Computers in Human Behavior Reports 21 (2026) 100977

Contents lists available at ScienceDirect

Computers in Human Behavior Reports

journal homepage: www.sciencedirect.com/journal/computers-in-human-behavior-reports

Staying healthy despite social pressure to be available? An experimental application of the Integrative Model of Mobile Media Use and Need Experiences (IM^{3}UNE)

Sarah Lutz [a,b,*], Frank M. Schneider [a,c], Annabell Halfmann [a]

[a] Institute for Media and Communication Studies, University of Mannheim, B 6, 30–32, 68159 Mannheim, Germany
[b] Institute for Media Research, Chemnitz University of Technology, Thüringer Weg 11, 09126, Chemnitz, Germany
[c] Department of Communication, Johannes Gutenberg University Mainz, Jakob-Welder-Weg 12, 55128, Mainz, Germany

ARTICLE INFO

Keywords:
Experiment
Instant messaging
Availability pressure
Well-being
Mindfulness
Self-control
Meaningfulness

ABSTRACT

This paper aims to investigate how social pressure to be available—a situational demand arising during messenger use—affects users' well-/ill-being. Referring to the *Integrative Model of Mobile Media Use and Need Experiences*, it focuses on specific mechanisms underlying this relationship: First, the mediating role of need experiences (i.e., satisfying versus frustrating users' autonomy, competence, and relatedness) in linking social pressure to well-/ill-being; second, the moderating role of salutogenic traits (i.e., mindfulness, self-control, meaning in life, and sense of coherence) on the interplay between social pressure and need experiences, and between need experiences and well-/ill-being. These mechanisms were tested in a series of four pre-registered vignette experiments (N_1 = 265, N_2 = 297, N_3 = 193, N_4 = 162; convenience samples). Across all experiments, the model's mediation paths became particularly evident for autonomy and competence, but not for relatedness. However, the expected moderation effects of the respective traits were hardly supported.

1. Introduction

In the last few years, there has been much discussion about how the use of mobile media affects individuals' well-/ill-being. As news coverage on this topic shows, the social debate often focuses on negative consequences such as addictions or depression (e.g., Wallace-Wells, 2024; Waters, 2021). Research has also often looked at pathogenic stressors associated with the use of mobile media, such as interruptive smartphone notifications, social pressure to be available to others, or problematic usage patterns leading to adverse effects on well-/ill-being (e.g., Elhai et al., 2021; Van Gaeveren et al., 2024; Wolfers & Karsay, 2024). Nevertheless, meta-reviews suggest that, overall, the relationship between computer-mediated communication and well-/ill-being is small and heterogeneous: There is evidence for negative correlations (e.g., for time spent online), but also for non-significant and positive (e.g., for phone calls) correlations (Godard & Holtzman, 2023; High et al., 2023; Meier & Reinecke, 2021).

In light of the heterogeneous findings, it becomes increasingly important to understand how and when mobile media use is related to well-/ill-being (High et al., 2023). Current theoretical models of this relationship recognize that ambivalent effects occur and that these arise from an interplay of situational and person-related factors (Schneider et al., 2022; Vanden Abeele, 2021). Applying the *I*ntegrative *M*odel of *M*obile *M*edia *U*se and *N*eed *E*xperiences (IM^{3}UNE; see Fig. 1) by Schneider et al. (2022), the present manuscript aims to explain *how* (i.e., through which mechanisms) and *when* (i.e., for whom) social pressure to be available affects users' well-/ill-being in the context of instant messenger use. Social pressure to be available can be conceived as a situational or internalized increased expectation of maintaining more or less close connections through mobile media (e.g., Hall, 2017; Hall & Baym, 2012; Ling, 2016). This definition captures both state- and trait-like aspects of social pressure to be available. Whereas the latter refers to more stable processes (e.g., internalized availability norms), the present manuscript focuses on the former, that is, situational pressure arising from specific demands. For example, when a mobile device signals an incoming call or an unread message, users may feel demanded to respond immediately and to be available to others to avoid negative consequences (e.g., Hall, 2017). Instead of conceptualizing this specific demand as pathogenic per se, we argue that positive or negative effects can arise depending on appraisal processes and individual resources.

* Corresponding author. Institute for Media Research, Chemnitz University of Technology, Thüringer Weg 11, 09126 Chemnitz, Germany
E-mail addresses: sarah.lutz@phil.tu-chemnitz.de (S. Lutz), frank.schneider@uni-mainz.de (F.M. Schneider), halfmann@uni-mannheim.de (A. Halfmann).

https://doi.org/10.1016/j.chbr.2026.100977
Received 6 November 2025; Received in revised form 15 February 2026; Accepted 16 February 2026
Available online 17 February 2026

Regarding the "how," Schneider et al. (2022) point to the mediating role of situational experiences of need satisfaction and frustration during mobile media use. To answer the question of "when" mobile media demands do not have negative effects, the authors claim that three possible salutogenic (i.e., health-promoting) traits—mindfulness, self-control, and meaning in life—are related to individuals' sense of coherence (SOC) and improve coping processes. SOC is the essential construct of the salutogenic approach and refers to a global orientation of individuals to understand life as comprehensible, manageable, and meaningful (Antonovsky, 1987, 1996).

This paper aims to investigate how the appraisal processes and individual resources described above affect the relationship between social pressure to be available and users' well-/ill-being. This not only represents an important step towards clarifying the heterogeneous findings described above, but is also among the first to empirically test the IM^{3}UNE. We have conducted five empirical studies: Our pilot study—see Online Appendix A—tests the extent to which mindfulness, self-control, and meaning in life are empirically related to specific SOC facets.[1] The manuscript focuses on four pre-registered online experiments investigating the effects of availability pressure as a situational demand arising during messenger use on users' well-/ill-being (i.e., affect, vitality, and stress). Conducted as conceptual replications, these experiments test the role of need satisfaction and frustration as mediating mechanisms across different samples and time points, thereby providing a robustness check of the proposed pathways. In each experiment, a different trait—mindfulness, self-control, meaning in life, or SOC—served as a boundary condition moderating the indirect effects specified above. We chose the context of instant messaging apps as they represent the most popular and frequently used type of mobile communication (e.g., Vorderer et al., 2016; We Are Social, & Hootsuite, 2024) and are often associated with ambiguous effects on well-/ill-being (e.g., Halfmann et al., 2021). Following open science guidelines, each study's material (i.e., pre-registration, dataset, experimental stimuli, codebook, R markdown, and additional analyses) can be found on OSF (https://osf.io/u93yv/).

2. Theoretical background

2.1. How does social pressure to be available influence individuals' well-/ill-being?

As outlined above, the present manuscript applies the IM^{3}UNE to one specific demand associated with mobile media use: Social pressure to be available, defined as the perceived obligation to respond quickly to incoming calls or messages and to regularly check the smartphone for potentially incoming notifications (Bayer et al., 2016; Hall, 2017). This represents a demand as it challenges users in several ways: On the one hand, giving in to social pressure can lead to perceptions of self-control failure (Halfmann et al., 2021), goal conflict (Halfmann et al., 2024), and interruptions in ongoing tasks (Elhai et al., 2021; Meier, 2021). Violating the availability norm by not using the smartphone can also trigger negative emotions, such as guilt, as well (Halfmann et al., 2025). On the other hand, giving in to social pressure can provide a sense of social support (e.g., Utz, 2020) and belonging (e.g., Hall et al., 2023).

Given the ambivalent role of social pressure to be available, it can be linked to both well-being (i.e., optimal functioning) and ill-being (i.e., malfunctioning). This aligns with recent two-continua models (Meier & Reinecke, 2021), conceptualizing these aspects of mental health as two distinct psychological constructs. Thus, the present manuscript differentiates between specific indicators linked to each dimension: As indicators for well-being, we specified affect (i.e., moods and emotions representing individuals' evaluation of specific events; Diener et al., 1999) and vitality (i.e., the experience of possessing energy and aliveness; Ryan & Frederick, 1997). Concerning ill-being, we focused on individuals' levels of stress (i.e., the perceived imbalance between environmental demands and individual abilities; Elo et al., 2003). Importantly, these three well-/ill-being indicators have been frequently used in previous research addressing the psychological consequences of mobile media use (e.g., Halfmann & Rieger, 2019; Reinecke et al., 2017).

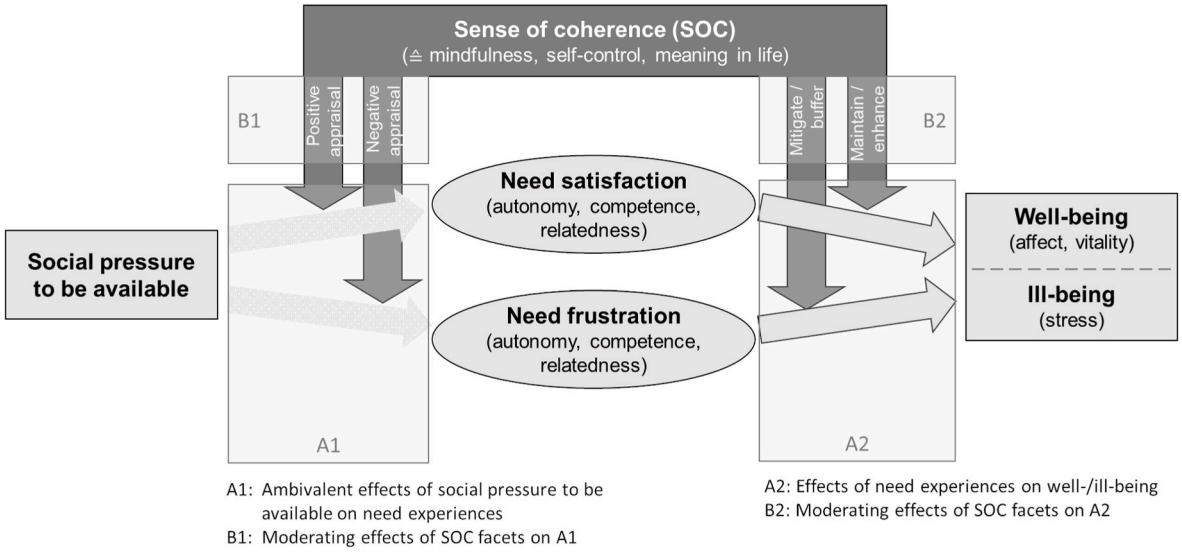

Fig. 1. Adapted version of the Integrative Model of Mobile Media Use and Need Experiences (IM^{3}UNE; Schneider et al., 2022).

2.2. Need experiences as an explanation of how social pressure influences well-/ill-being

To explain how social pressure to be available affects messenger

[1] Although specific SOC facets (i.e., comprehensibility, manageability, and meaningfulness) are conceptually related to broader salutogenic traits (i.e., mindfulness, self-control, and meaning in life), their empirical associations have not been examined to date. Additional details on the conceptual overlap between the salutogenic traits and the SOC facets, as well as the pilot study's methods and findings, are reported in Online Appendix A.

users' well-/ill-being, the IM^{3}UNE conceptualizes specific need experiences (i.e., the satisfaction versus frustration of psychological needs) as mediating variables (Schneider et al., 2022; see Fig. 1, A1 & A2). Drawing on self-determination theory (Ryan & Deci, 2017), Vansteenkiste et al. (2020) described these need experiences as follows: Satisfying the need for *autonomy,* which refers to the experience of willingness and volition, provides a sense of integrity in terms of authentic actions, thoughts, and feelings. In contrast, its frustration involves feelings of being pushed in an unwanted direction. The need for *competence*—defined as the experience of mastery and effectiveness—is satisfied when being able to use and extend personal skills. When being frustrated, individuals experience failure, ineffectiveness, or even helplessness. The need for *relatedness* refers to experiences of interpersonal care and bonding. Whereas its satisfaction is characterized by feelings of connection to significant others, its frustration involves feeling socially excluded. As satisfying versus frustrating these needs are conceptualized as qualitatively different experiences, they are assumed to produce variations in individuals' well-/ill-being: Whereas need satisfaction explains the positive state of well-being, need frustration—more so than the mere lack of need satisfaction—leads to ill-being (Martela & Sheldon, 2019; Vansteenkiste & Ryan, 2013).

However, research testing these associations in the context of mobile media use is limited. Concerning the A1 path shown in Fig. 1, there is sporadic evidence that giving in to social pressure to be available can help individuals sustain important relationships, which increases relatedness satisfaction (Hall & Baym, 2012; Li & Chan, 2024; Reinecke et al., 2014). In contrast, receiving only a limited number of messages—comparable to perceiving less social pressure to be available—has been found to frustrate users' need for relatedness (Lutz, 2023). However, as social pressure directs users' attention away from their primary activities (Vanden Abeele, 2021), it can also decrease autonomy and competence satisfaction (Halfmann & Rieger, 2019; Hall, 2017). Across two studies, social pressure has been positively associated with the frustration of these two needs (Lutz et al., 2025). In light of these findings, we formulated the following hypotheses concerning the effects of social pressure to be available on need experiences:

- H1: High social pressure to be available satisfies the needs for (a) autonomy and (b) competence less, but (c) the need for relatedness more than low social pressure to be available.
- H2: High social pressure to be available frustrates the needs for (a) autonomy and (b) competence more, but (c) the need for relatedness less than low social pressure to be available.

Concerning the A2 path in Fig. 1, previous research connected media users' need experiences with several indicators of well-/ill-being. For instance, need satisfaction was associated with greater life satisfaction, but less depression, anxiety, and stress (e.g., Bauer et al., 2017; Grieve et al., 2013; Meier, 2018). In contrast, need frustration was positively related to social media users' anxiety and depression, but negatively related to their life satisfaction and vitality (van de Casteele et al., 2024). Transferring these findings to the context of messenger use, we assume:

- Satisfying the needs for (a) autonomy, (b) competence, and (c) relatedness is positively related to messenger users' (H3) affect and (H4) vitality, but negatively related to (H5) stress.
- Frustrating the needs for (a) autonomy, (b) competence, and (c) relatedness is negatively related to messenger users' (H6) affect and (H7) vitality, but positively related to (H8) stress.

However, to our best knowledge, the mediating role of both satisfying and frustrating these needs in the interplay of mobile media use and well-/ill-being was only investigated by Lutz et al. (2025). In line with the IM^{3}UNE (Schneider et al., 2022), the authors found that availability pressure was indirectly related to affect, vitality, and stress—at least via specific need experiences. Thus, addressing the indirect relationships, we hypothesized:

- Satisfying the needs for (a) autonomy, (b) competence, and (c) relatedness mediates the effect of social pressure to be available on users' (H9) affect, (H10) vitality, and (H11) stress.
- Frustrating the needs for (a) autonomy, (b) competence, and (c) relatedness mediates the effect of social pressure to be available on users' (H12) affect, (H13) vitality, and (H14) stress.

2.3. Salutogenic traits as an explanation of when social pressure influences well-/ill-being

The IM^{3}UNE further emphasizes the importance of individual appraisal processes in the relationships described above. More specifically, it specifies under which conditions demands associated with mobile media use lead to need satisfaction versus frustration (see Fig. 1; B1), and under which conditions these need experiences result in well-/ill-being (see Fig. 1; B2). Adopting the concept of SOC (Antonovsky, 1996), the model focuses on three salutogenic traits commonly studied in mobile media research (for a more detailed explanation, see Schneider et al., 2019): (1) *Mindfulness*, defined as the "receptive attention to and awareness of present events and experience" (Brown et al., 2007, p. 212); (2) *Self-control*, describing "the ability to override or change one's inner responses, as well as to interrupt undesired behavioral tendencies and refrain from acting on them" (Tangney et al., 2004, p. 275); and (3) *Meaning in life*, referring to one's sense of having a significant purpose in life and understanding the world around (Park, 2010). One of the model's key assumptions is that these three traits are associated with health-promoting evaluation processes in dealing with demands and (frustrated) need experiences in the context of mobile media use.

The importance of mindfulness (Bauer et al., 2017; Charoensukmongkol, 2016; Hefner & Freytag, 2024), self-control (Halfmann & Rieger, 2019; Hofmann et al., 2017; Panek et al., 2015), and meaning in life (Rieger & Klimmt, 2019; Trepte & Oliver, 2018) has already been supported in the context of mobile media use. However, the extent to which these traits moderate the IM^{3}UNE's A1 and A2 paths has not yet been examined for all of them. The same applies to the moderating role of individuals' SOC. Addressing these research gaps, we formulated hypotheses concerning the moderating role of users' salutogenic traits in the interplay between (see Fig. 1; B1) social pressure to be available and need experiences (i.e., H15a/b/c/d/e/f) and (see Fig. 1; B2) need experiences and well-/ill-being (i.e., H16a/b/c–H21a/b/c):

- For users (H15) high in these traits, social pressure to be available leads to more satisfaction of the needs for (a) autonomy, (b) competence, and (c) relatedness, but less frustration of the needs for (d) autonomy, (e) competence, and (f) relatedness.
- For users high in these traits, less satisfaction of the needs for (a) autonomy, (b) competence, and (c) relatedness leads to more (H16) affect and (H17) vitality, but less (H18) stress, compared to those low in this trait.
- These salutogenic traits weaken the association between the frustration of the needs for (a) autonomy, (b) competence, and (c) relatedness and (H19) affect, (H20) vitality, and (H21) stress.

We tested these hypotheses for mindfulness (Study 1), self-control (Study 2), meaning in life (Study 3), and SOC (Study 4). As these traits are postulated to moderate the same IM^{3}UNE paths, this consistent numbering facilitates comparing our results across the four studies.

3. Method

3.1. Design and manipulation

In all four experiments, social pressure to be available was

manipulated on two levels (i.e., low vs. high)—either using screenshots (S1) or screen videos (S2, S3, S4) of a WhatsApp conversation. These vignettes were developed by Lutz et al. (2020) and have recently been successfully used in an experiment investigating effects on need experiences as proposed by the IM^{3}UNE (Lutz et al., 2025). The high- and low-pressure vignettes differed in (a) the number of missed voice calls, (b) the urgency of the message, and (c) the sender's online status (for an overview, see Table 1). Importantly, by combining a greater number of, and more urgent, demands with an indicator that the sender was still waiting for a reply, the high-pressure vignette was designed to create a perceived obligation to respond quickly and to check the messenger more frequently to avoid missing anything important. Both of these factors are key to our definition of social pressure to be available.

The participants were instructed to put themselves in the respective situation and imagine being the one receiving the messages, while being engaged in an important task (for the full instructions, see the study-specific codebooks on OSF). This allowed the incoming messages to be experienced as interruptions to an ongoing activity, thereby potentially affecting specific need experiences. Furthermore, this instruction provided participants with an explanation as to why they had missed calls and messages.

3.2. Procedure

Using online questionnaires, the experiments were conducted consecutively, each for one to two weeks (S1: May 2021, S2: November 2022, S3: March/April 2023, S4: October/November 2023). These questionnaires were structured in the same way: First, participants provided informed consent and answered specific filter questions regarding their messenger use. Afterward, the respective salutogenic traits (S1: mindfulness, S2: self-control, S3: meaning in life, S4: SOC) were measured. On the following page, the participants were randomly exposed to either the low- or high-pressure vignette. The next page contained a manipulation check and—in S2 and S3—an attention check concerning the vignette. This was followed by several pages assessing participants' need experiences and the respective well-/ill-being indicators. Finally, participants provided some demographic information, answered a suspicion check, and were debriefed. In all studies, established ethical standards were met, including voluntary participation, informed consent, anonymity and data protection, and debriefing.

3.3. Measures

Most of the variables mentioned below—social pressure to be available, need experiences, and well-/ill-being indicators—were measured in direct response to the experimental vignette (S1: "when looking at the chat conversation"; S2-S4: "while watching the video"). When not specified otherwise, participants responded on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For each study, zero-order bivariate correlations between the main variables and their descriptives are reported in the Online Appendix (see Tables B1, C1, D1, and E1).

Social Pressure to be Available. To check the success of the manipulation, either five (e.g., "I had the feeling that the other person expects me to be available all the time," McDonald's $\omega_{S1} = 0.78$) or four (e.g., "I had the feeling that the other person expected me to answer immediately," $\omega_{S2} = 0.89$; $\omega_{S3} = 0.87$; $\omega_{S4} = 0.92$) items of an adapted version of the Social Pressure to Use Facebook Scale (Reinecke et al., 2014) were used.

Need Experiences. In all four experiments, the same single items assessed participants' autonomy satisfaction (i.e., "I had the freedom to do things the way I wanted to"), competence satisfaction (i.e., "I was successful, even with difficult things"), relatedness satisfaction (i.e., "I felt close and connected to other people who are important to me"), autonomy frustration (i.e., "I felt a lot of pressure from others that I would have preferred to do without"), competence frustration (i.e., "I felt like I failed at something or wasn't good at something"), and relatedness frustration (i.e., "Other people have rejected or excluded me," Meier, 2018).

Well-/Ill-Being Indicators. Affect was operationalized in two different ways: First, using the valence dimension of the Self-Assessment Manikin (Bradley & Lang, 1994), participants in S1 could choose between five different smileys representing either unpleasant or pleasant mood states. Second, using the Scale of Positive and Negative Experience (SPANE, Diener et al., 2010), participants' positive (six items, e.g., "good," $\omega_{S2} = 0.93$; $\omega_{S3} = 0.92$; $\omega_{S4} = 0.95$) and negative affect (six items, e.g., "bad," $\omega_{S2} = 0.87$; $\omega_{S3} = 0.87$; $\omega_{S4} = 0.88$) were assessed. As recommended by Diener et al. (2010), SPANE-B was then calculated, indicating a balance between the positive and negative sum scores. Furthermore, Study 3 also comprised the 7-item Vitality Scale (e.g., "I felt alive," $\omega_{S3} = 0.88$; Ryan & Frederick, 1997) as a second well-being indicator. Concerning participants' ill-being, three experiments used the 10-item Perceived Stress Scale (e.g., "I was upset about things I couldn't control," $\omega_{S2} = 0.86$; $\omega_{S3} = 0.86$; $\omega_{S4} = 0.87$; Cohen et al., 1983).

Salutogenic Traits. Participants' salutogenic traits were operationalized using (1) the 15-item Mindful Awareness and Attention Scale (e.g., "I rush through activities without being really attentive to them" [recoded], $\omega_{S1} = 0.80$; Brown & Ryan, 2003), (2) the 13-item Brief Self Control Scale (e.g., "I am good at resisting temptation," $\omega_{S2} = 0.88$; Maloney et al., 2012), (3) the 5-item presence dimension of the Meaning in Life Questionnaire (e.g., "I understand my life's meaning," $\omega_{S3} = 0.87$; Steger et al., 2006), and (4) the 10-item Sense of Coherence Scale (e.g., "How often do you have very mixed-up feelings and ideas?" [recoded], $\omega_{S4} = 0.88$; Schumacher, Wilz, & Gunzelmann, 2000). For the latter, following Grevenstein and Bluemke (2017), the response ranged from 1 (*very rarely*) to 5 (*very frequently*).

3.4. Participants

All experiments relied on convenience samples, each collected by one student assistant using personal networks. Following the preregistered criteria, participants (a) not providing informed consent, (b) not using messenger services, (c) incorrectly answering the attention check, or (d) correctly guessing the study's aim were removed from the dataset. In Study 1, the final set of participants ($N = 265$) was almost equally distributed in gender identity (55% female). In Study 2 ($N = 297$), Study 3 ($N = 193$), and Study 4 ($N = 162$), female participants were (slightly) overrepresented (S2: 62%; S3: 80%; S4: 70%). Across all four studies, the samples were highly educated, with 39–46% of participants holding a general qualification for university entrance, and around half of the participants being students (S1: 42%; S2: 60%; S3: 47%; S4: 46%). Whereas the majority of participants was relatively young, the studies' samples included a wide age range (S1: $M = 27.33$, $SD = 11.47$, range = 18–83; S2: $M = 27.38$, $SD = 10.51$, range = 18–72; S3: $M = 26.28$, $SD = 8.49$, range = 18–73; S4: $M = 30.59$, $SD = 13.63$, range = 18–73), with some older participants representing outliers at the upper end of the age distribution.

Table 1
Key elements of the experimental vignettes.

Manipulated elements	Experimental Condition	
	Low pressure	High pressure
Missed voice call(s)	One (five minutes ago)	Five (within the last four minutes)
Received message (time stamp: 4:35 p.m.)	"Hey, I couldn't reach you earlier. Just call me back when you got a minute."	„Hey, please call me back asap!“
Sender's online status	Last seen today at 4:35 p.m.	Online

4. Results

Data were analyzed using the R packages *lavaan* (Rosseel, 2012) and *manymome* (Cheung & Cheung, 2023) with robust maximum likelihood estimation, Monte Carlo (MC) simulated 95% CIs (Preacher & Selig, 2012) for the indirect effects in the moderated mediation models, and significance tests applying an alpha-level of 0.05. These moderated mediation models each include the experimental condition (low pressure = −0.5 | high pressure = +0.5) as the independent variable, the six need experiences as mediating variables, the respective salutogenic trait being investigated in each study as the moderating variable, and the well-/ill-being indicators as outcome variables.[2] All tables and an overview of the (in)significant paths per study can be found in our Online Appendix. More specifically, it reports the unstandardized direct, specific indirect, total indirect, and total effects of availability pressure on well-/ill being indicators mediated by need experiences at average levels of the respective salutogenic trait (see Tables B2, C2, D2, and E2). According to Brown (2015), the model fits were good (S1), acceptable (S2), and excellent (S3, S4)—see fit indices in the tables' footnotes. The estimated conditional indirect effects of availability pressure at three levels (i.e., M–1SD, M, M+1SD) of the respective salutogenic trait are summarized in Tables B3, C3, D3, and E3, as well as in Fig. 2.

4.1. Study 1

Confirmatory Analyses. In Study 1, the moderating salutogenic trait of interest was mindfulness. Indicating a successful manipulation, participants in the low-pressure condition (M = 2.94, SD = 0.92) perceived less social pressure to be available than those in the high-pressure condition (M = 3.71, SD = 0.81), t(263) 7.26, p < .001, Cohen's d = 0.90. Furthermore, there were significant group differences for three out of six need experiences: As hypothesized, high pressure led to less autonomy satisfaction (H1a) and more frustration of the needs for autonomy (H2a) and competence (H2b) than low pressure. Contrary to our hypotheses, competence satisfaction, relatedness satisfaction, and relatedness frustration did not significantly differ per condition. Hence, H1b/c and H2c were rejected.

In line with H3a/b and H6a, affect was positively related to autonomy and competence satisfaction and negatively related to autonomy frustration. However, contrary to H3c and H6b/c, the relationships between the remaining need experiences (i.e., relatedness satisfaction, competence frustration, and relatedness frustration) and affect were not significant.

As postulated in H12a, we identified a negative indirect effect of social pressure manipulation on affect via autonomy frustration. Indirect relationships via autonomy satisfaction, competence satisfaction, relatedness satisfaction, competence frustration, and relatedness frustration were non-significant. Hence, H9a/b/c and H12b/c were rejected. However, as expected, the total indirect effect of the pressure manipulation on affect was significantly negative.

Trait mindfulness moderated the effect of the social pressure manipulation on both relatedness satisfaction and frustration. However, as social pressure significantly increased these two need experiences only for those with low mindfulness, the pattern was not in line with H15c/f. Moreover, mindfulness did not significantly moderate the effects on autonomy and competence satisfaction/frustration, thereby rejecting H15a/b/d/e. Furthermore, contradicting H16a/b/c and H19a/b/c, there were no significant interaction effects of mindfulness and any need experiences on affect.

Exploratory Analyses. We also looked at the indirect effects of availability pressure on affective state at three levels of the moderator trait mindfulness (M–1SD = −0.58, M = 0, M+1SD = +0.58). We only found a significant conditional indirect effect via autonomy frustration: Participants who were exposed to the vignettes in the high availability pressure condition felt more frustrated in their autonomy and, in turn, experienced a more negative affective state. This pattern was significant and most pronounced for those with low trait mindfulness compared to those with average trait mindfulness. However, for those high in trait mindfulness, the indirect effect was not significant anymore, thereby corroborating the idea of mindfulness as a buffer against the detrimental effects of availability pressure, at least for autonomy frustration (see Table B3 in the Appendix).

To explore why mindfulness could not exert its expected moderating influence on all need experiences, we additionally investigated whether participants differing in trait mindfulness had already perceived and appraised the manipulation of availability pressure differently. As the results of our path model show (see S1.html on OSF, Chapter 10), trait mindfulness did not moderate the effect of our manipulation, but significantly directly lowered perceived availability pressure. Furthermore, we found significant positive moderating effects of trait mindfulness on the relationships between perceived availability pressure and autonomy and relatedness satisfaction (see S1.html on OSF, Chapter 10). Finally, mindfulness was significantly negatively related to the frustration of autonomy, competence, and relatedness but unexpectedly also to relatedness satisfaction (see S1.html on OSF, Chapter 8).

4.2. Study 2

Confirmatory Analyses. Study 2 focused on self-control as the moderating salutogenic trait. The manipulation check revealed significant group differences in perceived social pressure to be available between the low-pressure (M = 2.86, SD = 1.11) and the high-pressure condition (M = 3.73, SD = 1.03), t(295) 7.03, p < .001, Cohen's d = 0.82. As hypothesized in H1a and H2a/b, high social pressure decreased autonomy satisfaction and increased autonomy and competence frustration. However, it had no significant impact on competence satisfaction, relatedness satisfaction, and relatedness frustration, rejecting H1b/c and H2c.

The relationships between need experiences and both well-/ill-being indicators were mostly in line with our hypotheses: Affect was positively related to autonomy (H3a) and relatedness satisfaction (H3c), and negatively related to autonomy (H6a) and competence frustration (H6b). Stress was negatively related to autonomy (H5a) and relatedness satisfaction (H5c), and positively related to the frustration of all three needs (H8a/b/c). However, we identified no significant relationships between competence satisfaction and affect/stress and relatedness frustration and affect, thereby rejecting H3b, H5b, and H6c.

Concerning the indirect effects of the social pressure manipulation on affect and stress, the same three need experiences served as mediating variables: Autonomy satisfaction (H9a/H11a), autonomy frustration (H12a/H14a), and competence frustration (H12b/H14b). The specific and the total indirect effects were negative for affect and positive for stress. Contrary to H9b/c, H11b/c, H12c, and H14c, there were no significant indirect effects via the remaining need experiences (i.e., competence satisfaction, relatedness satisfaction, and relatedness frustration).

Trait self-control moderated the effect of the social pressure manipulation on autonomy satisfaction as well as the relationship between autonomy frustration and stress. However, the direction of these patterns was not as hypothesized, thereby rejecting H15a and H21a. Self-control did not significantly interact with social pressure when

[2] Initially, we pre-registered statistical procedures (i.e., one-sided t-tests and regression analyses) investigating each path of the IM^{3}UNE separately. These analyses can be found in the last section of each study's markdown and are summarized on OSF (see file "Pre-registered analyses"). However, we have now realized that path analyses are superior to our pre-registered approach as they simultaneously control for all variables, provide more robust results, and decrease the familywise error rate. Thus, within the manuscript, we will focus on this procedure. Following our preregistration protocol, neither did we exclude age outliers nor did we include age as a control variable in our analyses.

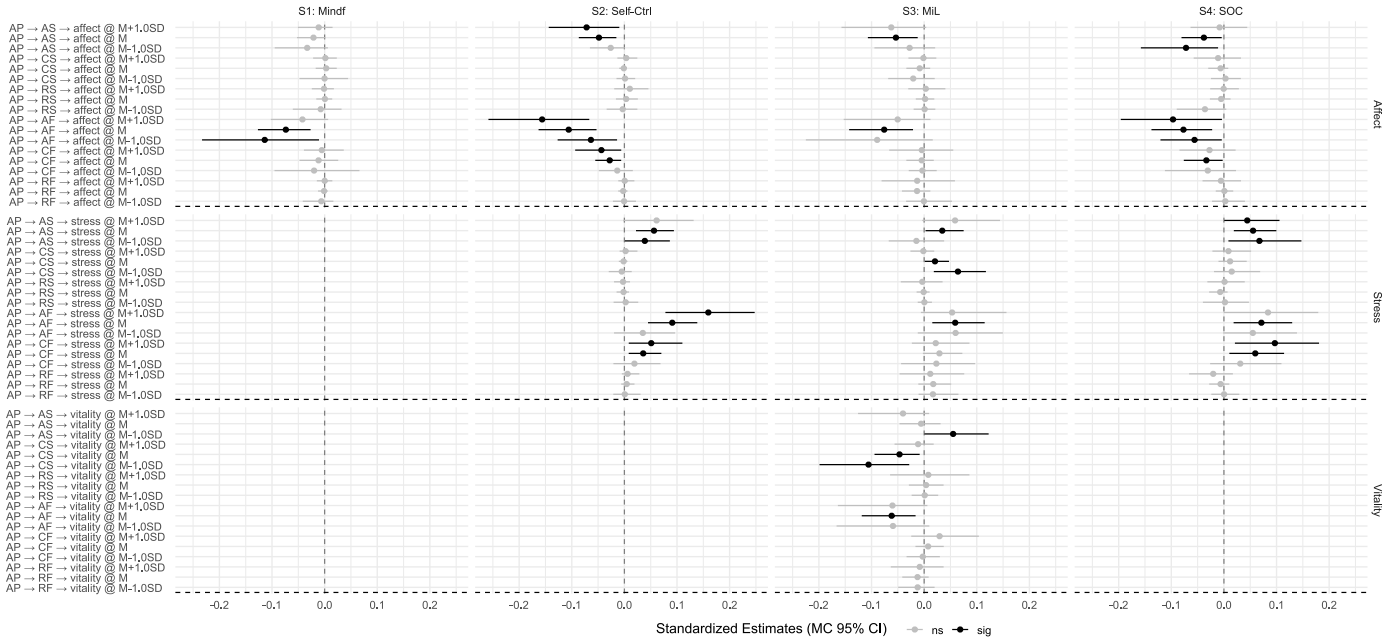

Fig. 2. Forest plot depicting estimated conditional indirect effects of Studies 1–4: standardized estimates including Monte Carlo 95% CIs at *M*-1*SD*, *M*, and *M*+1*SD* of the respective moderators. AP = Availability pressure, AS = autonomy satisfaction, CS = competence satisfaction, RS = relatedness satisfaction, AF = autonomy frustration, CF = competence frustration, RF = relatedness frustration, Mindf = mindfulness, Self-Ctrl = self-control, MiL = sense of meaning in life, SOC = sense of coherence. For more details, see Tables B3, C3, D3, and E3 in the Online Appendices.

predicting the remaining five need experiences (i.e., rejecting H15b/c/d/e/f), with any need experience when predicting affect (i.e., rejecting H16a/b/c and H19a/b/c), or with the remaining five need experiences when predicting stress (i.e., rejecting H18a/b/c and H21b/c).

Exploratory Analyses. We also looked at the indirect effects of availability pressure on affective state and stress at three levels of the moderator trait self-control (M–1SD = −0.67, M = 0, M+1SD = +0.67). We found various significant conditional indirect effects via different need experiences (see Table C3 in the Appendix). Unexpectedly, most patterns showed that the negative indirect effects of availability pressure on negative affective state or the positive effects on stress were more pronounced for those with increasing trait self-control. Thus, instead of working as a buffer, high trait self-control seemed to work as a catalyst.

To explore why self-control could not exert its expected moderating influence on all need experiences, we additionally investigated whether participants differing in trait self-control had already perceived and appraised the manipulation of availability pressure differently. As the results of our path model show (see S2.html on OSF, Chapter 10), trait self-control did not significantly moderate the effect of our manipulation on perceived availability pressure. Nevertheless, it was significantly positively related to the satisfaction of autonomy, competence, and relatedness and significantly negatively related to competence and relatedness frustration as well as to stress (see S2.html on OSF, Chapter 8).

4.3. Study 3

Confirmatory Analyses. Study 3 investigated the moderating role of meaning in life. Again, the low (M = 3.16, SD = 1.13) and high-pressure conditions (M = 3.71, SD = 1.08) significantly differed in their level of perceived social pressure to be available, t(191) 3.50, p < .001, Cohen's d = 0.51. This manipulation had a significant impact on four out of six need experiences: As hypothesized, high social pressure was—in comparison to low social pressure—associated with less satisfaction of the needs for autonomy (H1a) and competence (H1b) and with more frustration of those two needs (H2a/b). However, contrary to H1c/H2c, relatedness satisfaction and frustration did not significantly differ per condition.

The relationships between need experiences and affect were—in line with our hypotheses—significantly positive for autonomy (H3a) and relatedness satisfaction (H3c), and significantly negative for the frustration of these two needs (H6a/c). As hypothesized, vitality was significantly positively predicted by competence (H4b) and relatedness satisfaction (H4c) and significantly negatively predicted by autonomy (H7a) and relatedness frustration (H7c). For stress, we found significant relationships in the postulated direction with five need experiences: Negative ones with autonomy (H5a) and competence satisfaction (H5b), and positive ones with the frustration of all three needs (H8a/b/c). The remaining relationships between need experiences and the respective well-/ill-being indicators were non-significant, leading to a rejection of H3b, H4a, H5c, and H6b.

Although, as expected, the social pressure manipulation had significant total indirect effects on affect (negative), vitality (negative), and stress (positive), not all specific indirect effects were significant. Concerning affect, satisfying and frustrating the need for autonomy (H9a/H12a)—but not those for competence (H9b/H12b) and relatedness (H9c/H12c)—served as mediating variables. The effect on vitality was mediated via competence satisfaction (H10b) and autonomy frustration (H13a), but not via the remaining need experiences (i.e., rejecting H10a, H10c, H13b, and H13c). Regarding stress, there were significant indirect effects via autonomy satisfaction and frustration (H11a/H14a) as well as via competence satisfaction (H11b). However, H11c, H14b, and H14c had to be rejected.

Contrary to H15a–f, meaning in life did not moderate the effect of the social pressure manipulation on any need experience. Concerning the B1 path, meaning in life significantly moderated the interplay between four need experiences and well-/ill-being indicators in the hypothesized direction: Higher autonomy satisfaction related to more positive affect, particularly when meaning in life was high (H16a), whereas the negative association between autonomy frustration and positive affect was more pronounced for those with lower meaning in life (H19a). Moreover, relatedness satisfaction related more positively to vitality when meaning in life was high (H17c). Furthermore, the more the need for autonomy was frustrated, the more the participants reported stress, and

this was pronounced for those with low meaning in life (H21a). However, the moderating role of meaning in life in the interplay between those need experiences and well-/ill-being indicators not mentioned above was either not significant (rejecting H16b/c, H18a/b/c, H19b, and H20a/b/c) or not in the postulated direction (rejecting H17a/b, H19c, and H21b/c).

Exploratory Analyses. The indirect effects of availability pressure on affective state, vitality, and stress at three levels of the moderator sense of meaning in life (M–1SD = −0.80, M = 0, M+1SD = +0.80) showed various significant but rather inconsistent patterns. For instance, concerning the affective state, we only found significant negative conditional indirect effects via autonomy satisfaction and frustration on the average, but not on the low or high levels of meaning in life. Across all three outcomes and six mediators, there were no significant negative indirect effects at levels of high sense of meaning in life, indicating a potential mitigating effect (see Table D3 in the Appendix).

To explore why meaning in life could not exert its expected moderating influence on all need experiences, we additionally investigated whether participants differing in meaning in life had already perceived and appraised the manipulation of availability pressure differently. However, as the results of our path model show (see S3.html on OSF, Chapter 10), neither did meaning in life significantly moderate the effect of our manipulation on perceived availability pressure nor the relationships between perceived availability pressure and need experiences. Nevertheless, meaning in life was significantly positively related to the satisfaction of autonomy, competence, and relatedness as well as to vitality (see S3.html on OSF, Chapter 8).

4.4. Study 4

Confirmatory Analyses. In our final study, we looked at the moderating role of SOC as an overarching salutogenic trait. Perceived social pressure to be available significantly differed between the low (M = 2.55, SD = 1.11) and high-pressure condition (M = 3.60, SD = 1.29), t (160) 5.57, $p < .001$, Cohen's d = 0.88. As postulated, the groups also differed in terms of three need experiences: Compared to participants in the low-pressure condition, those in the high-pressure condition reported lower levels of autonomy satisfaction (H1a) and higher levels of autonomy (H2a) and competence frustration (H2b). Contrary to H1b/c and H2c, they did not significantly differ in competence satisfaction, relatedness satisfaction, and relatedness frustration.

As hypothesized, affect was positively associated with autonomy satisfaction (H3a) and negatively associated with autonomy (H6a) and competence frustration (H6b). Consistent with our assumptions, satisfying the needs for autonomy (H5a) and competence (H5b) was negatively and frustrating those two needs (H8a and H8b) was positively related to stress. The remaining hypothesized associations between need experiences and well-/ill-being indicators were non-significant, which is why H3b/c, H5c, H6c, and H8c were rejected.

In line with our hypotheses, the indirect effects of the social pressure manipulation on affect were significantly negative via autonomy satisfaction (H9a), autonomy frustration (H12a), and competence frustration (H12b). Furthermore, via these three need experiences, the social pressure manipulation was—in line with H11a, H14a, and H14b—significantly positively related to stress. The remaining three need experiences (i.e., competence satisfaction, relatedness satisfaction, and relatedness frustration) did not significantly mediate the interplay between social pressure and both well-/ill-being indicators, leading to a rejection of H9b/c, H11/b/c, H12c, and H14c. The total indirect effects of the pressure manipulation were significantly negative for affect and positive for stress.

SOC did not moderate the effects of the social pressure manipulation on any need experience, thereby rejecting H15a/b/c/d/e/f. Moreover, although it significantly moderated the interplays between specific need experiences and well-/ill-being indicators, some of these patterns were not in the hypothesized direction (i.e., rejecting H16a/c and H21c). As hypothesized (H16b), SOC pronounced the positive association between competence satisfaction and affect. The relationships between those need experiences and well-/ill-being indicators not mentioned above were not moderated by SOC (i.e., rejecting H18a/b/c, H19a/b/c, and H21a/b).

Exploratory Analyses. The indirect effects of availability pressure on affective state and stress at three levels of the moderator SOC (M–1SD = −0.74, M = 0, M+1SD = +0.74) showed comparable significant patterns concerning autonomy satisfaction, autonomy frustration, and competence frustration. For instance, participants who were exposed to the vignettes in the high availability pressure condition felt less satisfied and more frustrated in their autonomy and, in turn, experienced a more negative affective state and a more stressful state. For those low in SOC, the negative indirect effect of availability pressure on the affective state via autonomy satisfaction was strongest; for those high in SOC, it was not significant anymore. Similarly, the stress-enhancing effect of availability pressure was lowest for those with a high SOC. However, for autonomy frustration, it was the other way around: SOC rather worked as a catalyst for detrimental effects than as a buffer (see Table E3 in the Appendix).

To explore why SOC could not exert its expected moderating influence on all need experiences, we additionally investigated whether participants differing in SOC had already perceived and appraised the manipulation of availability pressure differently. As the results of our path model show (see S4.html on OSF, Chapters 9 and 11), SOC significantly moderated the effect of our manipulation, but not as expected: those with a higher SOC felt significantly less pressured in the low pressure condition but more pressured in the high pressure condition compared to those with lower SOC. Furthermore, we found a significant positive moderating effect of SOC on the relationship between perceived availability pressure and autonomy satisfaction, as well as a significant negative moderating effect on the relationship between availability pressure and autonomy frustration (see S4.html on OSF, Chapter 9). Finally, SOC was significantly positively related to competence satisfaction and significantly negatively related to stress (see S4.html on OSF, Chapter 8).

5. Discussion

The present manuscript aimed to explain how and when social pressure to be available is related to messenger users' well-/ill-being by applying and testing the IM^{3}UNE (Schneider et al., 2022). In short, across our four main studies, there is more support for the mediation effects assumed in the IM^{3}UNE than for the moderation effects: Experiences of need satisfaction and frustration had mediating effects and accordingly help explain how the experience of social pressure to be available affects well-/ill-being. The expected moderation effects of mindfulness, self-control, meaning in life, and sense of coherence were hardly evident. There is thus little support for the assumption that these salutogenic personality traits are associated with health-promoting evaluation processes in dealing with social pressure to be available and (frustrated) need experiences.

A tabular overview of all (in)significant paths across our four main studies is provided in Online Appendices F and G. Table 2 provides a concise summary of the specific indirect effects of availability pressure on well-/ill-being, highlighting both consistent and inconsistent patterns across the respective studies investigating these variables.

A more detailed visualization of these paths is presented in the forest plot shown in Fig. 2. Mediated paths (i.e., the *how* component of the IM^{3}UNE) are considered significant when the confidence intervals of the indirect effects do not include zero. The position of the estimates relative to zero indicates both the direction and size of the effects. Moderated paths (i.e., the *when* component of IM^{3}UNE) are reflected in variations in the size or significance of the respective indirect effects across different levels of a moderator. In the following two subchapters, we summarize

Table 2
Summary of the specific indirect effects of availability pressure on well-/ill-being.

Dependent variable	Study			
Mediator	1	2	3	4
Affective state				
Autonomy satisfaction	Ns	s (neg)	s (neg)	s (neg)
Competence satisfaction	Ns	ns	ns	ns
Relatedness satisfaction	Ns	ns	ns	ns
Autonomy frustration	s (neg)	s (neg)	s (neg)	s (neg)
Competence frustration	Ns	s (neg)	ns	s (neg)
Relatedness frustration	ns	ns	ns	ns
Vitality				
Autonomy satisfaction			ns	
Competence satisfaction			s (neg)	
Relatedness satisfaction			ns	
Autonomy frustration			s (neg)	
Competence frustration			ns	
Relatedness frustration			ns	
Stress				
Autonomy satisfaction		s (pos)	s (pos)	s (pos)
Competence satisfaction		ns	s (pos)	ns
Relatedness satisfaction		ns	ns	ns
Autonomy frustration		s (pos)	s (pos)	s (pos)
Competence frustration		s (pos)	ns	s (pos)
Relatedness frustration		ns	ns	ns

Note. s denotes a significant path; ns denotes a non-significant path; effect directions are indicated in parentheses (pos = positive, neg = negative); empty cells indicate that the path was not examined in the respective study.

the main findings for each model component.

5.1. Mediated paths (i.e., the how component)

In line with the IM^{3}UNE (Schneider et al., 2022), the results of our studies demonstrated that social pressure to be available leads to different need experiences, which in turn influence users' affect, vitality, and stress. Supporting previous research (e.g., Halfmann & Rieger, 2019), this became particularly evident for autonomy and competence: Via their satisfaction and frustration, social pressure to be available was negatively linked to well-being, but positively associated with stress. However, across all four experiments, neither the satisfaction nor the frustration of relatedness needs mediated these relationships. Moreover, social pressure to be available had no direct effects on these two need experiences. This might be attributed to the poor fit between the experimental vignette and the respective operationalization (see Chapter 5.3 for a more detailed discussion).

Another finding worth discussing concerns the total indirect effects of social pressure on well-/ill-being: Across all experiments, we identified negative effects on affect and vitality, and a positive one on stress. This contradicts the basic assumption of the IM^{3}UNE that specific demands associated with mobile media use are not pathogenic per se, but can have both beneficial (i.e., need satisfaction) and detrimental (i.e., need frustration) effects, depending on how these demands are interpreted. As social pressure to be available both decreased need satisfaction and increased need frustration, which in total harmed users' mental health, such a pathogenic view might seem more plausible—at least for this specific demand.

5.2. Moderated paths (i.e., the when component)

Importantly, the above-mentioned patterns only refer to the model's *how* component (i.e., A1 and A2; see Fig. 1)—meaning that the indirect effects were calculated at the average level of the respective salutogenic trait. However, the picture becomes more complex if we take conditional effects—the *when* component—into account (i.e., B1 and B2, see Fig. 1). Overall, only a few moderating effects were significant and showed the expected direction. This was particularly true for meaning in life. For instance, the higher meaning in life, the more autonomy satisfaction was positively associated, and the less autonomy frustration was negatively associated with affect and stress, respectively. However, some findings were even opposed to what we hypothesized: One example is that the effects of availability pressure on relatedness satisfaction and frustration were more pronounced only for those with low trait mindfulness, whereas we assumed that the effects would have been attenuated, particularly for those with high trait mindfulness. Another example is that the conditional indirect effects of availability pressure on affect and stress were strengthened for those with high trait self-control, but in such a way that the positive affect decreased and stress increased. One reason could lie in the experimental design, which exposes participants to stimuli pressuring them, but at the same time does not allow them to immediately cope with this situation by replying to the messages. This might be specifically detrimental for those who want to exert self-control but cannot.

Despite the few examples discussed above, most of the interactions were not significant. Thus, across all four experiments, we found little support for our expected moderating effects of the four salutary constructs on the impact of availability pressure on need experiences and on the relationships between need experiences and the outcome variables (i.e., affect, vitality, and stress). One explanation might be that the uniformly formulated moderating hypotheses proposed by the IM^{3}UNE (Schneider et al., 2022) may not theoretically hold across different mobile media demands but instead need careful reconsideration for each stimulus representing the demand and each specific salutogenic trait. Another possible reason might be that we examined the salutogenic traits separately, with each experiment targeting only one moderating variable. We adopted this approach to minimize participant burden and reduce consistency-driven responding. However, simultaneously measuring multiple salutogenic traits may reveal more complex moderation models, including three- or even four-way interactions. Conversely, the inconsistent findings regarding the moderators proposed by the IM^{3}UNE could also suggest that a simpler model without boundary conditions might be a better, more parsimonious choice (for a similar argument about moderators in media effects research, see also Coenen, 2025). This would be in line with the universality claim of basic psychological needs theory (Ryan & Deci, 2017; Vansteenkiste et al., 2020), implying that the effects of need experiences may operate independently of the moderators outlined in the IM^{3}UNE's *when* component.

5.3. Limitations and future research suggestions

When discussing the lack of effects of our availability pressure manipulation on relatedness satisfaction and frustration, we already pointed to a poor fit between the experimental vignette and the respective operationalization as a possible limitation. Concerning relatedness satisfaction, the item directly referred to "other people *who are important to me*." As the screenshot/-video showed a conversation with a fictitious chat partner, this need experience could hardly be evoked. Concerning relatedness frustration, the item referred to situations in which "*other people have rejected or excluded me*." Importantly, even in the low-pressure vignette, the chat partner has attempted contact (i.e., each one voice call and message), which does not correspond to the definition of social exclusion, that is, being ignored and receiving no attention at all (Williams, 2009). Initially, these items were developed to assess mobile media users' emotional responses in real life (Meier, 2018). Thus, future research aiming to test the IM^{3}UNE could apply more externally valid manipulations of social pressure to be available. One approach might be the use of text vignettes depicting everyday situations, such as incoming messages from friends on one's smartphone (Halfmann et al., 2021, Study 1). Another option would be to expose participants to connection cues rather than merely imagining receiving them. In previous laboratory experiments manipulating the presence versus absence of connection cues, participants only monitored

notifications incoming on the experimenter's smartphone, which did not yield significant differences in participants' perceptions of having to be available (Halfmann et al., 2024). Adapting this approach, participants themselves could receive either a high or low number of messages when engaging in a chat with a confederate (Latina et al., 2023). The IM^{3}UNE could further be tested in field experiments manipulating social pressure to be available by varying both technical (e.g., instructing participants to switch their ringtones on vs. off) and mental connection cues (e.g., increasing vs. not increasing the salience of availability norms; Halfmann & Rieger, 2019, Study 1).

Another limitation refers to the two levels of availability pressure depicted in the vignettes. In the present experiments, the high-pressure vignette signals a rather high degree of urgency (i.e., five missed voice calls), which was necessary to ensure sufficient variance in the manipulation and thus maintain internal validity. However, this may have limited ecological validity, as such intense urgency may be relatively uncommon in everyday messenger communication. Consequently, adopting the above-mentioned suggestions for more ecologically valid manipulations might also enable future research to better capture the nuances of everyday availability pressure. Furthermore, the messages requesting to call back "as soon as possible" (i.e., high pressure) versus "when you got a minute" (i.e., low pressure) differ in their degree of controlling language and may thus have directly manipulated fundamental needs. This might have been particularly relevant for the need for autonomy, as its operationalization taps into feeling volitional and having free choices (e.g., "the freedom to do things the way I wanted to do").

This leads to a further limitation, namely the use of single items to measure users' need experiences. Given the difficulties of single items in adequately capturing complex psychological constructs (Allen et al., 2022), our operationalization may not have emphasized the fine-grained distinction between need frustration and (low) need satisfaction. Consequently, future research testing the IM^{3}UNE should rely on multi-item scales, such as the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015).

Furthermore, the causal mechanisms regarding the link between need experiences and well-/ill-being have not been properly tested yet. Until now, most experimental research related to the IM^{3}UNE did not manipulate but only measure the mediators, which does not allow for causal claims (e.g., Pirlott & MacKinnon, 2016), at least for this part of the model. This research gap could be addressed by explicitly manipulating specific need experiences in the context of mobile media use. For instance, concerning relatedness need experiences, previous research has applied a range of manipulations, such as whether social media users are tagged in photos posted by their friends (i.e., relatedness satisfaction) or not (i.e., relatedness frustration; Büttner & Rudert, 2022; Lutz et al., 2024). However, experimental studies manipulating the remaining need experiences in the context of mobile media use are scarce (for a scoping review concerning autonomy satisfaction versus frustration, see Dietrich et al., 2024). Such manipulated mediators would help establish stronger claims regarding the causal order of mediating and outcome variables.

A further limitation concerns the use of convenience sampling, which resulted in highly educated samples with substantial age variability. Although the present research was not designed to examine group-specific differences, it cannot be ruled out that different sociodemographic groups are characterized by specific attributes (e.g., the internalization of availability norms), which in turn may affect the strength of direct effects of mobile media demands (Reinecke et al., 2017). To increase the generalizability of the findings, future research using more representative samples is needed to test whether the observed effects vary as a function of sociodemographic characteristics.

6. Conclusion

In conclusion, the studies' results complement research on the effects of mobile media use on users' well-being in theoretical and empirical terms. Concerning theory development, they point to the relevance of need experiences—especially autonomy and competence satisfaction/frustration—emerging in response to specific mobile media demands (here: availability pressure), but question the role of the personality traits mindfulness, self-control, and meaning in life for situational assessments and dealing with challenging experiences in the context of messenger use. Compared to previous research findings, our studies showed less heterogeneous effects for social pressure to be available, but predominantly health-damaging effects. Future research must clarify whether this is due to the methodological designs used or whether this specific demand for users provides little scope for positive interpretation.

CRediT authorship contribution statement

Sarah Lutz: Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Frank M. Schneider:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Annabell Halfmann:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization.

AI disclosure statement

The authors confirm that no AI was used in the creation of the manuscript.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

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

Acknowledgments

The authors would like to thank Sophia Schweinsberg, Emily Schäfer, Roxanne Takacs, and Greta Sanderbrandes for their assistance in collecting the data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chbr.2026.100977.

Data availability

Each study's material (i.e., pre-registration, dataset, experimental stimuli, codebook, R markdown, and additional analyses) can be found on OSF: https://osf.io/u93yv/.

References

Allen, M. S., Iliescu, D., & Greiff, S. (2022). Single item measures in psychological science. *European Journal of Psychological Assessment, 38*(1), 1–5. https://doi.org/10.1027/1015-5759/a000699

Antonovsky, A. (1987). *Unraveling the mystery of health: How people manage stress and stay well*. Jossey-Bass.

Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International, 11*(1), 11–18. https://doi.org/10.1093/heapro/11.1.11

Bauer, A. A., Loy, L. S., Masur, P. K., & Schneider, F. M. (2017). Mindful instant messaging. Mindfulness and autonomous motivation as predictors of well-being and stress in smartphone communication. *Journal of Media Psychology, 29*(3), 159–165. https://doi.org/10.1027/1864-1105/a000225

Bayer, J. B., Campbell, S. W., & Ling, R. S. (2016). Connection cues: Activating the norms and habits of social connectedness. *Communication Theory, 26*(2), 128–149. https://doi.org/10.1111/comt.12090

Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The self-assessment manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry, 25*, 49–59. https://doi.org/10.1016/0005-7916(94)90063-9

Brown, T. A. (2015). *Confirmatory factor analysis for applied research (2nd ed.)*. Guilford Press.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 84*(4), 822–848. https://doi.org/10.1037/0022-3514.84.4.822

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211–237. https://doi.org/10.1080/10478400701598298

Büttner, C. M., & Rudert, S. C. (2022). Why didn't you tag me?!: Social exclusion from Instagram posts hurts, especially those with a high need to belong. *Computers in Human Behavior, 127*, Article 107062. https://doi.org/10.1016/j.chb.2021.107062

Charoensukmongkol, P. (2016). Mindful facebooking: The moderating role of mindfulness on the relationship between social media use intensity at work and burnout. *Journal of Health Psychology, 21*(9), 1966–1980. https://doi.org/10.1177/1359105315569096

Chen, B., Vansteenkiste, M., Beyers, W., Boone, L., Deci, E. L., Van der Kaap-Deeder, J., Duriez, B., Lens, W., Matos, L., Mouratidis, A., Ryan, R. M., Sheldon, K. M., Soenens, B., Van Petegem, S., & Verstuyf, J. (2015). Basic psychological need satisfaction, need frustration, and need strength across four cultures. *Motivation and Emotion, 39*(2), 216–236. https://doi.org/10.1007/s11031-014-9450-1

Cheung, S. F., & Cheung, S.-H. (2023). Manymome: An R package for computing the indirect effects, conditional effects, and conditional indirect effects, standardized or unstandardized, and their bootstrap confidence intervals, in many (though not all) models. *Behavior Research Methods*. https://doi.org/10.3758/s13428-023-02224-z

Coenen, L. (2025). Lost in a maze? On the philosophical problems with differential and individual-level susceptibility in research on media effects. *Communication Research, 52*(2), 262–286. https://doi.org/10.1177/00936502241287018

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*(4), 385–396. https://doi.org/10.2307/2136404

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*(2), 276–302. https://doi.org/10.1037/0033-2909.125.2.276

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143–156. https://doi.org/10.1007/s11205-009-9493-y

Dietrich, F., Arenz, A., & Reinecke, L. (2024). What constitutes experiences of autonomy in digital technology use? A (computational) scoping review through the lens of self-determination theory. *Interacting with Computers*. https://doi.org/10.1093/iwc/iwae050. iwae050.

Elhai, J. D., Rozgonjuk, D., Alghraibeh, A. M., & Yang, H. (2021). Disrupted daily activities from interruptive smartphone notifications: Relations with depression and anxiety severity and the mediating role of boredom proneness. *Social Science Computer Review, 39*(1), 20–37. https://doi.org/10.1177/0894439319858008

Elo, A.-L., Leppänen, A., & Jahkola, A. (2003). Validity of a single-item measure of stress symptoms. *Scandinavian Journal of Work, Environment & Health, 29*(6), 444–451. https://doi.org/10.5271/sjweh.752

Godard, R., & Holtzman, S. (2023). Are active and passive social media use related to mental health, wellbeing, and social support outcomes? A meta-analysis of 141 studies. *Journal of Computer-Mediated Communication, 29*(1), zmad055. https://doi.org/10.1093/jcmc/zmad055

Grevenstein, D., & Bluemke, M. (2017). Longitudinal factor analysis and measurement invariance of sense of coherence and general self-efficacy in adolescence. *European Journal of Psychological Assessment, 33*(5), 377–387. https://doi.org/10.1027/1015-5759/a000294

Grieve, R., Indian, M., Witteveen, K., Tolan, G. A., & Marrington, J. (2013). Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behavior, 29*(3), 604–609. https://doi.org/10.1016/j.chb.2012.11.017

Halfmann, A., Meier, A., & Reinecke, L. (2021). Too much or too little messaging? Situational determinants of guilt about mobile messaging. *Journal of Computer-Mediated Communication, 26*(2), 72–90. https://doi.org/10.1093/jcmc/zmaa018

Halfmann, A., Meier, A., & Reinecke, L. (2024). Trapped between goal conflict and availability norm? How users' mobile messaging behavior during task engagement influences negative self-conscious emotions. *Journal of Media Psychology, 36*(1), 45–57. https://doi.org/10.1027/1864-1105/a000381

Halfmann, A., & Rieger, D. (2019). Permanently on call: The effects of social pressure on smartphone users' self-control, need satisfaction, and well-being. *Journal of Computer-Mediated Communication, 24*(4), 165–181. https://doi.org/10.1093/jcmc/zmz008

Halfmann, A., Wolfers, L. N., & Meeus, A. (2025). Can mothers avoid guilt about their smartphone usage behavior? Effects of the availability norm and goal conflict on guilt, recovery, and accomplishment experiences. *Mobile Media & Communication, 13*(1), 5–27. https://doi.org/10.1177/20501579241252098

Hall, J. A. (2017). The experience of mobile entrapment in daily life. *Journal of Media Psychology, 29*(3), 148–158. https://doi.org/10.1027/1864-1105/a000228

Hall, J. A., & Baym, N. K. (2012). Calling and texting (too much): Mobile maintenance expectations, (over)dependence, entrapment, and friendship satisfaction. *New Media & Society, 14*(2), 316–331. https://doi.org/10.1177/1461444811415047

Hall, J. A., Pennington, N., & Merolla, A. J. (2023). Which mediated social interactions satisfy the need to belong? *Journal of Computer-Mediated Communication, 28*(1). https://doi.org/10.1093/jcmc/zmac026. zmac026.

Hefner, D., & Freytag, A. (2024). Consciously connected: The role of mindfulness for mobile phone connectedness and stress. *Media Psychology, 27*(4), 503–532. https://doi.org/10.1080/15213269.2023.2253732

High, A. C., Ruppel, E. K., McEwan, B., & Caughlin, J. P. (2023). Computer-mediated communication and well-being in the age of social media: A systematic review. *Journal of Social and Personal Relationships, 40*(2), 420–458. https://doi.org/10.1177/02654075221106449

Hofmann, W., Reinecke, L., & Meier, A. (2017). Of sweet temptations and bitter aftertaste: Self-control as a moderator of the effects of media use on well-being. In L. Reinecke, & M. B. Oliver (Eds.), *The Routledge handbook of media use and well-being* (pp. 211–222). Routledge.

Latina, D., Goreis, A., Sajko, P., & Kothgassner, O. D. (2023). Does being ignored on WhatsApp hurt? A pilot study on the effect of a newly developed ostracism task for adolescents. *Journal of Clinical Medicine, 12*(5), 2056. https://doi.org/10.3390/jcm12052056

Li, X., & Chan, M. (2024). Is availability pressure always detrimental? From availability pressure to relationship satisfaction through compulsive checking of smartphone and need satisfaction. *Behaviour & Information Technology*. Advance online publication. https://doi.org/10.1080/0144929X.2024.2369631

Ling, R. S. (2016). Soft coercion: Reciprocal expectations of availability in the use of mobile communication. *First Monday, 21*(9). https://doi.org/10.5210/fm.v21i9.6814

Lutz, S. (2023). Why don't you answer me?! exploring the effects of (repeated exposure to) ostracism via messengers on users' fundamental needs, well-being, and coping motivation. *Media Psychology, 26*(2), 113–140. https://doi.org/10.1080/15213269.2022.2101008

Lutz, S., Büttner, C. M., & Neumann, D. (2024). A window to what we missed: Effects of self- versus other-exclusion on social media users' fundamental needs, emotional responses, and online coping behaviors. *Media Psychology, 27*(3), 401–427. https://doi.org/10.1080/15213269.2023.2242769

Lutz, S., Schneider, F. M., Halfmann, A., Freytag, A., & Hefner, D. (2025). Navigating social pressure to be available: The roles of mindfulness and need experiences in messenger users' well-/ill-being. *Mobile Media & Communication*. https://doi.org/10.1177/20501579251370458, 20501579251370458.

Lutz, S., Schneider, F. M., & Vorderer, P. (2020). On the downside of mobile communication: An experimental study about the influence of setting-inconsistent pressure on employees' emotional well-being. *Computers in Human Behavior, 105*. https://doi.org/10.1016/j.chb.2019.106216

Maloney, P. W., Grawitch, M. J., & Barber, L. K. (2012). The multi-factor structure of the brief self-control scale: Discriminant validity of restraint and impulsivity. *Journal of Research in Personality, 46*(1), 111–115. https://doi.org/10.1016/j.jrp.2011.10.001

Martela, F., & Sheldon, K. M. (2019). Clarifying the concept of well-being: Psychological need satisfaction as the common core connecting eudaimonic and subjective well-being. *Review of General Psychology, 23*(4), 458–474. https://doi.org/10.1177/1089268019880886

Meier, A. (2018). Alles eine Frage der digitalen Autonomie? Die Rolle von Autonomie in der digitalen Kommunikation für psychologische Grundbedürfnisse und psychische Gesundheit im Alltag [All a question of digital autonomy? The role of autonomy in digital communication for basic psychological needs and mental health in everyday life]. *Medien und Kommunikationswissenschaft, 66*(4), 407–427. https://doi.org/10.5771/1615-634X-2018-4-407

Meier, A. (2021). Studying problems, not problematic usage: Do mobile checking habits increase procrastination and decrease well-being? *Mobile Media & Communication, 10*(2). https://doi.org/10.1177/20501579211029326

Meier, A., & Reinecke, L. (2021). Computer-mediated communication, social media, and mental health: A conceptual and empirical meta-review. *Communication Research, 48*(8), 1182–1209. https://doi.org/10.1177/0093650220958224

Panek, E. T., Bayer, J. B., Dal Cin, S., & Campbell, S. W. (2015). Automaticity, mindfulness, and self-control as predictors of dangerous texting behavior. *Mobile Media & Communication, 3*(3), 383–400. https://doi.org/10.1177/2050157915576046

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin, 136*(2), 257–301. https://doi.org/10.1037/a0018301

Pirlott, A. G., & MacKinnon, D. P. (2016). Design approaches to experimental mediation. *Journal of Experimental Social Psychology, 66*, 29–38. https://doi.org/10.1016/j.jesp.2015.09.012

Preacher, K. J., & Selig, J. P. (2012). Advantages of Monte Carlo confidence intervals for indirect effects. *Communication Methods and Measures, 6*(2), 77–98. https://doi.org/10.1080/19312458.2012.679848

Reinecke, L., Aufenanger, S., Beutel, M. E., Dreier, M., Quiring, O., Stark, B., Wölfling, K., & Müller, K. W. (2017). Digital stress over the life span: The effects of communication load and internet multitasking on perceived stress and psychological health impairments in a German probability sample. *Media Psychology, 20*(1), 90–115. https://doi.org/10.1080/15213269.2015.1121832

Reinecke, L., Vorderer, P., & Knop, K. (2014). Entertainment 2.0? The role of intrinsic and extrinsic need satisfaction for the enjoyment of Facebook use. *Journal of Communication, 64*(3), 417–438. https://doi.org/10.1111/jcom.12099

Rieger, D., & Klimmt, C. (2019). The daily dose of digital inspiration: A multi-method exploration of meaningful communication in social media. *New Media & Society, 21*(1), 97–118. https://doi.org/10.1177/1461444818788323

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2). https://doi.org/10.18637/jss.v048.i02

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.

Ryan, R. M., & Frederick, C. (1997). On energy, personality, and health: Subjective vitality as a dynamic reflection of well-being. *Journal of Personality, 65*(3), 529–565. https://doi.org/10.1111/j.1467-6494.1997.tb00326.x

Schneider, F. M., Halfmann, A., & Vorderer, P. (2019). POPC and the good life. A salutogenic take on being permanently online, permanently connected. In J. A. Muñiz Velázquez, & C. Pulido (Eds.), *The Routledge handbook of positive communication* (pp. 295–303). Routledge.

Schneider, F. M., Lutz, S., Halfmann, A., Meier, A., & Reinecke, L. (2022). How and when do mobile media demands impact well-being? Explicating the integrative model of mobile media use and need experiences (IM^{3}UNE). *Mobile Media & Communication, 10*(2), 251–271. https://doi.org/10.1177/20501579211054928

Schumacher, J., Wilz, G., Gunzelmann, T., & Brähler, E. (2000). Die Sense of Coherence Scale von Antonovsky. Teststatistische Überprüfung in einer repräsentativen Bevölkerungsstichprobe und Konstruktion einer Kurzskala. *Psychotherapie, Psychosomatik, Medizinische Psychologie, 50*(12), 472–482. https://doi.org/10.1055/s-2000-9207

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology, 53*(1), 80–93. https://doi.org/10.1037/0022-0167.53.1.80

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*(2), 271–324. https://doi.org/10.1111/j.0022-3506.2004.00263.x

Trepte, S., & Oliver, M. B. (2018). Getting the best out of POPC while keeping the risks in mind: The calculus of meaningfulness and privacy. In P. Vorderer, D. Hefner, L. Reinecke, & C. Klimmt (Eds.), *Permanently online, permanently connected: Living and communicating in a POPC world* (pp. 107–115). Routledge.

Utz, S. (2020). Social network sites as vehicles for effective/ineffective social support. In N. Egbert, & K. B. Wright (Eds.), *Social support and health in the digital age* (pp. 5–27). Rowman and Littlefield Publishing Group.

van de Casteele, M., Flamant, N., Ponnet, K., Soenens, B., van Hees, V., & Vansteenkiste, M. (2024). Adolescents' mental health in the social-media era: The role of offline and online need-based experiences. *Journal of Adolescence, 3*(96). https://doi.org/10.1002/jad.12286

Van Gaeveren, K., Murphy, S. L., De Segovia Vicente, D., & Vanden Abeele, M. M. P. (2024). Connected yet cognitively drained? A mixed-methods study examining whether online vigilance and availability pressure promote mental fatigue. *Communication Research*. Advance online publication. https://doi.org/10.1177/00936502241248494

Vanden Abeele, M. M. P. (2021). Digital wellbeing as a dynamic construct. *Communication Theory, 31*(4), 932–955. https://doi.org/10.1093/ct/qtaa024

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263–280. https://doi.org/10.1037/a0032359

Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion, 44*(1), 1–31. https://doi.org/10.1007/s11031-019-09818-1

Vorderer, P., Krömer, N., & Schneider, F. M. (2016). Permanently online – Permanently connected: Explorations into university students' use of social media and mobile smart devices. *Computers in Human Behavior, 63*, 694–703. https://doi.org/10.1016/j.chb.2016.05.085

Wallace-Wells, D. (2024). Are smartphones driving our teens to depression? *The New York Times*. https://www.nytimes.com/2024/05/01/opinion/smartphones-social-media-mental-health-teens.html.

Waters, J. (2021). Constant craving: How digital media turned us all into dopamine addicts. *The Guardian*. https://www.theguardian.com/global/2021/aug/22/how-digital-media-turned-us-all-into-dopamine-addicts-and-what-we-can-do-to-break-the-cycle.

We Are Social, & Hootsuite. (2024). *Digital 2024: Global overview report*. In . https://datareportal.com/reports/digital-2024-global-overview-report.

Williams, K. D. (2009). Ostracism: A temporal need-threat model. In M. P. Zanna (Ed.), *Advances in experimental social psychology, 41* pp. 275–314). Elsevier Academic Press.

Wolfers, L. N., & Karsay, K. (2024). The smartphone as physical object: Advancing the debate on problematic smartphone use. In T. von Pape, & V. Karnowski (Eds.), *The mobile media debate: Challenging viewpoints across epistemologies* (pp. 37–51). Routledge.