirm our key assumptions that experiencing high goal conflict leads to stronger guilt about using messengers (H1) and that high availability norm salience increases guilt about *not* using messengers (H2). The findings did not support the hypothesized three-way interaction (H3). That is, the data did not indicate that pursuing an important goal and feeling pressured to be available served as excuses that potentially reduced participants' guilt about their (hypothetical) messaging. Reasons for this could be the artificial vignette setting and the fact that participants did not actually experience guilt-inducing situations, but assessed their feelings in these scenarios reflectively, one by one. Moreover, it is striking that—irrespective of the effects of norm salience and goal conflict—the described messenger use explained a considerable part of the variance in guilt (see Table 1), with messenger use producing higher levels of guilt than non-use (RQ1). This is surprising, given that from a theoretical point of view, guilt should only arise if individuals recognize that their behavior is inconsistent with personally relevant goals or social norms (Tracy & Robins, 2004). This could indicate that the artificiality of the vignette experiment influenced results. It therefore seems appropriate to re-test our hypotheses with a laboratory experiment.

Study 2

Method

To test our hypotheses in a situation where participants can actually experience goal conflict and a violation of the availability norm, we conducted a laboratory experiment. We again preregistered hypotheses, sample size justification, analysis plan, and exclusion criteria.

Materials and procedure

Student participants were recruited to first participate in an online survey between June and July 2019, several days prior to the main laboratory experiment. The survey covertly screened for smartphone owners who used at least one mobile messenger. After completing this first online questionnaire, participants were invited to come to the laboratory for a study on "personality, mood, and TV series usage." This cover story was used to conceal our focus on participants' smartphone and messenger use and was also mentioned in the initial online survey. Upon arrival in the lab, participants were greeted by an experimenter who informed them that the previous participant had arrived late, resulting in unspecified delay, as the "lab room" was still occupied. Participants were asked to take a seat in the "waiting room," where the experimenter (i.e., a trained student assistant) was also seated behind a desktop computer, a few feet away. The duration of the waiting period was not revealed to participants. The experimenter left the waiting room after approximately ten minutes to "check on the previous participant in the lab" and then returned to the waiting room. After 20 minutes, the experimenter checked the lab again and afterwards informed the participant that the lab was now vacant. The participant was brought into the laboratory, a nearby room, and then filled out an online questionnaire. Answering the questionnaire took $M = 14$ minutes ($SD = 4$).

Each participant was randomly assigned to one of four groups (2×2 between-subjects design), which varied the level of goal conflict (low vs. high) and availability norm salience (low vs. high) during the waiting period. Messenger use was not manipulated because investigations into guilt require individuals to perceive themselves as responsible for their behavior (Tracy & Robins, 2004). Manipulating messenger use would have undermined this crucial precondition for participants' guilt experiences. Instead, we assessed messenger use as a quasi-experimental factor that depended on

participants' behavior in the waiting room. Furthermore, the mock waiting period was essential to reduce the risk that participants would not use the smartphone at all, due to a potential smartphone non-use etiquette in lab experiments. Goal conflict was manipulated by announcing an intelligence test and giving participants the choice to practice for the test during the waiting period with provided materials or to spend the time as they pleased (high level of goal conflict). Alternatively, participants were only told that they could spend the waiting period as they pleased, without announcing an intelligence test (low level of goal conflict). In this condition, magazines were provided so that participants had behavioral options other than smartphone use. Availability norm salience was manipulated through the experimenter behavior. Based on the theoretical arguments by Bayer et al. (2016) and findings from Study 1, technical cues (e.g., messenger notifications) should serve as a trigger that increases cognitive salience of the availability norm. Because sending notifications to participants' smartphones would have raised suspicion and thereby likely affected the external validity of their messaging behavior during the waiting period, the technical cue was provided by the experimenter's phone. Previous research suggests that sounds from another person's smartphone trigger cognitive responses (e.g., Shelton, Elliott, Lynn, & Exner, 2009). The effects of technical cues on norm salience described by Bayer et al. (2016) should thus also apply to cues from other people's smartphones. In the high norm salience condition, the experimenter sent messages from a computer to his/her own smartphone several times, eliciting audible notifications. In between notifications, the experimenter continued to visibly use his/her phone for brief episodes of messaging (i.e., reading and/or writing), thus also providing a spatial cue to increase the strength of the manipulation (Bayer et al., 2016). In the low norm salience condition, the experimenter sat quietly behind the computer, did not use a smartphone at any time, nor receive notifications. In all conditions, participants could use their smartphones freely during the waiting period. However, for ethical reasons and to avoid demand effects, we did not record participants' behavior but instead measured it via self-report after the waiting period.

Participants

The laboratory study was completed by $N = 116$ participants. Applying our preregistered exclusion criteria resulted in the exclusion of two participants (i.e., did not bring a smartphone, limited attention). Moreover, 19 participants did not correctly identify the condition-specific messaging behavior of the experimenter. We thus compare findings with and without these participants. The final full sample consisted of $N = 114$ messenger users (53% female; $M_{age} = 22.89$, $SD = 2.73$). The sample size did not match the preregistered size required to find an effect of $f = .25$ with 80% power at $\alpha < .05$ ($N = 128$, see preregistration). Based on a sensitivity analysis, we adjusted the effect size we *can* find to $f = .26$.

Measures

To assess guilt, we adapted the five-item guilt subscale of the State Shame and Guilt Scale (SSGS; Marschall, Sanftner, & Tangney, 1994).[2] The scale asked participants how they felt about the frequency of their smartphone use during the waiting period (e.g., "I feel bad about my behavior"). Participants answered on a scale ranging from 1 (*does not apply at all*) to 5 (*fully applies*). To obtain acceptable internal consistency ($\alpha = .74$), we had to omit one item. The four-item scale had a highly right-skewed distribution ($M = 1.41$, $SD = 0.57$). Furthermore, we inquired whether participants had used their smartphone (*yes/no*) while waiting. Participants' frequency of messenger use was then measured with the question "During the waiting period, how frequently did you engage in the following activities on your smartphone?" and the two items "Checked whether I received any messenger

notifications (e.g., via WhatsApp)" and "Read or wrote messages via a messenger." The 5-point scale was anchored at 1 (*not at all*) and 5 (*very often*). The mean index ($M = 2.57$, $SD = 1.33$) of these two items ($r = .72$) was used to test the predicted interaction effects (H1–H3). Additional measures not used in this article can be found in the preregistration.

Results

Strength of guilt

On average, participants did not feel very guilty about their smartphone use during the waiting period ($M = 1.41$, $SD = 0.57$). However, 54% of participants reported at least some guilt (i.e., $M > 1.00$). Participants who did not use messengers at all felt less guilty ($M = 1.16$, $SD = 0.34$, $n = 29$) than those who did ($M = 1.50$, $SD = 0.61$, $n = 85$). The correlation between the frequency of messenger use and guilt was $r = .28$, $p = .003$. Thus, almost no participants who abstained from messaging felt guilty (RQ1b), while those who used messengers experienced some guilt, albeit at very low levels (RQ1a).

Manipulation checks and messenger use across conditions

To assess whether the goal conflict manipulation was successful, participants were asked on a five-point scale whether "using the smartphone during the waiting period would have conflicted with another activity." Participants in the high goal conflict condition reported significantly higher goal conflict ($M = 2.94$, $SD = 1.58$) than those in the low goal conflict condition ($M = 1.80$, $SD = 1.29$), $t(102.26) = -4.21$, $p < .001$, indicating that goal conflict was successfully induced. To test whether the availability norm salience manipulation was successful, we asked participants how strongly they felt like they "had to be available to others" during the waiting period. The manipulation was not successful. Participants' perception of having to be available did not differ significantly between the low ($M = 2.11$, $SD = 1.15$) and high norm salience condition ($M = 1.86$, $SD = 1.21$), $t(112) = 1.11$, $p = .271$. This did not change when comparing conditions only among those participants ($n = 95$) who correctly identified the experimenter's behavior.[3]

Hypotheses tests

We tested H1 by conducting a one-factorial analysis of covariance (ANCOVA) with goal conflict as factor and frequency of messenger use as covariate. The ANCOVA was calculated using the lm function in *R*, orthogonal contrasts, and type III sums of squares. Statistical contrasts between conditions were obtained using the contrast package (Kuhn, Weston, Wing, Forester, & Thaler, 2016). Only messenger use, $F(1, 110) = 7.95$, $p = .006$, $\eta_p^2 = .07$, but neither goal conflict, $F(1, 110) = 0.01$, $p = .942$, $\eta_p^2 = .01$, nor the interaction between messenger use and goal conflict, $F(1, 110) = 0.34$, $p = .563$, $\eta_p^2 = .00$, significantly affected guilt. We thus reject H1. Because the manipulation of norm salience was not successful, we cannot test H2 and H3 by comparing the two norm salience conditions. Instead, we investigated the impact of *perceived* norm salience (i.e., the manipulation check measure; $M = 1.98$, $SD = 1.18$). These analyses are exploratory since they deviate from our preregistration.

Exploratory analyses

We explored H2 with a hierarchical regression analysis using the lm function in *R*. The frequency of messenger use and perceived availability norm salience were entered in the first step, followed by the interaction term in the second step. All variables in the model were sample-mean centered. The effect of messenger use on guilt did not reach significance, $\beta = .08$, $p = .066$, but perceived norm salience significantly predicted guilt, $\beta = .12$, $p = .013$. The regression model explained 11% of the variance in

guilt. In contrast to H2, there was no significant interaction effect of norm salience and messenger use, $\beta = -.04$, $p = .287$, and adding the interaction term did not significantly increase the explained variance in guilt. To investigate H3, we conducted a one-factorial ANCOVA with goal conflict as between-subjects factor and perceived availability norm salience and messenger use as covariates. The three-way-interaction between goal conflict, perceived norm salience, and messenger use was not significant, $F(1, 106) = 0.23$, $p = .636$, $\eta_p^2 = .00$, leading us to reject H3.

To better understand why H1 was not confirmed, we explored the data further. In addition to measuring potential goal conflict (i.e., the manipulation check), participants were asked on a five-point scale whether "using the smartphone during the waiting period actually conflicted with another activity." Results from an ANCOVA with goal conflict as factor and messenger use as covariate indicated that there were neither significant main effects nor an interaction effect on actually experienced goal conflict.

Discussion

Results from Study 2 are overall in stark contrast to Study 1. The manipulation check indicated that goal conflict was successfully manipulated in Study 2—however, results did not support our assumption that under high goal conflict, individuals feel guiltier about using messengers (H1). While most participants noticed the experimenter behavior correctly according to their respective condition—and results did not change when we excluded those that did not—our manipulation of availability norm salience did not prove successful. This finding contradicts core assumptions of Bayer et al. (2016) who argue that technical and spatial connection cues, such as the ones provided by the experimenter, increase the salience of the availability norm. Given the failed manipulation, we had to deviate from our preregistered analyses and explored whether perceived norm salience predicted guilt. Results revealed that perceived norm salience was significantly and positively related to guilt. However, messenger use and perceived norm salience did not interact in influencing guilt. In contrast to H2, our data therefore do not indicate that using messengers less frequently increases guilt when norm salience is high. Consistent with Study 1, we found no evidence for the three-way interaction proposed in H3. The second finding consistent with Study 1 was that using messengers elicited more guilt than not using messengers (RQ1). Still, overall, guilt levels were considerably lower in the laboratory setting than in the stereotypical scenarios that we investigated in the vignette experiment.

General discussion

The aims of this preregistered research were to examine the occurrence of and reasons for feeling guilty about using messengers too much or too little. Previous research has focused either on goal conflicts resulting from individuals' intrinsic motivation to experience pleasure during media use (e.g., Hofmann et al., 2017), or on the extrinsic motivation to comply with the availability norm (e.g., Hall, 2017), in order to explain guilt about mobile media use. This research, for the first time, considers both of these boundary conditions simultaneously and integrates them theoretically by drawing on SDT (Ryan & Deci, 2000a). A vignette experiment (Study 1) and a laboratory experiment (Study 2) showed mixed findings. Results from Study 1, but not Study 2, support the hypotheses that high, as opposed to low, goal conflict triggers considerable levels of guilt about using messengers, and that guilt about not using messengers arises if the availability norm is highly salient because individuals then perceive a norm violation. Unexpectedly, findings from both studies did not indicate that the

boundary conditions interact in influencing guilt. That is, fulfilling the availability norm or pursuing an important goal did not legitimize and thereby mitigate guilt about using or not using messengers, respectively.

Possible reasons for the contradictory findings between both studies may lie in their different methodological approaches, which has several implications for future experimental work on mobile media effects. Whereas participants in Study 1 read descriptions of stereotypical reading and studying scenarios, participants in Study 2 could actually experience goal conflict by having the opportunity to prepare for a test (high conflict) or spend the time as they pleased (low conflict) during a waiting situation. However, it may be particularly difficult to allow for feelings of guilt in such a laboratory scenario, because participants align their behavior with what they believe the experimenter wants them to do (i.e., demand effects). Consequently, they may feel less responsible for their behavior, reducing the likelihood of experiencing guilt (Tracy & Robins, 2004). Furthermore, in the laboratory experiment, the waiting situation itself may have served as an excuse for using messengers (Baumeister et al., 1994). In other words, it is possible that the now widespread norm to use the smartphone while waiting (Rieger, Hefner, & Vorderer, 2017) undermined the influence of goal conflict on guilt. We also cannot rule out that participants started using messengers *after* they felt sufficiently prepared for the test. In this case, using messengers may have been evaluated as a "well-deserved break," which could have mitigated any guilt reactions (Reinecke & Hofmann, 2016). In line with this explanation, we found that when considering the actually experienced rather than potential conflict between smartphone use and other activities, the goal conflict manipulation did not prove successful.

Contrary to our expectations and theoretical arguments by Bayer et al. (2016), providing connection cues in Study 2 via the experimenter behavior did not increase availability norm salience. One reason for this could be that participants prepared themselves *not* to use their smartphones while participating in the study. This makes it considerably more difficult to use cues as availability triggers for a laboratory manipulation. In light of these difficulties, the vignette experiment may in fact have higher internal validity higher than the laboratory experiment. Yet, the artificiality of the vignette experiment may have distorted the results. Prior research suggests that individuals experience less strong emotions in response to vignette descriptions compared to tangible experiences (Collett & Childs, 2011), which calls for studying guilt in the laboratory. Furthermore, it must be pointed out that the use of technical cues in Study 2 differed from Study 1 in that notifications were received not on one's own smartphone but on the smartphone of the experimenter. This could also explain the inconsistent effects of the norm salience manipulation in both studies. Interestingly, our exploratory analyses for Study 2 revealed that irrespective of how frequently participants engaged in messenger use, perceived availability norm salience was positively related to feelings of guilt. One reason for this could be that participants who felt they had to be available for others assumed that they could not fulfill this expectation while in the laboratory and therefore felt guilty.

Two findings were consistent across both studies. First, there was no evidence that goal conflict, availability norm salience, and messenger use interacted in influencing guilt. This means that fulfilling the availability norm or pursuing an important goal did not excuse using or not using messengers, respectively. Mobile technology has blurred the lines between "online" and "offline" settings (Vorderer et al., 2018). Hence, individuals are challenged to be available even in situations in which they pursue an important goal (Bayer et al., 2016). Although our findings must be viewed with caution, the fact that we did not find the presumed interaction effect suggests that when high goal conflict and high norm salience co-occur, these boundary conditions may not mitigate guilt by reducing personal responsibility. Individuals may not perceive primary goals or the availability norm as excuses at all, or

perceive them as insufficient to reduce guilt. Nevertheless, it should be further investigated whether there are coping strategies that can reduce feelings of guilt about messenger (non-)use. For example, with regard to delayed responses, it could be that other excuses are more relevant (e.g., technical problems) or that it depends on specific conditions whether excuses are successful, such as the communication partner (e.g., close friend vs. acquaintance) or the (expected) content of a message.

Second, results from both studies suggest that individuals feel guiltier about using than not using messengers and that the frequency of checking messengers is directly related to guilt. This resonates with a currently overall more negative societal appraisal of media technology use, compared to non-use. Guilt is a moral emotion that reflects internalized social norms, for instance, regarding media use behavior (Tracy & Robins, 2004). Clearly, such norms and the discourses around them—especially with regard to "new" media—change considerably over time (e.g., Zaman, Holloway, Green, Jaunzems, & Vanwynsberghe, 2020). In recent years, smartphone use in particular has been under public scrutiny and subject to critical media coverage (e.g., Roose, 2019). Moreover, users may be impacted by "implicit theories" about how using mobile and social media impacts their well-being—for better or worse (e.g., Lee & Hancock, 2020). Consequently, individuals may have developed generalized guilt reactions to smartphone use or media use (Reinecke & Meier, 2020). Put differently, grabbing the phone to message may inherently evoke more guilt because it represents a "guilty pleasure" (Panek, 2014), while not doing so may be evaluated positively as a brief "digital detox" or a demonstration of successful self-control (Hofmann et al., 2017). Generalized feelings of guilt about messenger use could undermine potential guilt responses to violations of the (salient) availability norm. Overall, this interpretation would mean that the boundary conditions of guilt about messenger use we examined might be less relevant, compared to the effect of internalized norms about smartphone use in general. An alternative explanation for our finding would be that introspective self-reporting of guilt about a behavior (i.e., using messengers) is cognitively more accessible than reporting guilt about a non-behavior (i.e., not using messengers).

However, it is noticeable that participants in the laboratory experienced very little guilt in reaction to their messenger use behavior. Possibly, other boundary conditions that we have not included in our research are crucial. For example, guilt due to a violation of the availability norm may only occur with respect to close friends (Lee et al., 2019). Still, by investigating several common situations—test preparation, reading during leisure time, a waiting period—our two experimental designs contribute to current discourses surrounding the context-specificity of smartphone effects (e.g., David, Kim, Brickman, Ran, & Curtis, 2014; Lepp, Barkley, & Li, 2016; Rieger et al., 2017). Future research could explore whether messenger use elicits stronger guilt in other situations, for instance, while driving or during face-to-face interactions. Yet, guilt could also only very rarely occur in reaction to messenger use. Previous research has shown that using entertainment or social media in goal conflict situations triggers guilt (Panek, 2014; Reinecke et al., 2014). Messaging differs from these media because it tends to be a short-lived, ephemeral behavior; it may therefore lead to fewer or weaker negative self-evaluations. Furthermore, in terms of non-use, messengers offer a number of ways to evade availability demands, such as turning off the "read function," making it impossible for others to see whether one has read their message (Mai, Freudenthaler, Schneider, & Vorderer, 2015).

From a theoretical point of view, our research demonstrates that the application of SDT (Ryan & Deci, 2000a) helps to explain different mechanisms (i.e., goal vs. norm violation) that may lead to guilt about interpersonal media use. Further considerations arise from the perspective of SDT: The desire to experience need satisfaction should not only influence self-control over messenger use but also the pursuit of primary goals offline. For example, internalized long-term goals, such as studying for an exam, can create a drive to succeed, which is equivalent to meeting competence needs. If

individuals use messengers during studying and this thwarts their need for competence, they may experience guilt. This would mean that although there is a chance that the need for relatedness is fulfilled by using messengers, the experience of competence might be limited at the same time. Results from Halfmann and Rieger (2019) support this notion of "need trade-offs" by showing that self-control failure is associated with reduced feelings of competence. A similar dilemma may arise with regard to the need for autonomy. It has been shown that fulfilling availability expectations can lead to feelings of "entrapment" (Hall & Baym, 2012) and reduce the perceived autonomy of users, which in turn can hinder the fulfillment of relatedness needs (Halfmann & Rieger, 2019). To experience need satisfaction and emotional well-being, users must therefore find a balance between meeting the availability norm (i.e., extrinsic motivation) and the possibilities of satisfying certain needs through messenger use or by pursuing offline goals (i.e., intrinsic motivations). Due to the above-described inconsistent effects of messenger use on need satisfaction, however, users may find it particularly difficult to anticipate whether messenger use would be beneficial in a certain situation. Developers of mobile communication apps could aid users in finding this balance by giving them the flexibility to set up times when they cannot be interrupted by notifications, while at the same time providing more ways to reduce availability demands (e.g., with automatic absence messages akin to out-of-office notifications).

Besides the described challenges for experimental research on mobile media, there are additional limitations. Our studies relied on samples of young messenger users and are thus limited to this population. Furthermore, Study 2 revealed floor effects on guilt, meaning that participants, on average, experienced very low levels of guilt regarding their messenger use. It may be that the items contained in the SSGS (e.g., "I feel tension about something I have done"; Marschall et al., 1994) do not adequately capture the emotional experiences users have regarding messaging. In future studies, researchers should consider using different measures of guilt or examine related self-conscious emotions such as regret and pride. Moreover, future research could test the guilt processes we investigated with regard to other norms and media applications. The described guilt dilemma should always materialize when conflicts occur between expectations set in a mediated context and other, non-media-related goals. Typically, such expectations refer to different forms of social interaction, such as others expecting that one takes enough time for a phone call or to respond to social media messages. However, possibly, the dilemma may also arise in the case of non-social responsibilities (e.g., maintenance of a farm in an online game), which may also collide with offline goals.

Overall, the present research contributes to our understanding of how mobile messaging is emotionally appraised by its users. Based on two experimental designs testing preregistered hypotheses, we find that (young) users associate some guilt with using as well as not using messengers in reaction to high goal conflict and high availability norm salience—yet only, when these conditions are induced by stereotypical vignettes that participants can consciously reflect on. In a laboratory setting using a common real-life situation for students (e.g., preparing for a test in the presence of a person who engages in messaging), participants showed very little guilt about using—or not using—the smartphone. Our research sheds light on the conditions under which guilt may arise, which is particularly important because abundant systematic review evidence suggests that the impact of social media on well-being depends on moderators and mediators (for an overview, see Meier & Reinecke, 2020). Guilt could play a central role among these mediators, as feelings of guilt about media use have been linked to reduced well-being (e.g., decreased vitality; Reinecke et al., 2014). Furthermore, our mixed findings strongly underline the complex interplay between mobile media use, self-control, social norms, and usage contexts when investigating effects of mobile media on well-being. In view of the "replication crisis" across the social sciences (Shrout & Rodgers, 2018), research on computer-mediated communication can benefit from preregistered studies—especially if they do not lead to the

expected results but have important methodological implications. Accordingly, future experiments should take greater care to account for usage contexts: connection cues (Bayer et al., 2016), specifically, appear as ambiguous behavioral triggers. Our results suggest that users perceive such cues differently, depending on context. Building on the work presented here will considerably extend our understanding of the boundary conditions that shape the implications of mobile media for the well-being of their users.

Note

1. Preregistrations of Study 1 (https://osf.io/cpz2f) and Study 2 (https://osf.io/uyw4c), study materials, as well as data and analysis code for both studies (https://osf.io/w5zjr/) are available online.
2. In addition, participants filled in a mood questionnaire which included a "guilt" item before (T1) and immediately after (T2) the waiting period. Because this guilt measure showed strong floor effects and virtually no change between T1 and T2, we only report analyses of the multi-item guilt scale. Floor effects and lack of variance can be explained by the fact that this measurement of guilt is global (i.e., it did not explicitly refer to messenger use).
3. Messenger use was not distributed equally across conditions. Participants in the high goal conflict condition were less likely to use their smartphones in general ($\chi^2 = 8.62$, $p = .003$), or for messaging specifically ($\chi^2 = 9.79$, $p = .002$), than in the low conflict condition. However, the frequency of messenger use was only slightly higher in the low ($M = 2.81$, $SD = 1.30$) than in the high conflict condition ($M = 2.30$, $SD = 1.33$), $t(112) = 2.08$, $p = .040$. No differences in messenger use were found between the two norm salience conditions.

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