

The use of social web applications as a functional alternative in loneliness coping: investigating the plausibility of a model of compensatory Internet use

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Andreas Reißmann aus
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Gutachter (Betreuer): Prof. Dr. K. W. Lange

Gutachter: Prof. Dr. P. Fischer

I used to think that the worst thing in life was to end up alone. It's not. The worst thing in life is to end up with people who make you feel alone.

(Robin Williams)

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List of abbreviations

AA *Ambulatory Assessment*

ADHD *Attention-Deficit/Hyperactivity Disorder*

ARD *Arbeitsgemeinschaft der öffentlich-rechtlichen Rundfunkanstalten*

ASRS *ADHD Self-Report Scale*

ASSIST *Alcohol, Smoking and Substance Involvement Screening Test*

ASSIST_alcohol *Alcohol, Smoking and Substance Involvement Screening Test: alcohol abuse subscale*

ASSIST_cannabis *Alcohol, Smoking and Substance Involvement Screening Test: cannabis abuse subscale*

ASSIST_nicotine *Alcohol, Smoking and Substance Involvement Screening Test: tobacco abuse subscale*

BFAS *Bergen Facebook Addiction Scale*

BMI *Body Mass Index*

briefCOPE *Short form of Carver's Coping Inventory*

C1_social *Coping Inventory: social support seeking subscale*

C2_self-reproach *Coping Inventory: self-reproach subscale*

C3_religion *Coping Inventory: religious coping subscale*

C4_humour *Coping Inventory: humorous coping subscale*

C5_Internet use *Coping Inventory: distractive Internet use subscale*

C6_active *Coping Inventory: active problem-solving subscale*

CATI *Computer-Assisted Telephone Interview*

CMC *Computer-Mediated Communication*

DSM *Diagnostic and Statistical Manual of Mental Disorders*

DSM-5 *Diagnostic and Statistical Manual of Mental Disorders, 5th revision*

DSM-IV *Diagnostic and Statistical Manual of Mental Disorders, 4th revision*

EFA *Exploratory Factor Analysis*

ESM *Experience Sampling Methodology*

ESP *Experience Sampling Program*

GAD-7 *Generalized Anxiety Disorder Scale*

GPIU *Generalized form of pathological Internet use*

GSE-6 *Short Form of the Global Self Efficacy Scale*

HPA *Hypothalamic-Pituitary-Adrenal*

I-8 *Impulsive Behavior Scale-8*

I-8_persev *Impulsive Behavior Scale: perseverance subscale*

i-8_premed *Impulsive Behavior Scale: premeditation subscale*

I-8_sensation *Impulsive Behavior Scale: sensation seeking subscale*

I-8_urgency *Impulsive Behavior Scale: urgency subscale*

ICC *Intraclass Correlation*

IP *Internet Protocol*

KMO *Kaiser-Meyer-Olkin measure of sampling adequacy*

LPB *Strain because of Career-related Problems Scale*

LPB-inf *Strain because of Career-related Problems Scale: lack of information subscale*

LPB-job *Strain because of Career-related Problems Scale: occupational pessimism subscale*

LPB-sec *Strain because of Career-related Problems Scale: career-choice insecurity subscale*

LSC *Loneliness Scale*

M1_fun *Internet Motive Scale: Fun & Relaxation Subscale*

M2_inf *Internet Motive Scale: Information & Learning Subscale*

M3_soc *Internet Motive Scale: Social & Personal Unfolding Subscale*

Mini-SPIN *Mini Social Phobia Inventory*

ML *Maximum Likelihood*

MLS *Multidimensional Loneliness Scale*

MMT *Mood Management Theory*

MSPSS *Multidimensional Scale of Perceived Social Support*

MTUAS *Media Technology Usage and Attitudes Scale*

PDA *Personal Digital Assistant*

PHQ-9 *Depression Scale of the Patient Health Questionnaire*

PSS *Perceived Stress Scale*

REML *Restricted Maximum Likelihood*

RSES *Rosenberg Self-Esteem Scale*

SAS *Statistical Analysis Software*

SES *Socioeconomic Status*

SIAT *Short Form of the Internet Addiction Test*

SNS *Social Network Site*

SOEP *Socioeconomic Panel*

SPIU *Specific form of pathological Internet use*

SPSS *Statistical Package for the Social Sciences*

SWLS *Satisfaction with Life Scale*

TCP *Transmission Control Protocol*

U&G *Uses and Gratifications (Account)*

U-Bogen 24 *Short version of the Insecurity Questionnaire by Ulrich de Muynck & Ulrich*

WHO *World Health Organization*

WWW *World Wide Web*

ZDF *Zweites Deutsches Fernsehen*

Summary

Loneliness is a negative psychological experience that results from a perceived lack of supportive and intimate social relationships. While normative throughout development, the experience nonetheless may be indicative of psychosocial maladjustment in the context of ongoing developmental tasks. Moreover, social isolation and loneliness have been shown to be associated with increased mortality, physical, and mental health problems. The university context is especially attractive for studies of loneliness, since the transitions afforded by university entry and the normative expectations concerning the adoption of a vocational identity represent major stressors in emerging adults' lives. Social integration might represent a major buffer, a correlate of mastering such developmental tasks. Just as with every stressor, the occurrence of loneliness implies the adoption of coping strategies aimed at overcoming the experience or its underlying causes. Engaging in activities on the Internet might be an effective way of loneliness coping, given that it offers manifold and convenient ways to establish and maintain social relationships. The studies reported in this work investigate the significance of social-compensatory Internet use for the lonely within a broader framework of media uses and effects. The "Uses and Gratifications" approach was meant as a conceptual basis for the present studies, since it puts a large emphasis on the motivational dimension of media use and posits that use behaviors are active and serve the gratification of psychological needs.

Since loneliness has been associated with negative Internet effects such as Internet addiction, the importance of behavioral engagement in social web applications for establishing and maintaining such addictive use behaviors was investigated (Study 1, Chapter II). A large sample of university students was recruited using an online survey, and they were assessed for a broad variety of psychosocial, mental health, and Internet use indicators including loneliness and Internet addiction. Based on existing theory and empirical findings, loneliness was hypothesized to be indirectly associated with Internet addiction due to social-compensatory Internet use motives. The strength of this indirect effect, in turn, was hypothesized to be contingent on the level of social web application use endorsed by the individual. Study hypotheses were largely supported by the obtained results. Not only could this study show the specificity of social-compensatory use motives in mediating loneliness effects on Internet addiction, but also their contingency on the actual extent of social web application use. Albeit small in effect, the identified moderation of loneliness effects suggests that lonely people who effectively use higher levels of social web applications show a stronger social-compensatory use orientation. This, in turn, translates into higher levels of addictive Internet use. These findings suggested that lonely people are indeed driven toward the Internet in their attempt to gratify needs un-

met in real life. Moreover, the Internet would seem to be a more addictive environment for those who deliberately seek to compensate for social relationship deficits in the real world by engaging in high levels of social web application use. The implications and limitations of these findings will be discussed and complemented by suggestions for future studies of Internet addiction in the context of loneliness.

Since loneliness has been associated with media use as a coping strategy, the occurrence of such coping through social media was investigated within the context of everyday life (Study 2, Chapter III). Adopting an experience sampling methodology, a convenience sample was derived within the university context and equipped with handheld PDA devices for digitized data recordings. Subjects were to assess their psychological states, social contacts, and uses of the social network site Facebook several times a day for a study period of two weeks. Moreover, psychosocial trait indicators and information concerning Internet use were recorded through laboratory-based assessments. Building on existing theory and empirical findings, a conceptual distinction was made between the acute experience of loneliness in a given situation (i.e. state loneliness) and more chronic and cross-situational forms of the experience (i.e. trait loneliness). It was hypothesized that state feelings of loneliness would lead to an increase in the subsequent use of Facebook. Since social media might represent important functional alternatives for the gratification of social needs in the lonely, the strength of these situation-level contingencies was hypothesized to be contingent on trait levels of loneliness. It was expected that lonely (trait) persons would show an increased inclination to social media when feeling (state) lonely. Data were analyzed within a multilevel analytic framework, and major hypotheses were confirmed. Albeit small in effect, state feelings of loneliness were indeed predictive of subsequent increases in Facebook use. Moreover, trait loneliness moderated the strength of state loneliness effects, as hypothesized. Considering the moderating role of other person-level traits such as gender, social insecurity, and Facebook addiction levels, the meaning and the limitations of these findings will be discussed.

While the studies reported here largely support the notion of compensatory Internet use in the lonely and show how psychological and media concepts can be meaningfully integrated to aid such study, several open issues remain. The reported effects were of rather small magnitude and the studies were largely cross-sectional in nature, hence not allowing for definite causal interpretations. Against the background of identified conceptual and methodological limitations, several suggestions for future studies of social-compensatory Internet use, whether framed in terms of behavioral addictions or of maladaptive coping, will be made.

I. Coping with loneliness through the use of the Internet: a construct analysis and general introduction

Systematic research on loneliness as a psychological correlate of various forms of social isolation was scarce until the 1970s (Marangoni & Ickes, 1989; Peplau & Perlman, 1982a). Yet, even the earliest accounts linked the experience of loneliness to potentially inept ways to overcome the acute experience or, more importantly, its underlying causes (e.g. Peplau & Perlman, 1982b; Rubins, 1964). Among the then and now discussed ways was the use of mass media such as television (e.g. forming surrogate relationships with telenovela characters in the so-called “para-social” interaction), radio, and even more importantly nowadays, the Internet (Rubins, 1964; Schwab, 1997; Seepersad, 2004). But before discussing the psychological significance of such media use and providing any empirical evidence regarding its prevalence and consequences, a more general outline of the relevant constructs seems warranted.

Therefore, the first part of this chapter will provide the reader with the fundamentals of loneliness as a psychological phenomenon. Starting with an attempt at giving a definition and overview of the many theoretical accounts available, an epidemiology of loneliness will be provided (with a special emphasis on college-age students). A final subsection will deal with the different ways of coping with loneliness, focusing on the use of mass media.

The second part of the chapter will discuss the effects of mass media communication from a media and communication science perspective and introduce the Uses and Gratifications Approach (Katz, Blumler, & Gurevitch, 1973). This rather loose theoretical framework for the explanation of media effects from the perspective of an active audience provides suitable tools for the analysis of the possible role loneliness plays in promoting media use. In this respect, the communicative context of the Internet will be analyzed more thoroughly with regard to the potential gratifications it offers to the lonely. While understanding antecedent and concomitant factors in the use of mass media is certainly of great scientific value, there is yet another side of the coin that also deserves attention, namely the (potentially negative) consequences of media use. A Uses and Dependency Model of Mass Communication (Rubin & Windahl, 1986) will be outlined to serve as an overarching conceptual heuristic for the present discussion.

This chapter will close with a summary of the relevant theoretical and empirical aspects that also served as the underlying rationale and guiding principles for the empirical studies in the chapters to follow.

1. Loneliness

The ability of man to establish and nurture stable and satisfying social relationships is believed by some to be the result of evolutionary selection processes, which favored those of our ancestors who were able and willing to cooperate with others in a dangerous world of scarce resources (J. T. Cacioppo, Hawkley, et al., 2006). The ability to experience loneliness in situations of social separation from others may have motivated even the physically strongest of our hunter-gatherer ancestors to return to their relatives and allies. In this way, individuals' experience of loneliness may have helped their own genetic offspring (themselves carrying the "loneliness genes") to survive (op. cit.).

Thinking about the adaptiveness of loneliness in terms of evolutionary fitness should not detract from the individual significance of the experience, its constituting aspects (emotional, cognitive, motivational, behavioral, and biological), as well as factors associated with its occurrence (see Heinrich & Gullone, 2006 for review). In modern western societies, loneliness is discussed as a significant problem associated with or predictive of various negative health outcomes including reduced immune functioning, steeper cognitive decline in old age, the occurrence of depressive symptoms, and poorer general health (Hawkley & Capitanio, 2015). From a clinical point of view, the consideration of loneliness as an important aspect of client psychosocial functioning seems worthwhile in terms of both diagnostics and treatment (Schwab, 1997).

1.1 Definition and theoretical conceptualizations of loneliness

As reviewed extensively elsewhere (Peplau & Perlman, 1982b; Schwab, 1997), there is a host of different definitions of the term "loneliness," many of which are not strictly phenomenological, but already biased toward constituting elements of underlying theoretical accounts. However, there are some core elements that these definitions have in common (Peplau & Perlman, 1982b). First, scholars seem to agree that the experience stems from a paucity of social relationships and/or a lack of intimate relationships (such as a partner). Second, the experience as such is rendered subjective and thus is not directly related to objective states of social isolation (e.g. feeling lonely in a crowd; not feeling lonely despite a lack of social contacts in everyday life). Third, the experience itself is aversive, distressing, and linked to a complex set of negative emotions and cognitions (Peplau & Perlman, 1982b; Rubenstein & Shaver, 1982a). It is this inherent averseness of the experience that helps to separate the term "loneliness" from neutral terms such as "aleness" (the mere situational state of being alone), or positively connoted terms such as "solitude" (as a form of aleness that is actively and voluntarily sought) (Coplan & Bowker, 2014; Schwab, 1997). Furthermore, loneliness should not be equated with

“social isolation” or a “lack of social support,” as these terms refer to rather objective states of lacking social integration and are not necessarily linked to the experience of loneliness (Schwab, 1997).

For present purposes, the definition of loneliness, as given by Schwab (1997), will be adopted. Hence, loneliness is defined as “*the disquieting awareness of internal distance between oneself and others and the accompanying desire for connectedness in satisfying, meaningful relationships*” (Schwab, 1997, p. 22; translated by the author). Note that Schwab (1997) adds a motivational aspect to the experience (i.e. the desire for connectedness), which aims at ameliorating or remedying the causes of the disquieting experience. This aspect is of relevance in considering the ways of coping with the experience (see Section I.1.3) and in discussing potential mechanisms of etiologic relevance (see below).

Having defined the central aspects of the experience of loneliness, yet another step should involve an attempt at defining the broader spectrum of symptoms that may surround it. In this respect, there have been attempts at defining the “*prototype of a lonely person*” (Heinrich & Gullone, 2006; Horowitz, French, & Anderson, 1982). The term “prototype” refers to identified clusters of features at the affective, cognitive, and behavioral levels that are commonly associated with the experience of loneliness, although they do not necessarily characterize the unique experience of a lonely individual (Heinrich & Gullone, 2006). *Affective components of the loneliness experience* may involve four different clusters of feelings, namely desperation, depression, impatient boredom, and self-deprecation (Heinrich & Gullone, 2006). While the desperation cluster involves feelings related to anxiety, hopelessness and panic, the depression cluster is comprised of feelings of sadness, emptiness, and rejection (op. cit.). The impatient boredom cluster involves feelings of impatience, anger, and restless frustration, while the self-deprecation cluster entails feelings of inferiority, awkwardness, shame, and unattractiveness (op. cit.). At the *cognitive level*, loneliness has consistently been associated with negative conceptions of and beliefs about oneself, commonly referred to as low self-esteem (op. cit.). At the same time, there have been indications of heightened vigilance about signs of social threat and rejection (op. cit.). Such a notion accords with empirical findings of greater negativity toward others in the lonely, such as regarding others as less supportive and trustworthy (Rotenberg, 1994; Vaux, 1988). Other common cognitive features are maladaptive cognitive attributions regarding the causes of the experience, such as rooting it in unchangeable and internal characteristics of the affected person such as shyness or other negative personality traits (Heinrich & Gullone, 2006). At the *behavioral level*, lonely persons have been found to potentially engage in less competent and effective behaviors in social interactions and to cope

in dysfunctional and more passive ways with stress and loneliness (Heinrich & Gullone, 2006; see also Section I.1.3).

When trying to explain the experience, most theories of loneliness have taken a deficit perspective in their attempt to explain the occurrence and chronicity of the experience from problems and deficiencies in different domains (Marangoni & Ickes, 1989; Schwab, 1997). There are many proponents of a ***social needs perspective***, some of which relate early childhood experiences to the development of intrapsychic conflicts or problematic patterns of attachment, hampering social skills and thus giving rise to the frequent and often chronic experience of loneliness (Hazan & Shaver, 1987; Hojat, 1989; Perlman & Peplau, 1982; Rubenstein & Shaver, 1980). Other need theorists contend that one should pay special attention to the current social relationships and the quality of their social provisions, in order to arrive at a better understanding of the loneliness experience (DiTommaso & Spinner, 1997; D. Russell, Cutrona, Rose, & Yurko, 1984; Shaver & Buhrmester, 1983; Weiss, 1973, 1974). Yet other theorists adopt a ***cognitive process perspective***, since it is a perceived discrepancy between one's opted and actual social relationships that would give rise to the experience (de Jong-Gierveld & Kamphuls, 1985; de Jong-Gierveld & van Tilburg, 1999; Peplau, Miceli, & Morasch, 1982; Peplau & Perlman, 1982b; Perlman & Peplau, 1982). Based on such an account, the key to understanding the ways a person deals with loneliness is the attribution to the underlying reasons for the experienced loneliness. When rooted in stable (rather than situational), internal (rather than external), and uncontrollable (rather than resolvable by oneself) causes, the experience of loneliness is said to induce feelings of hopelessness and depression, and change attitudes and expectations regarding one's social self in the long run, which in itself might affect future social behaviors (Peplau et al., 1982). Directly related to this perspective is a ***social skill account of loneliness***, which posits that a lack of adequate social skills and interpersonal behavioral strategies undermines the establishment and nurturance of need-satisfying interpersonal relationships, eventually giving rise to the experience of loneliness (W. H. Jones, Hobbs, & Hockenbury, 1982; Marangoni & Ickes, 1989; Schwab, 1997). Indeed, lonely people have been found to rate their social skills as deficient and their social relationships as being of lower quality (DiTommaso, Brannen-McNulty, Ross, & Burgess, 2003; Duck, Pond, & Leatham, 1994; Shaver, Furman, & Buhrmester, 1985). Furthermore, these self-perceptions have been affirmed by observer ratings of deficient social skills and problematic interaction behaviors such as a reduced self-disclosure and a lower level of interpersonal attentiveness in the lonely (Ignatius & Kokkonen, 2007; W. H. Jones et al., 1982; Shaver et al., 1985; Stokes, 1987). Other factors that have been discussed in relation to deficient social skills and the accompanying risk

of loneliness include personality characteristics and traits such as low self-esteem, shyness, depression, and introversion (Marangoni & Ickes, 1989).

To date, there has been no single all-encompassing theory of loneliness that could integrate the many multifaceted and complex aspects preceding, accompanying, or following from the experience (Peplau & Perlman, 1982b; Perlman & Peplau, 1982; Schwab, 1997). This makes the adoption of eclectic accounts seem reasonable. One example for such an account is the evolutionary one proposed by Cacioppo and colleagues (J. T. Cacioppo, Hawkley, et al., 2006), which is amenable to many of the psychological positions mentioned above. At the same time, this model framework aims at integrating interdisciplinary approaches in the fields of neuroscience (S. Cacioppo, Capitanio, & Cacioppo, 2014) and neuroendocrinology (J. T. Cacioppo, Cacioppo, Capitanio, & Cole, 2015) to further our understanding of loneliness. Within this account, the experience of loneliness in relation to instances of social separation from others is of evolutionary significance. This experiential mechanism drives organisms to form, maintain, and re-instate social bonds irrespective of their momentary value for self-interests. While framing the evolutionary process generally as one of the “selfish gene” favoring organismic compositions and behaviors that ensure survival of the individual (thereby increasing its overall chance of reproduction), Cacioppo et al. (2006) point out that this state of affairs might be more complex in the human species: Compared to lower species, the period of caregiver-dependency is quite long among human offspring, as the development of life-ensuring abilities (mainly rooted in human cognitive ability) takes very long. This, together with small litter sizes, may have made it more adaptive to ensure the survival of one’s offspring through the evolution of mechanisms for social connection and care (J. T. Cacioppo, Hawkley, et al., 2006). This neurobiological mechanism, involving social pain in response to disconnection and social reward in response to contact reinstatement, is hypothesized to be similar to that of physical pain. Furthermore, chronic social pain is similar to a stressor that leads to an (chronically) elevated activity in the biological systems known to mediate the human stress response such as the sympathetic nervous system or the hypothalamic–pituitary–adrenal (HPA) axis (J. T. Cacioppo, Hawkley, et al., 2006). This might be of significance in explaining many of the health consequences and correlates of (chronic) loneliness that have been established (see Section I.1.2.3).

1.2 Epidemiology of loneliness in emerging adulthood

Experience sampling studies suggest that there is an age gradient regarding time spent alone. While relatively little time is spent alone during childhood years (17%), this ratio increases throughout life and peaks at about 50% of one’s time spent alone in retired adults (Larson, 1990). Comparatively, time ratios spent in solitude both for adolescents (26%) and adults

(29%) are rather low. Nevertheless, it is during adolescence that the mere situational state of being alone is most strongly connected to the situational experience of loneliness, which gives rise to many potential interpretations (Larson, 1990). This stronger link may be due to the normative developmental pressures of identity formation (Erikson, 1968, cited after Larson, 1990, p. 171). Alternatively, it may result from a heightened social sensitivity regarding the conformation to cultural expectations during this age period. This latter interpretation is consistent with the finding that the link between aloneness and experienced loneliness was especially strong when adolescents reported to be alone on Friday or Saturday evenings, times when it is increasingly normative to be together with peers (Larson, 1999).

Findings such as these clearly point to the fact that loneliness research needs to be conducted in developmentally as well as culturally sensitive ways in order to arrive at a better understanding of the experience. Therefore, the following subsections will first deal with the developmental significance of the period of young adulthood and the challenges that university students have to face. Second, an overview of key epidemiological findings related to the more severe forms of loneliness will be given, including an estimate of the prevalence and the sociodemographic, physical, and mental health correlates of the experience.

1.2.1 Developmental challenges of emerging adulthood and university life

The concept of emerging adulthood, as proposed by Arnett (2014), refers to the age period of about 18–30 years and tries to capture the period of prolonged identity exploration in terms of educational, vocational, and familial/relationship affairs. For post-materialist cultures, in which the fulfillment of basic material needs is no longer a matter of concern, the concept seeks to explain many of the key sociological findings related to a postponement in the adoption of adult roles, as observable in modern western societies including Europe (Douglass, 2007). Among these findings is an extended period of education through increasing rates of university enrollment. This, in turn, postpones the accomplishment of salient developmental tasks of young adulthood, such as leaving home and establishing an independent household with a stable partner, obtaining a professional qualification, adopting a vocational role, reaching financial independence, and assuming responsibility at a societal level (Arnett, 2014; Douglass, 2007; Seiffge-Krenke, 2009).

Research has consistently shown that the transition to university contexts presents major challenges regarding the development of a student learner identity/sense of belonging (Briggs, Clark, & Hall, 2012) and the establishment of satisfying social relationships in less stringent contexts than those during the school years (Asher & Weeks, 2014). Moreover, this time period is frequently associated with psychosocial and mental health problems (Berger, Franke,

Hofmann, Sperth, & Holm-Hadulla, 2015; Hahne, 1999; Holm-Hadulla, Hofmann, Sperth, & Funke, 2009; Hunt & Eisenberg, 2010; Kreß, Sperth, Hofmann, & Holm-Hadulla, 2015; Rückert, 2015). Furthermore, indicators of social adjustment (perceived levels of social support; levels of social involvement in the university context) have consistently been shown to be associated with academic achievement (Richardson, Abraham, & Bond, 2012; Robbins et al., 2004), university retention (Robbins et al., 2004) and satisfaction with college in emerging adult populations (DeBerard, Spielmans, & Julka, 2004; Hunt & Eisenberg, 2010; Riggio, Watring, & Throckmorton, 1993; Robbins et al., 2004). Importantly, these social aspects predicted retention beyond more traditional predictors such as socioeconomic status, high school grade point average or university aptitude test scores (Robbins et al., 2004). It has to be stated, however, that these effects were of rather small magnitude and other indicators of psychosocial functioning and study skills such as academic goals, academic self-efficacy and skills proved to be stronger predictors of both retention and achievement (Richardson et al., 2012; Robbins et al., 2004). Nonetheless, findings such as these underline the importance of psychosocial functioning in the university context and its consideration in understanding student adjustment to university.

While the work of Shaver et al. (1985) and Cutrona (1982) focused on the time course in the (presumed) normative experience of loneliness during transition to university contexts, other investigations focused on epidemiological aspects such as the prevalence and correlates of more chronic forms of loneliness and/or social contact problems.

1.2.2 Prevalence and sociodemographic correlates of loneliness

Early work on loneliness in the US (Rubenstein & Shaver, 1980; Rubenstein, Shaver, & Peplau, 1979) focused on its prevalence, paying attention to putative sociological as well as psychological determinants. A general finding from this work is that almost everyone reports to feel lonely at least sometimes (only 6% of more than 25,000 respondents to a newspaper survey reported to never feel lonely; see Rubenstein et al., 1979). Furthermore, a total of 15% of respondents stated that they felt lonely most or all of the time (Rubenstein et al., 1979). However, findings imply that the prevalence of the experience is dependent on a host of factors (Peplau & Perlman, 1982a; Rubenstein & Shaver, 1980; Schwab, 1997). These will be reviewed here in some detail, with special emphasis on a discussion of loneliness in young adulthood and the transition to college and university.

The **prevalence of loneliness** in Germany was reviewed by Döring (1997). She used data from several representative panel surveys conducted since 1949 and found that the experience of loneliness was quite frequent in postwar Germany (19% of respondents indicating to

feel lonely frequently in 1949) and declined until the 1970s (7% of respondents indicating to feel lonely frequently). Since then, the numbers remained quite stable and even dropped to as low as 5% of Germans reporting the frequent experience of loneliness in 1995 (Döring, 1997). This finding is substantiated by more recent data taken from the 2008 wave of the “Socioeconomic Panel” (SOEP), which indicates that 7.6% of the German population aged 16 or older reports to feel lonely frequently (TNS Infratest Sozialforschung, 2009). Thus, the prevalence of severe forms of loneliness appears to have been quite stable at a population level for the last few decades. However, when using a less stringent criterion and data for the same question wording (i.e. data from SOEP 2008 and from the Wohlfahrtssurvey), the reported prevalence of frequently experienced loneliness for the years 1978–98 rises to about 15% and is quite stable for this time period (with the exception of East German respondents in the early years after the Fall of the Wall) (Schöb, 2001). Using the 2008 SOEP data in this way, the prevalence of loneliness becomes almost 23% (TNS Infratest Sozialforschung, 2009), which is suggestive of an increase in overall levels of experienced loneliness in Germany, though this is not related to an increase in severe/chronic forms of the experience (see above).

There is strong evidence that the prevalence of loneliness differs across age, and this may be related to a host of factors such as shifts in maturation or adopted social roles, with accompanying risks for social disconnection as well as opportunities for social reconnection (Qualter et al., 2015). Most interestingly, there seems to be a bimodal course of loneliness across ontogeny, with peaks in adolescence/young adulthood (Rokach, 2000) and in old age (Qualter et al., 2015), with relatively low and stable rates of loneliness throughout adulthood and rather low rates during the childhood years (Qualter et al., 2015; Victor & Yang, 2012). When looking for age-specific data regarding the prevalence of loneliness in Germany, the author was unable to locate current findings. The “newest” data found were derived from the Wohlfahrtssurvey in 1998 and thus must be treated with some caution. Nevertheless, the trend analysis from 1978 to 1998 allows for a consistency analysis of age differences across the last few decades (see Table I.1). These data are largely consistent with international (Qualter et al., 2015; Victor & Yang, 2012), although the youngest age group (18–34 years) does not peak as might be expected. This could be because this age grouping collapses across different normative age periods (late adolescence/emerging adulthood and adulthood) to a certain extent and thus is rather insensitive to the respective developmental periods from a psychological point of view. Nonetheless, there clearly appears to be a need for updated information regarding the prevalence of loneliness (Heinrich & Gullone, 2006), both at national and international levels.

Table I.1

Prevalence of loneliness in Germany across different age groups (data represent percentages and were taken from Schöb, 2001)

Age (y)	1978	1980	1984	1988	1993	1998
18–34	13	17	16	10	10	14
35–59	14	15	14	9	10	13
60+	27	25	24	26	22	20

Although not directly assessing the prevalence of loneliness, Hahne (1999) reported a 12-month prevalence of subjectively perceived contact difficulties in 12.4% of German university students. In this investigation involving more than 20,500 participants, social contact difficulties ranked seventh among the most prevalent problems reported by students, after achievement problems, low self-esteem, depressive mood, test apprehension, emotional lability, and anxiety. Most interestingly, this problem prevalence increased with age and the duration of study (Hahne, 1999), which directly contradicts the conceptualization of loneliness as a normative and transient experience during the transition to university (see above). On the contrary, the course of this increase might be indicative of ongoing developmental pressures that students have to face (Hahne, 1999). In a “netnographic” study, Janta, Lugosi, and Brown (2014) recently provided qualitative evidence for the existence of loneliness among doctoral students and discussed individual as well as institutional ways to help in coping with the experience in the academic postgraduate context.

The discussed **sociodemographic correlates of loneliness** include *gender*, although the precise relation is presently unknown and might depend on methodological as well as social aspects (Adamczyk, 2016; Borys & Perlman, 1985; Döring & Bortz, 1993; Heinrich & Gullone, 2006; Koenig & Abrams, 1999; Peplau & Perlman, 1982a; Schöb, 2001; Schwab, 1997; Victor & Yang, 2012). Unsurprisingly, the relationship between *marital status* (i.e. being unmarried, divorced, or widowed) and loneliness is rather straightforward (Schwab, 1997; Victor & Yang, 2012; West, Kellner, & Moore-West, 1986). However, there are indications that loneliness may be common in certain life circumstances directly related to marriage and early parenthood (C. S. Fischer & Phillips, 1982). Complicating things even more, some social provisions (e.g. network of friends) might substitute for others related to partnerships when they are (temporarily) unavailable (Adamczyk, 2016). As reviewed by Schwab (1997), indicators of *socioeconomic status* (SES) are related to the experience of loneliness. People with a low educational and socioeconomic status frequently report to feel lonely. Likewise, unemployment seems to be a risk factor for the experience of loneliness in both adolescent and adult populations (Creed & Reynolds, 2001; Schwab, 1997), although this relation might depend on attitudinal and personality aspects, and deserves further study (Schwab, 1997).

Putting things together, there clearly is evidence for an association of loneliness with factors at the sociodemographic level. Furthermore, loneliness clearly presents a matter of concern in the age period of emerging adulthood, although there appears to be a need for updated and representative studies of the prevalence of loneliness in this realm.

1.2.3 Comorbidities of loneliness

A lack of social ties has been implicated as a significant factor in the development of a diverse range of both physical and mental health conditions (Coyne & Downey, 1991; Hawkley & Cacioppo, 2010; Hawkley & Capitano, 2015; Heinrich & Gullone, 2006; Kessler, Price, & Wortman, 1985; Petite et al., 2015). The effect also has been shown to occur in children and adolescents coming from “high-risk populations” during their transition to adulthood (Burt & Paysnick, 2012), hence implying a stress-buffering effect of social ties. Although this health-related dimension of social ties has been well-established, the underlying social and psychological processes mediating such effects on health are rather badly understood, as discussed elsewhere (Hawkley & Cacioppo, 2003; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Kessler et al., 1985; Thoits, 2011; Uchino, Bowen, Carlisle, & Birmingham, 2012; Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

Lower levels of social ties, whether framed in terms of lacking social support, experienced loneliness, an objective state of social isolation, or complex combinations of indicators, are longitudinally associated with an *increased risk of overall mortality due to physical conditions* (Holt-Lunstad et al., 2015; Holt-Lunstad, Smith, & Layton, 2010). This relationship does not seem to be confounded by influences related to initial health status, mental health problems (depression, anxiety) or lifestyle behaviors (Holt-Lunstad et al., 2015; Holt-Lunstad et al., 2010). The risk-increasing effects of loneliness were assessed separately in these analyses and were compared in magnitude to those of Grade 2 and 3 obesity (Holt-Lunstad et al., 2015). Most interestingly, this mortality-increasing effect was moderated by age, in that the mortality-increasing effect of low-quality social ties was stronger in middle-aged adults than in older adults. This clearly points to the importance of considering social ties in health-related research before old age (Holt-Lunstad et al., 2015).

As reviewed extensively elsewhere, loneliness is associated with and even *predictive of a host of physical conditions* across age groups, including young adults (e.g. Goosby, Bellatorre, Walsemann, & Cheadle, 2013). Some of the identified conditions are increased difficulty in sleep, cardiovascular diseases, high body-mass index (BMI)/obesity, stroke, and abnormalities in neuroendocrine and immune functioning (Goosby et al., 2013; Hawkley & Cacioppo, 2010;

Hawkley & Capitano, 2015; Heinrich & Gullone, 2006; Pettitte et al., 2015; Uchino et al., 1996; West et al., 1986).

Additionally, there is *strong evidence for an association between mental health problems and the quality of a person's social ties* (Coyne & Downey, 1991; Kessler et al., 1985; Mikulincer & Shaver, 2012; Sroufe, Duggal, Weinfield, & Carlson, 2000). Among the established associations of loneliness with mental disorders are: Personality disorders (e.g. borderline personality disorder), schizophrenia, substance abuse, eating disorders (obesity, anorexia and bulimia nervosa), cognitive decline and dementia, (social) anxiety disorder, and depression (for review, see Hawkley & Cacioppo, 2010; Hawkley & Capitano, 2015; Heinrich & Gullone, 2006; Schwab, 1997). The most intensively studied link in this respect is the one between loneliness and depression, which has been discussed and established in either direction (J. T. Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006). There is considerable evidence that loneliness longitudinally predicts an increase in depressive symptoms both in older age groups (J. T. Cacioppo, Hawkley, & Thisted, 2010) and in younger age groups including adolescents (Burt, Obradović, Long, & Masten, 2008; A. C. Jones, Schinka, van Dulmen, Bossarte, & Swahn, 2011; Qualter, Brown, Munn, & Rotenberg, 2009). The precise relationship between a lack of social ties and psychopathology is not totally clear, although it can be expected to be bidirectional in nature (Mikulincer & Shaver, 2012; Sroufe et al., 2000). Some authors discuss the inability to establish (need-fulfilling and supportive) social ties as a risk factor for the development of psychopathology (Coyne, Burchill, & Stiles, 1991; Coyne & Downey, 1991; Mikulincer & Shaver, 2012; Nelson, Leibenluft, McClure, & Pine, 2005; Sroufe et al., 2000). Contrary to this, others point to the reverse and assert that psychopathology may put people at risk for more instable social ties of lower quality, possibly by hampering the development and use of adaptive social skills (Breslau et al., 2011; Keltner & Kring, 1998; Kessler, Walters, & Forthofer, 1998).

1.3 Coping with loneliness

Clearly, the situational experience of loneliness might drive a person toward remedial action or other ways to cope with the aversive experience. Adopting the position of Weiss' (1973, 1974) needs model of loneliness, one could predict rather straightforward and aimful attempts at (re-)establishing the specific social provisions a lonely person is temporarily lacking. As might be expected, however, things are far more complex and certainly deserve a more detailed discussion, which will give special weight to the use of media as a means of coping with the experience of loneliness.

1.3.1 *Taxonomies of coping with loneliness*

Coping behavior, defined herein as any attempt generally aimed at managing stress (Holahan & Moos, 1987), can be roughly typified into two broad classes of strategies, namely problem-focused and emotion-focused ones (Lazarus & Folkman, 1984, cited after Holahan & Moos, 1987, p. 946). While *problem-focused strategies* directly aim at tackling the source of stress behaviorally or cognitively, *emotion-focused strategies* aim at modifying the (affective) consequences of stress rather than its actual source and may even be avoidant in nature.

In two adult samples of depressed patients and community controls, Holahan and Moos (1987) found evidence for a strong temporal stability of emotion-focused/ avoidant coping strategies (r values above .50 in both samples over a period of one year). Furthermore, they found considerable evidence for associations between social background characteristics (family income, education), personality aspects (self-confidence, easygoingness) and contextual factors (negative life events, family support) and the coping strategies used. Thus, avoidance coping was associated with lower levels of education and income in both samples, with less self-confidence and easygoingness and with more negative life events and less family support. Furthermore, controlling for T1 avoidance coping, variance in avoidance coping at T2 one year later was incrementally predicted by the personality characteristics and the contextual factors in the predicted ways. Holahan and Moos (1987) noted that family support appeared to be an especially strong predictor of avoidance coping (in case of low support). Since then, the link between low levels of social support, the subjective experience of loneliness and the adoption of avoidant coping behaviors has received considerable empirical support (J. T. Cacioppo et al., 2000; Ditommaso, Brannen, & Best, 2004; Hörchner, Tuinebreijer, Kelder, & van Urk, 2002; McWhirter, Besett-Alesch, Horibata, & Gat, 2002; Schreurs & de Ridder, 1997; Shulman, 1993; Terry, 1991).

Therefore, the presence of loneliness implies the adoption of less social and more avoidant and maladaptive coping behaviors in the face of a diverse range of stressors. But does loneliness predict maladaptive coping with the (stressful) experience of loneliness itself? Indeed, this is what the empirical evidence has found so far. When asking a normative sample of people from the general population about their behavioral responses to the experience of loneliness, Rubenstein and Shaver (1982a) found participants' responses to load onto four factors of coping behaviors: sad passivity, active solitude, spending money and social contact (see Table I.2 for corresponding item examples). They found that the apparently maladaptive index of sad passivity was positively and most strongly correlated with a measure of loneliness ($r = .42$), while the social contact index (indicating direct, problem-focused coping) was negatively correlated with experienced levels of loneliness ($r = -.11$). Furthermore, sad passivity coping with

loneliness was inversely related to participant age ($r = -.23$), indicating a heightened prevalence of this type of coping in the younger age groups. The correlation between the adoption of sad passivity coping and levels of experienced loneliness was later substantiated in a sample of adolescents by Van Buskirk and Duke (1991).

This coping taxonomy has been replicated in large parts by subsequent studies using the original or adapted versions of the Rubenstein and Shaver (1982a) scale (D. Russell et al., 1984; Shaver et al., 1985; Van Buskirk & Duke, 1991). However, several alternative taxonomies of coping ranging from 2–11 classes of behaviors and cognitions have been suggested (Besevegis & Galanaki, 2010; Gerstein & Tesser, 1987; Mikulincer & Segal, 1990; Revenson, 1981; Rokach, 1990, 1999, 2000; D. Russell et al., 1984; Schoenmakers, van Tilburg, & Fokkema, 2012; Schwab, 1997). This heterogeneity of the findings should not be surprising, however, as different taxonomies were derived from a range of studies and statistical designs (including purely phenomenological and qualitative approaches) and from responses to differently predefined sets of coping items, hence also reflecting respective authors' views about ways to cope with loneliness. Nonetheless, a general finding derived from this literature is that lonely people engage in apparently dysfunctional, passive and emotion-focused ways of loneliness coping and that they tend to abstain from active, problem-focused strategies (Heinrich & Gullone, 2006; W. H. Jones & Carver, 1991; Rubenstein & Shaver, 1982a; Schwab, 1997). However, while the use of different media may be inherent in passive and avoidant coping strategies (see Table I.2), subsuming it with many different “oral” behaviors such as eating and substance use (Rubenstein & Shaver, 1982a) precludes precise information regarding its prominence and relative importance in coping with loneliness.

Table I.2

Clusters of different types of loneliness coping behavior with corresponding behaviors (according to Rubenstein & Shaver, 1982a)

Sad Passivity	Active Solitude	Spending Money	Social Contact
<i>Cry, Sleep, Sit and think, Do nothing, Overeat, Take tranquilizers, Watch television, Drink or get stoned</i>	<i>Study or work, Write, Listen to music, Exercise, Walk, Work on a hobby, Go to a movie, Read, Play music</i>	<i>Spend money, Go shopping</i>	<i>Call a friend, Visit someone</i>

1.3.2 Internet use as a means of coping with loneliness

Even among the earliest scientific discussions of loneliness coping, media attendance emerged as one of the many possible ways relieving from the situational averseness of the experience.

For example, Rubins (1964) noted: *“It may be through spectator-observer activity rather than direct participation, as in all the forms of entertainment watching; and indeed we have only to look at the vast entertainment industries which flourish because of such needs”* (Rubins, 1964, p. 159).

Indeed, later empirical study has shown that the use of media is among the most prevalent behaviors that participants indicate when asked about the behaviors they adopt to cope with loneliness. In a comparative interview study of Greek children visiting Grades 2, 4 and 6, Besevegis and Galanaki (2010) were able to show that behavioral distraction (including watching TV, listening to music, playing with toys and/or electronic video games) was among the most prevalent ways that children of all age groups coped with feelings of loneliness. Moreover, the prevalence of this kind of coping increased with age (from 51.7% of children in Grade 2 to 80% of children in Grade 6). Indeed, all identified studies that report information regarding individual item responses relating to media use also report that it is among the most prevalent behaviors that people resort to as a means of coping. The respective percentages for mixed media use (including TV and radio) items circle around 60% (Moore & Schultz Jr, 1983; Schwab, 1997) with numbers for television use ranging from 48 to 60% (Gerstein & Tesser, 1987; Rubenstein & Shaver, 1982b, cited after Jones & Carver, 1991, p. 408) and for music/radio listening between 15 and 66% (Gerstein & Tesser, 1987; Mikulincer & Segal, 1990; Rubenstein & Shaver, 1982a).

Other studies conducted in the field of media epidemiology analyzed the different uses, functions, and capacities the different mass media have for their recipients. In the representative German longitudinal study *“Massenkommunikation”* (Breunig & Ridder, 2015; Ridder & Engel, 2001; van Eimeren & Ridder, 2011), this type of functional analysis has been conducted for an array of psychological functions. Table I.3 gives an overview of these functional assessments and represents a time analysis of four media functions—fun, information, relaxation, and reduction of loneliness (see Breunig & Ridder, 2015; Ridder & Engel, 2005 for more thorough results). Television and radio can be considered “all-rounders” as they are rated by more than 75% of the respondents to be used for fun and relaxation as well as information purposes, and, to a lesser extent, to help alleviate feelings of loneliness (see Table I.3). Daily newspapers and the Internet are generally seen as being more niche-specific in that they are used mainly for obtaining information and having fun. However, neither of these two media vehicles is thought to be used for alleviating feelings of loneliness, and only a substantial minority reports on their use for relaxation purposes (see Table I.3). While almost all media functions appear to be relatively stable over the course of the past 15 years, television and radio seemed to be declining in their informational function (with a drop of roughly 10% over this

time period), while the Internet would seem to be gaining in relaxation and loneliness-alleviating function (5–9% increases).

Table I.3

Percentage agreement related to selected media use functions for television, radio, Internet and daily newspapers based on the general German population aged 14+ years (adapted from Breunig & Ridder, 2015; Ridder & Engel, 2005)

	2000	2005	2010	2015	
fun	84	83	81	79	TV
information	92	90	84	81	
loneliness reduction	26	22	26	25	
relaxation	79	79	77	78	
	2000	2005	2010	2015	
fun	90	90	86	85	Radio
information	86	84	80	77	
loneliness reduction	36	32	33	31	
relaxation	80	78	76	75	
	2000	2005	2010	2015	
fun	80	78	80	75	Inter- net
information	93	91	91	90	
loneliness reduction	9	7	14	14	
relaxation	28	28	37	36	
	2000	2005	2010	2015	
fun	67	65	66	64	News- paper
information	98	98	97	95	
loneliness reduction	10	9	10	10	
relaxation	42	38	40	40	

Annotations. Given percentages are based on participant responses to Likert-type items; agreement was rated when participants either agreed somewhat or strongly on a 4-point Likert scale

This trend is even stronger in the youngest age group sampled, i.e. the 14–29-year-olds. Table I.4 shows these functional ratings and allows for a more age-specific analysis. Radio and television are not as important sources of information as the Internet and daily newspapers, and their importance in this respect clearly is declining. Furthermore, the Internet is rated to provide equal amounts of fun by this age group (as compared to television and radio). During the past 15 years, the Internet clearly gained in importance when it comes to providing relaxation and alleviating loneliness (10–22% increases). The loneliness-alleviating function is equal to that of television and lags only close behind that of the radio within this youngest age group sampled. Thus, the Internet is an “all-in-one” medium in the young (Breunig & Ridder, 2015).

In a competitive assessment of media capacities, participants in the study “Massenkommunikation” were asked to rate which media they perceived best/second-best at providing a specific function (see Breunig & Ridder, 2015; Ridder & Engel, 2005). In this form of assessment, one gains insight into the relative importance of a respective medium when comparing it to all other media.

Table I.4

Percentage agreement related to selected media use functions for television, radio, Internet and daily newspapers based on the general German population aged 14–29 years (adapted from Breunig & Ridder, 2015; Ridder & Engel, 2005)

	2000	2005	2010	2015	
fun	90	89	87	85	TV
information	83	79	72	66	
loneliness reduction	24	20	20	21	
relaxation	82	84	85	83	
	2000	2005	2010	2015	
fun	90	87	82	87	Radio
information	76	71	70	66	
loneliness reduction	38	27	21	28	
relaxation	78	76	72	71	
	2000	2005	2010	2015	
fun	93	88	94	87	Inter- net
information	93	91	90	92	
loneliness reduction	12	12	24	22	
relaxation	33	40	51	54	
	2000	2005	2010	2015	
fun	65	62	56	59	News- paper
information	97	95	96	91	
loneliness reduction	5	6	4	8	
relaxation	38	34	31	39	

Annotations. Given percentages are based on participant responses to Likert-type items; agreement was rated when participants either agreed somewhat or strongly on a 4-point Likert scale

Figure I.1 shows a line chart displaying this kind of competitive assessment for the four different types of media and the four functions already described. One can see that television is rated to be the most suitable medium for alleviating feelings of loneliness, followed by the radio and the Internet. The same is true for the relaxation function, while for the fun function, the TV prevails and the radio and the Internet are equal in capacity. Note also, that people are quite indifferent when judging which medium is the best at providing information. When conducting the same analysis separately in the youngest age group, a completely different image emerges (see Figure I.2). The Internet is perceived to be the best source of information and fun, whereas television is roughly equally important for the latter function. Moreover, television prevails for the loneliness-alleviating function and roughly is on par with the Internet for that function. For relaxation purposes, the young age group prefers television, but even here, the Internet comes in second is as important as the radio. What can be seen from this figure is that the Internet is perceived as the best/second-best medium for a host of different functions including reducing feelings of loneliness (in fact, the Internet prevails over television in six out of nine categories sampled, see Breunig & Ridder, 2015, p. 331).

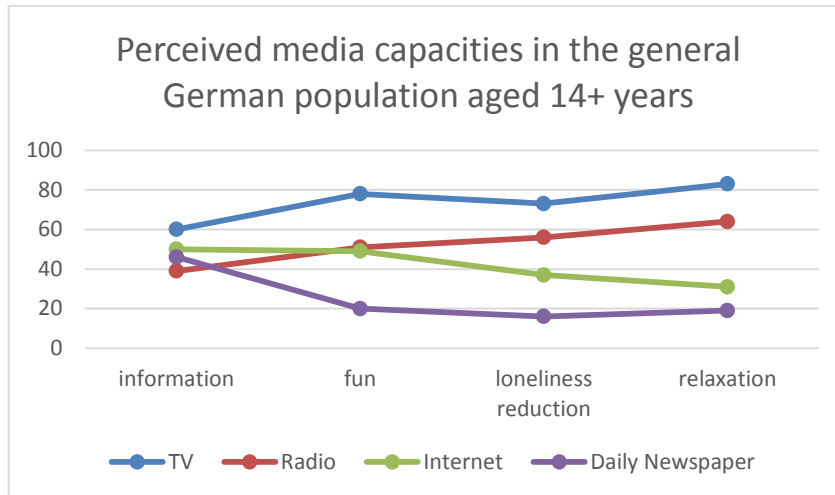


Figure I.1

Comparative ratings of the general German population aged 14+ years concerning which media are perceived best/second-best at providing a specific function

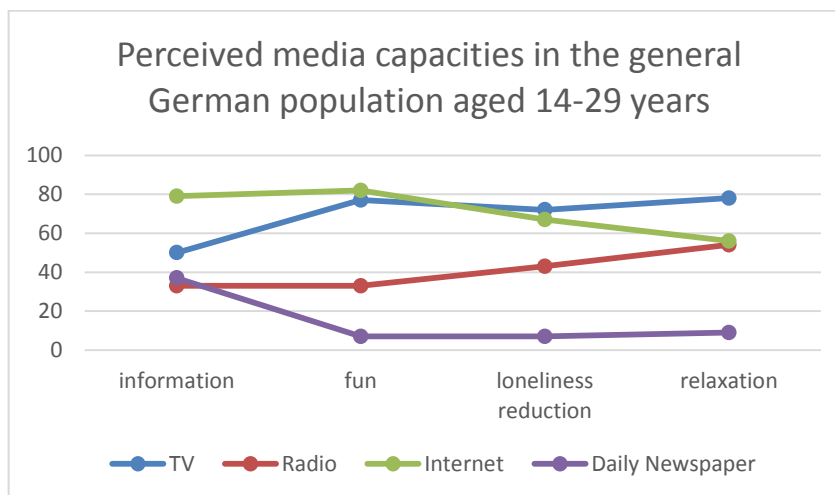


Figure I.2

Comparative ratings of the general German population aged 14–29 years concerning which media are perceived best/second-best at providing a specific function

This presentation was meant to underscore the significance of media use for coping with loneliness and to provide the reader with up-to-date information regarding the prevalence of such use as well as the perceived attractiveness of media for such use. As can be seen, many people report to use traditional mass media to cope with the aversive state of feeling lonely. It appears to be true that the prevalence rates for such use of the Internet are rather low. Nonetheless, the Internet seems to be an especially important way for this type of coping among the young age groups. With the advent of mobile Internet applications, the almost 100% availability of devices capable of connecting to the Internet, such as smartphones (98%) or computers

(98%), in the 14–29-year-olds (Engel & Breunig, 2015), a situationally motivated and loneliness-alleviating use in everyday life seems possible, if not plausible.

2. Choice and effect models of Internet use

As stated by Döring (1997, 2006), the advent of new mass media is always accompanied by more or less scientifically grounded suspicions regarding their potentially negative influences upon established societal systems and interpersonal relationships. In fact, scientists from various fields including psychiatry do not hesitate to allege the Internet and its associated possibilities for computer-mediated communication (CMC) in general to be destructive for interpersonal communication, to exert negative influences on the cognitive development of children, to hamper the development of social skills and relationships and to be detrimental for mental health (Mettler-Meibom, 1990; M. Spitzer, 2012). Other researchers state that these critics are overly biased in their analyses and would base their discussions on an unjustified, one-sided critique of technology, lacking a critique of the (active) user and the user-medium interplay (Appel & Schreiner, 2014; Döring, 2006).

The frequently cited “*HomeNet*” study by Kraut and colleagues (1996, 1998, 2002) might serve a good example for the complexities in the field that preclude drawing any clear-cut and overly simplistic conclusions regarding the psychosocial effects of the use of Internet. Following up a family sample (98 families, total n for analysis = 169) up to two years after gaining Internet access, Kraut et al. (1998) showed that the amount of Internet use predicted declines in subjective well-being (increased depression scores) and social involvement (reduced family communication and local social network and increased feelings of loneliness). These longitudinal associations held even when controlling for the respective baseline measures, hence being supportive of the negativistic account of Internet effects. Kraut and colleagues (1998) called this effect a paradox, because the Internet was used heavily for social and communication purposes, yet it did increase feelings of loneliness. In a later follow-up study of the very same sample, however, these negative effects of Internet use could not be replicated and had even changed signs for the depression variable used (Kraut et al., 2002). The authors reported a replication study in that later publication and again were unable to replicate the earlier negative findings, but found considerable evidence for positive psychosocial effects (Kraut et al., 2002). These discrepant findings may have been due to technological developments and the changing composition of the increasing group of active users at that time, which might have enabled more adaptive and beneficial social uses transferrable to real-world contexts (Kraut et al., 2002). It is also interesting that this follow-up study provided evidence for a conditional effect the authors called “rich-get-richer,” meaning that increased amounts of Internet use are

related to lower levels of loneliness and a higher amount of community involvement for the more extraverted people in their sample. For introverts, the pattern was the reverse and larger amounts of Internet use were related to heightened levels of loneliness and a lower community involvement (which could be called a “poor-get-poorer” effect).

Complex patterns of findings such as these are the rule rather than the exception in media effects research, complicating any straightforward conclusions regarding media effects (Appel, 2016; Appel & Schreiner, 2014; Döring, 2006, 2014; Schenk, 2007). It appears that specific effects should be analyzed in a manner sensitive to both the contextual and personal characteristics of the user as well to the actual Internet services used. For example, Kraut and colleagues (2002) found that a person’s level of extraversion was positively associated with time spent engaging in online social interaction with already known and new people, while persons with low initial social support displayed a higher amount of use for entertainment purposes and for meeting new people. Effect research hence should also incorporate and account for person-dependent ways of media use that may well explain the relation between person characteristics and media effects. In doing so, explanatory focus automatically shifts away from mere observable effects to the person and underlying motives, which may come to govern a dysfunctional use of media.

2.1 Tracing media effects back to media choices – a case for Uses & Gratifications?

Among the many negative effects of digital media discussed are several social ones, including a reduction of social interactions, increases in experienced loneliness and a reduction in societal participation and engagement (for critical discussions of these topics, see Appel, 2016; Appel & Schreiner, 2014; Döring, 2014). Systematic meta-analyses of studies investigating such putatively negative social effects of Internet use largely failed to confirm these assumptions (Boulianne, 2009; Huang, 2010; Shklovski, Kiesler, & Kraut, 2006). These findings should be treated with caution, however, as the majority of included studies were cross-sectional in nature and the studies themselves are rather outdated from the present perspective. A specific negative effect/phenomenon that has been discussed in relation to excessive amounts of Internet use is Internet addiction (Brand, Young, & Laier, 2014; Kimberly S. Young, Xiao Dong Yue, & Ling, 2011; Young, 1998, 1999). In parallel with the recent discussion about behavioral addictions in general, special and highly appealing characteristics of the applications were hypothesized to give rise to a vicious cycle of ever-increasing amounts of use, ultimately resulting in a loss of control and an addictive pattern of use that is continued despite serious negative consequences in major life domains (Grant, Potenza, Weinstein, & Gorelick, 2010; K. P. Rosenberg & Feder, 2014). For example, Young (1998) speculated about a pathogenic role of

interactive features of web applications when she stated: “*It is possible that a unique reinforcement exists that on-line relationships have the ability to provide fulfillment of unmet real-life social needs. Individuals who feel misunderstood and lonely may use virtual relationships to seek out feelings of comfort and community*” (Young, 1998, p. 243). As will be seen later, this social deficit hypothesis has played a major role in psychological accounts of Internet addiction. Important, however, is the point Young makes in specifying vulnerabilities (unmet social needs) that, when coupled with specific patterns of use (engaging in online relationships), might provide the vulnerable user with certain gratifications (feelings of comfort and community) that ultimately give rise to such an excessive pattern of use (Internet addiction). It is precisely this kind of more differentiated thinking that is needed to arrive at a more thorough understanding of media usage behavior and resultant effects such as Internet addiction from a psychological point of view (Kardefelt-Winther, 2014a).

In the present context, it seems worthwhile to elaborate further on the gratification aspect of Internet use, since it could be represented as the underlying motivational dimension driving media use and ultimately determining the effects of such use (Schenk, 2007). In this respect, one especially important account is the so-called “Uses & Gratifications” (U&G) account established by Katz et al. (1973), which represents a rather loose theoretical framework for explaining media effects from a user perspective (Schenk, 2007). Central to this account is the assumption of an active user, which, depending on his/her respective underlying needs, is motivated to use specific media (content) expected to fulfill these needs (Schenk, 2007). Mass media such as the Internet are but one of many different ways to fulfill these audience needs and all these alternatives can thus be regarded as competing for being chosen as a means of need satisfaction (Katz et al., 1973; Schenk, 2007). These competing (non-)media channels are termed “*functional alternatives,*” as they represent different ways of satisfying the same needs (Katz et al., 1973).

Which functional alternatives are available to a person for respective need fulfillment depends on many factors such as aspects of the societal system, the structure of the mass media system, as well as personal characteristics (life position, education, psychosocial resources, etc.) (Rubin & Windahl, 1986). The actual choice of a specific functional alternative for respective need fulfillment hence depends on its (perceived) availability, but also on the actual or expected degree of need fulfillment by that alternative. Former as well as expected need fulfillment is reflected in the so-called “*gratifications,*” which represent the evaluation of obtained satisfaction of (media-related) needs like providing information, catering for fun and entertainment, or fulfilling central social needs (LaRose & Eastin, 2004; Rubin & Windahl, 1986; Schenk, 2007). Gratification-related attitudes/expectations develop over the course of media

use history as well as a person's general history of socialization, which is reflected in models of gratification development such as the one outlined by Palmgreen (1984). In his empirically grounded expectation/evaluation account (see Figure I.3), Palmgreen outlines a transactional process wherein the gratifications obtained by actual media use loop back on a person's expectations regarding media characteristics and capacities, thereby influencing which gratifications are sought from a respective medium (Palmgreen, 1984). In other words, the more a specific medium is used in a certain way/for its specific contents (e.g. social contacts) and the more the corresponding gratifications are obtained (provision of social comfort/sense of belonging), the stronger a person's motivation will be for using that medium for the respective need fulfillment (i.e. the gratifications sought from that medium). In this respect, interpersonal and mediated communication have been discussed as functional alternatives for the fulfillment of social and psychological needs (Rubin & Rubin, 1985; Rubin & Windahl, 1986). When social and personal characteristics reduce the likelihood of using interpersonal communication channels for the satisfaction of social needs, then mediated channels such as the Internet might become viable functional alternatives providing similar or even better gratifications. This bears the risk of dependent patterns of media use, where the satisfaction of a person's needs becomes solely contingent on the provisions a respective media channel has to offer (Rubin & Windahl, 1986). This might be especially true when there are no or only bothersome functional alternatives available or when the functional alternative(s) used displace the availability of other alternative ways of need satisfaction (e.g. by increasing social isolation and thus hindering the establishment of social relationships).

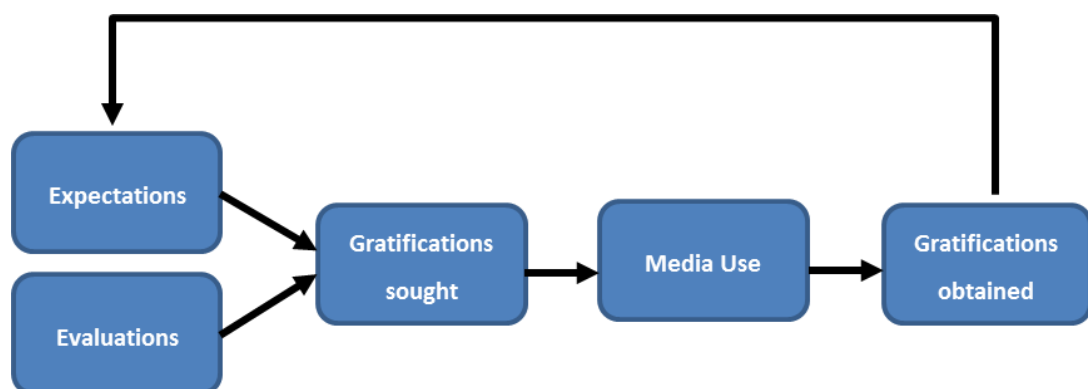


Figure I.3

Expectation/Evaluation Model of Gratifications sought, as outlined by Palmgreen (1984)

2.2 Social Internet functions and gratifications: what about the lonely?

In discussing the gratifications available through Internet use, one should not overlook the complex and highly versatile development of the technology over the course of the last dec-

ades. With an ever-growing number of web applications, the Internet has become an all-in-one medium offering information, entertainment (integrating many of the more traditional media services through web television, web radio, etc.), convenience, besides many different forms of social provisions.

As reviewed in detail by Musch (2000), even in the earliest stages of the Internet, it was the development of social communicative applications that led to tremendous increases in technology use. Examples include the introduction of application for sending and receiving electronic messages (email) or publicly accessible forms of news exchange and discussion such as the USENET. After the establishment of protocol standards such as the “Transmission Control Protocol” (TCP) and the “Internet Protocol” (IP) in the 1980s, not only the integration of different forms of hardware but also of different types of networks into one “net of nets” became possible. Hence the term Internet was established. In the early 1990s the concept of nonlinear hyper-texting was adopted for the Internet, setting the stage for the World Wide Web (WWW) and the possibility to browse a sheer endless number of websites for gathering and exchanging information. As already envisioned by Musch (2000) at the beginning of the 21st century, the further development of the Internet did integrate many of the other media channels such as the telephone net and the cable television net. Even more so, the early 2000s witnessed an increasing shift from a WWW used in a mainly one-way manner to a platform in which contents and applications became increasingly interactive and social in nature (e.g. blogs, wikis, and collaborative software projects). The term “Web 2.0” serves the demarcation of the technical and ideological underpinnings of such an interactive form of the WWW, other terms such as “user generated content” and “social media” became prominent in describing the respective applications and the content being characteristic of the Web 2.0 (Kaplan & Haenlein, 2010). Among the many discussed social media services available are Wikipedia, YouTube, Facebook, Second Life, just to name a few. The rich possibilities to combine aspects of audiovisual entertainment, gaming, different information channels and social activities (e.g. instant messaging, chat, commentary functions etc.) to varying degrees and depending on the respective social media application under study make a clear-cut categorization of these applications increasingly difficult.

Kaplan and Haenlein (2010) attempted at such a categorization scheme, differentiating the many applications along two broadly defined dimensions. One dimension is related to media characteristics directly relevant for the *social presence* of the user (type of cues and immediacy of cues available for communication) and encompasses aspects of media richness (the amount and type of information that can be transmitted unambiguously by the available media channels). The second dimension is related to the amount of *self-disclosure* required by the medi-

um and the type of self-representation it allows the active user. Combining these two dimensions gives the categorization scheme in Table I.5, which shows that even certain types of online games should be regarded as a type of social media, as they merely set the stage for virtual communities of players communicating and interacting with each other in a virtual world with immediate social presence and many cues available for communication.

Table I.5

Categorization scheme of social media applications based on their degrees of social presence and self-disclosure (adapted from Kaplan & Haenlein, 2010, p. 62)

		Social presence/ Media richness		
		Low	Medium	High
Self-Presentation/ Self-Disclosure	High	Blogs	Social networking sites (e.g. Facebook)	Virtual social worlds (e.g. Second Life)
	Low	Collaborative Projects (e.g. Wikipedia)	Content communities (e.g. YouTube)	Virtual game worlds (e.g. World of Warcraft)

Over the last few years, commercial forms of online audiovisual entertainment and information provision gained considerable prominence (Engel & Breunig, 2015), as also reflected by the wide availability of online versions of newspapers and magazines, television broadcasters' media centers, web radio offerings (live radio, podcasts etc.) and "video-on-demand" portals such as maxdome or Netflix. The Internet has become a technological umbrella term integrating almost all the functions of traditional mass media and combining them with many additional functions related to information, data exchange, communication and commercial services.

These (envisioned and real) complexities of the media offerings in digital age have led scholars in the U&G domain to question the transfer of traditional mass media gratifications to the newer communication technologies (Ruggiero, 2000; Sundar & Limperos, 2013). Simple intermedia comparisons such as those mentioned above (see Section 1.3) generally reveal that the Internet can be used to serve similar functions as the traditional mass media (Breunig & Ridder, 2015; Ridder & Engel, 2001, 2005; Schenk, 2007; Scherer & Schlütz, 2004). However, other functions such as enhancing one's social status or monetary aspects such as saving money through comparison of prices (LaRose, Mastro, & Eastin, 2001) have been identified in normative samples. Internet gratifications have been studied extensively and include obtaining information, entertainment, mood-regulation, convenience, pastime, fun and social utilities (including the alleviation of loneliness), satisfied within a broad range of different applications

including political information websites (Kaye & Johnson, 2002, 2004), instant messaging (Leung, 2001) and other types of social media (Papacharissi & Mendelson, 2010; Quan-Haase & Young, 2010; Shao, 2009; P. Sheldon, 2008b).

The new features of the digital media like interactivity (i.e. the degree to which a participant's role in the communication process is amenable to one's situational needs), demassification (the degree to which the medium and its message content can be controlled and individually tailored to meet one's needs) and asynchronicity of messages have been discussed to open up new avenues of media functions well beyond that of traditional mass media and even face-to-face interactions (Ruggiero, 2000; Walther, 1996). As reflected in Walther's (1996) account of hyperpersonal interaction, CMC typically is characterized by a reduced availability of social communication cues (e.g. absence of vocal or visual information subserving the decoding of message content in in-person interactions) and by a certain extent of asynchronicity/controllability, each giving the sender of a message greater opportunity to select the ways and content of self-representation. This might contribute to a (social) disinhibition effect and to online self-disclosure (Suler, 2004; Walther, 1996). Online interactions within the constraints of CMC could be hyperpersonal in that they eventually proceed in a manner more socially desirable than typically experienced in offline contexts. They might be characterized by increased amounts of self-disclosure. Additionally, the unavailability of clarifying social cues might predispose interactants toward forming idealized perceptions of their interaction partners (Walther, 1996). Empirical investigations of this account found psychosocial factors and personality characteristics, such as private and public self-consciousness, as well as social anxiety to be predictive of the perceived relevance of reduced cues and asynchronicity/controllability in CMC, which acted as mediators between these psychosocial traits and the self-disclosure shown in the context of instant messaging applications (Schouten, Valkenburg, & Peter, 2007).

Likewise, theorists in the field of Internet addiction have speculated about the role of these characteristics of CMC, noting that they might be especially salient for the socially inept and the lonely. According to this view, the psychosocially vulnerable are provided with new ways to satisfy unmet social needs, e.g. through engaging and self-disclosing in online relationships (Caplan, 2003, 2005, 2007; Davis, 2001). Caplan (2003), for example, empirically substantiated the point that loneliness sets individuals at risk for developing an unusual preference for engaging in online social relationships. This signifies that social web applications might represent a superior functional alternative to in-person interaction for the psychosocially vulnerable (Morahan-Martin, 1999; Morahan-Martin & Schumacher, 2003). Similar findings of social-compensatory use orientation have also been obtained in studies of television use (Finn &

Gorr, 1988). However, while Finn and Gorr (1988) operationalized their social compensation motives cluster rather globally and mixed items related to companionship-seeking, pastime, habit, and escapist motivations, this found connection between loneliness and social compensation might well be imprecise. Indeed, other researchers found loneliness to be rather unrelated or even negatively related to relationship-seeking motives (e.g. para-social interaction) in television use (Rubin, Perse, & Powell, 1985; Q. Wang, Fink, & Cai, 2008). Rather, more passively oriented compensation motives such as pastime have been found to be related to loneliness (Perse & Rubin, 1990). As will be discussed in the following chapters, there is conflicting evidence in the case of the Internet which shows that loneliness might be related to more passive-avoidant uses (e.g. Seepersad, 2004) as well as to approach-oriented motives involving social compensation (Morahan-Martin & Schumacher, 2003). Therefore, the study of Internet use and the effects resulting from such use clearly should not overlook the underlying motivational dimension, which might contribute significantly to the understanding of both usage behavior and the effects resulting from the consumption of media content (Schenk, 2007). An assumption that could be derived from the studies just reviewed is that only if the Internet is used as a functional alternative to gratify unmet social needs, loneliness should be related to a heightened preference for online social relationships.

3. Summary and outline of studies

Summarizing the points made above, loneliness appeared as a complex and multidimensional construct involving dysphoric mood, cognitive attribution processes and behavioral manifestations such as problems at self-disclosing in real-life interaction contexts (see Section I.1.1). Furthermore, social isolation has been found to be related to a host of both physical and mental health problems, underlining the clinical importance of considering psychosocial adaptation in the transactional course of development (see Section I.1.2). Although loneliness was theorized to be associated with a motivational drive toward social reconnection, the reverse seems to be true for chronic forms of loneliness. Chronic loneliness seems to be associated with more passive and emotion-focused types of coping behavior and not so much with problem-focused attempts at reconnecting (see Section I.1.3). This is also highlighted in the salience of media use as a means of coping with the experience of loneliness (see Section I.1.3.2).

When considering potentially negative effects of media use, psychosocial vulnerabilities such as loneliness and social anxiety have been considered as important predictors of maladaptive outcomes (see Sections I.2.1 and I.2.2). They have been shown to be related to aberrant gratifications sought from the media, giving further credence to the U&G account in the explanation and understanding of the motivational underpinnings of Internet use and its re-

sultant effects (Section I.2.2). The U&G approach argues that the consideration of the type/content of media use and the motivational underpinnings of such use will help determine the effects of media use. This approach could eventually contribute to a fuller understanding of negative media effects such as Internet addiction. One could predict that only when certain media content is used as the preferred alternative in satisfying psychological needs, a dependent media-audience relationship is established. There might be circumstances in which the media represent a more salient functional alternative for the gratification of social needs, such as in case of the perceived unavailability of social relationships or the perceived impossibility of establishing them due to the felt constraints of the current life situation. The university context might present a highly salient context to study the plausibility of such a dependent media use. Emerging adults have been shown to be both highly equipped and willing to use the Internet for a variety of different purposes (see Sections I.1.2.1 and I.1.3.2). Furthermore, the study period is a developmentally challenging life period marked by many transitions and changes in one's social context, putting people at risk for developing psychosocial and mental health problems (Section I.1.2.1).

For these reasons, the studies to-be-presented will deal with the plausibility of a model of compensatory Internet use, in which the use of the medium is conceptualized as a functional alternative to satisfying interpersonal interactions in real-life. This will be accomplished by adopting both a molar (Study 1, Chapter II) and a more molecular (i.e. situational) perspective (Study 2, Chapter III). The first study will be concerned with the role that chronic loneliness plays in university students' Internet use, Internet use expectancies and Internet addiction. The second study will try to identify situational predictors of social media use and adopt a mood-management account derived from the broader U&G framework. It is assumed that situational psychological states might be predictive of subsequent social media use. Besides, in line with the U&G account, it is assumed that psychosocial characteristics of the person such as chronic forms of loneliness might determine the salience of social media as a functional alternative. It is assumed to find moderating effects of such person-level factors on the strength of the relationship between situation-level psychological states and media use. This certainly would give additional credence to the media dependency account outlined above (see Section I.2.1), as such evidence would be supportive of a differential role of social media as a functional alternative in situational mood management. This work will close with a general discussion of the results found, outline their importance for conceptual development and empirical approaches in the field of Internet addiction and highlight some major methodological drawbacks that could be considered more thoroughly in future empirical work (Chapter IV).

II. The role of loneliness in university students' Internet addiction – a conditional process analysis of the moderating effect of social web application use

1. Introduction

While there has been an ongoing discussion in the scientific literature as to the existence and conceptualization of pathological forms of Internet use (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Kardefelt-Winther, 2014a, 2015; Morahan-Martin, 2005), the proponents of the Internet addiction¹ account have prevailed. This is reflected in major scientific and therapeutic sourcebooks (Kuss & Griffiths, 2015; Montag & Reuter, 2015; Wölfling, Jo, Bengesser, Beutel, & Müller, 2013; Young, 1999; Young & Abreu, 2011), as well as in repeated scientific discussions about the integration of the syndrome into the official catalogue of psychiatric disorders, as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM) of the American Psychiatric Association, or the International Classification of Diseases of the World Health Organization (Block, 2008; Grant et al., 2014; Grant et al., 2010; Pies, 2009). Actually, this has not been done for the fifth revision of the DSM published in 2013 due to insufficient research qualifying such a decision (Grant et al., 2014; Heinz & Friedel, 2014). Nonetheless, this addiction conceptualization is in line with a general opening of the formerly substance-bound concept of addiction/dependence over the last few decades to include several classes of behaviors that in themselves could be exerted in ways and accompanied by consequences characteristic of addiction (Grant et al., 2010; Marlatt, Baer, Donovan, & Kivlahan, 1988; K. P. Rosenberg & Feder, 2014; Shaffer et al., 2004).

1.1 The phenomenology of Internet addiction

From the very beginning of Internet addiction research, anecdotal reports of maladaptive and excessive use of the technology have paralleled it with the addicted use of psychoactive substances (e.g. Young, 1998). As many of these reports also mentioned the occurrence of negative consequences of such (addicted) use in terms of conflicts and drawbacks in major life domains such as family, work, or education, the potential clinical importance of the phenomenon

¹ For the sake of clarity, the term “addiction” will be used throughout this work, although it is avoided in the clinical literature due to negative connotations and often vaguely defined meanings (American Psychiatric Association, 2013; Goodman, 1990). This is because the term “Internet addiction” has gained considerable prominence in the scientific literature and has been overtaken by proponents of the addiction model, as opposed to others advocating an impulse control disorder conceptualization or those advocating an obsessive-compulsive account of Internet overuse (see Weinstein & Lejoyeux, 2010 for discussion).

became evident. Therefore, this introduction to the field of Internet addiction research will start with a detailed discussion of syndrome phenomenology.

1.1.1 Syndrome definition

When taking a liberal standpoint, the term addiction could be widened to include not only the various forms of chemical dependencies but also different forms of excessive behaviors, the enactment of which appears in excessive ways and leads to negative consequences in the affected persons' lives (Beard & Wolf, 2001). In doing so, the term addiction might be defined like this: *"Addiction is the irrefutable desire for a specific state of consciousness. The power of reason becomes subordinate to this desire. It interferes with the free development of personality and destroys the social ties and opportunities of the individual"* (Wanke, 1985, p. 20). This molar definition by the desire for an openly defined (and potentially substance-/ behavior-specific) state of consciousness signifies the possible psychological links of the different expression of an addiction syndrome, yet it still warrants a more syndrome-specific adaptation.

In lack of formal definitions of behavioral addictions, Young (1998) found Pathological Gambling, as defined by the DSM-IV, to be the most similar disorder in terms of phenomenology and hence conceptualized Internet addiction as an impulse-control disorder. Dropping three of the symptom criteria of Gambling Disorder related either to return to gambling to get even with former losses of money (criterion 6), to money supply by committing illegal acts (criterion 8) or to financial dependencies (i.e. debts) because of the gambling behavior (criterion 10), Young (1998) adapted an eight-item measure serving as a starting point for the definition of Internet addiction. This set of criteria is displayed in Table II.1. This conceptualization might be contrasted with an account rooted in the substance dependence domain such as the components model proposed by Griffiths (Griffiths, 1998, 2005), which puts larger emphasis on the psychological dimension by elaborating what Young (1998) tackles with the preoccupation criterion, namely the *salience of the addictive stimulus* (i.e. the Internet). By proposing a salience criterion, Griffiths elaborates what it means when the excessive Internet use becomes the most salient/predominant activity in a person's life. Not only do affected persons become preoccupied with Internet- und use-related cognitions, but also will their (strong desire/craving for Internet use) and behaviors be governed by the addictive content. The excessive online activity leads to a displacement of former important activities (up to the point of negative consequences). Despite these subtle differences, however, the accounts are quite similar regarding the phenomenology of the syndrome (beyond differences in the wordings, which are discussed overtly critical in Van Rooij & Prause, 2014). This is also reflected in more

recent discussions of suitable diagnostic criteria for the syndrome (Block, 2008; Hsu, Lin, Chang, Tseng, & Chiu, 2015; Starcevic, 2013; Tao et al., 2010).

Table II.1

Symptom criteria of Internet Addiction by Young (1998), as adapted from the DSM-IV criteria for Pathological Gambling (p. 238)

#	Symptom Description	Symptom Domain
1	Preoccupation with the Internet (thinking about previous or future online sessions)	Cognitive preoccupation
2	Need to increase amount of use so as to achieve satisfaction	Tolerance
3	Unsuccessful efforts to control, cut back, or stop the Internet use	Inability to stop/Relapse
4	Being restless, moody, depressed, or irritable when attempting to cut down or stop the use	Withdrawal
5	Staying online longer than originally intended	Loss of control
6	Jeopardized/risked the loss of a significant relationship, job, educational or career opportunity because of the Internet	Negative consequences in major life domains
7	Lied to family members, etc. to conceal the extent of Internet involvement	Impression management
8	Use as a way of escaping from problems or of relieving a dysphoric mood	Mood-Regulation

An ongoing debate exists, however, with respect to the tolerance criterion, as there is little empirical evidence in support of its applicability (Hsu et al., 2015; Pies, 2009). Furthermore, there are many critics of the global conceptualization of the syndrome, which has, from early on, been reflected in the postulation of subtypes of Internet addiction (Davis, 2001; Pawlikowski, Nader, Burger, Stieger, & Brand, 2014; Starcevic, 2013; Young, 1999, without year).

1.1.2 Different forms of Internet addiction

While several content-specific subtypes of the syndrome have been discussed in theoretical terms, relatively few studies have actually investigated the validity of such a content-specific differentiation in terms of phenomenology, associated correlates or observable course of disorder (although the identified studies actually confirmed the differentiated view; see Király et al., 2014; Montag et al., 2015; Pawlikowski et al., 2014; Rehbein & Mößle, 2013). Likewise, there is some debate over whether one should distinguish between disorders genuinely enabled by the Internet medium and other online syndromes, in which the Internet merely serves

as one of several possible ways of engaging in the addictive content (e.g. pornography consumption, game playing, gambling, shopping etc.) (Davis, 2001; Greenfield, 2011). The probably most prominent account in this respect is the one taken by Davis (2001), who distinguishes between a generalized form of pathological Internet use (GPIU) and several specific forms of pathological Internet use (SPIU). The different forms of SPIU might be thought of manifestations of preexisting psychopathologies that come to be translated to maladaptive use of specific Internet content. On the other hand, GPIU should be thought of as a more problematic form of disorder, as it is said to be a content-overarching and purely Internet-enabled syndrome in which the technology becomes “*the individual’s lifeline to the outer world*” (Davis, 2001, p. 193). It has been shown, however, that the generalized form of GPIU is hard to distinguish from one specific form of SPIU, namely social networking sites addiction (Montag et al., 2015). This might still be in line with the conceptualization of GPIU, as it is discussed to be inherently linked to social deficiencies in the offline world (Caplan, 2003, 2005; Davis, 2001).

Young and her colleagues (Young, without year; Young, Pistner, O’Mara, & Buchanan, 1999) were among the first authors to postulate a set of discrete online disorders, within which five subtypes were differentiated:

1. **Cybersex addiction**—compulsive use of adult websites for cybersex and cyberporn.
2. **Cyber-relationship addiction**—over-involvement in online relationships.
3. **Net compulsions**—obsessive online gambling, shopping, or online trading.
4. **Information overload**—compulsive web surfing or database searches.
5. **Computer addiction**—obsessive computer game playing.

(taken from Young et al., 1999, p.477)

Three of these five syndromes have received considerable research attention, namely *cybersex addiction* (e.g. Brand & Laier, 2015; Cooper, Putnam, Planchon, & Boies, 1999; Delmonico, 1997; Eichenberg & Blokus, 2010; Griffiths, 2012; Laier, Pawlikowski, Pekal, Schulte, & Brand, 2013; Laier, Pekal, & Brand, 2014; Love, Laier, Brand, Hatch, & Hajela, 2015; Meerkerk, Van Den Eijnden, & Garretsen, 2006; Short, Black, Smith, Wetterneck, & Wells, 2011; Wéry & Billieux, 2016), *computer (and online game) addiction* (e.g. Dong & Potenza, 2014; Hyun et al., 2015; Kardefelt-Winther, 2014b, 2014c; King & Delfabbro, 2014; King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Király et al., 2014; Kuss & Griffiths, 2011a; Rehbein & Mößle, 2013; Toker & Baturay, 2016), and *cyber-relationship/social networking sites addiction* (Andreassen, 2015; Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Błachnio, Przepiorka, & Pantic, 2016; Hong, Huang, Lin, & Chiu, 2014; Hormes, Kearns, & Timko, 2014; Koc & Gulyagci, 2013; Kuss & Griffiths, 2011b; Z. W. Y. Lee & Cheung, 2014; Z. W. Y. Lee, Cheung, & Thadani, 2012; Masters,

2015; Müller et al., 2016; Sampasa-Kanyinga & Lewis, 2015; Satici & Uysal, 2015; Wolniczak et al., 2013). This research generally confirmed the validity of these syndrome subtypes, although there is a clear need for studies furthering our knowledge regarding the similarities as well as differences between the subtypes in terms of phenomenology and associated features (Montag et al., 2015). With respect to the present study, one should keep in mind that there is only limited evidence justifying the separated study of Internet addiction subtypes.

1.2 Epidemiology of Internet addiction

1.2.1 Prevalence of Internet use and addiction

The personal computer supply in German households has risen sharply since the 1990s (Engel & Breunig, 2015; van Eimeren & Ridder, 2011), such that today more than 80% of households are equipped with at least one stationary desktop computer (as compared to 23% in 1995). Since the year 2000, the mean daily duration of Internet use has more than octuplicated (from 13 minutes per day in 2000 to 107 minutes per day in 2015) and this trend is especially prominent in adolescent and young adult age (Breunig & Ridder, 2015; Ridder & Engel, 2010; van Eimeren & Ridder, 2011). As can be seen from Table II.2, by 2015 the Internet has become the most widely used medium in the young and surpassed television and radio, which have been the most widely used media across all age groups since the 1970s (van Eimeren & Ridder, 2011).

Table II.2

Mean daily use duration (in minutes) of different media in the German population aged 14 or above (adapted from Breunig & Ridder, 2015; van Eimeren & Ridder, 2011)

	Population aged 14+ years				Population aged 14–29 years			
	2000	2005	2010	2015	2000	2005	2010	2015
Television	185	220	220	208	180	190	151	144
Radio	206	221	187	173	173	164	136	137
Newspaper	30	28	23	23	16	13	10	9
Internet	13	44	83	107	25	79	144	187
CD/LP/MC/mp3	36	45	35	24	73	101	80	51

Another recent trend involves the growing pervasiveness of mobile Internet devices, with 54% of the German population aged 14 or above reporting smartphone use in 2015, with a substantially higher proportion of 98% in those aged between 14 and 29 years old (Engel & Breunig, 2015).

Given the prevalence and high intensity of Internet use in normative samples of young age, it would be unsurprising to find higher prevalence estimates for problematic forms of use such

as Internet addiction in the young. Using a latent class analysis approach in a representative sample of the German population aged 14 to 64 years of age, Rumpf, Meyer, Kreuzer, and John (2011) estimated the prevalence of Internet addiction to be 1.0%. This number increased to 2.4% in the 14–24-year-olds and even to 4.0% when looking at adolescents between 14 and 16 years of age. Furthermore, there was a gender difference, in that males were at a higher risk of Internet addiction, but this gender difference disappeared or even changed directions in the younger age groups (Rumpf et al., 2011). This finding was unexpected and is not generally supported by most studies (Durkee et al., 2012; Kuss, Griffiths, Karila, & Billieux, 2014; Müller, Glaesmer, Brähler, Woelfling, & Beutel, 2014). A recent comparative study conducted by Durkee et al. (2012) investigated the prevalence of Internet addiction in adolescents across different European countries and corroborated the gender parity finding in Internet addiction risk for German adolescents (~4.8% of males and females were estimated to be Internet addicted). Furthermore, there were considerable differences in overall prevalence and gender ratios across countries. Nonetheless, when collapsing across countries, male gender was significantly associated with increased addiction risk.

In another representative sample of the German population 14 to 94 years of age, Müller et al. (2014) queried the symptoms of Internet addiction in leisure time Internet users and found an estimated prevalence of 2.1% for the whole sample (3.7% in the leisure time users). Interestingly, when comparing regular and addicted leisure time users regarding sociodemographic characteristics, Müller et al. (2014) were unable to find differences in prevalence rates across different age groups (i.e. between 2.5 and 5.2% of all leisure time users could be regarded as Internet addicts). Associated risk factors included male gender, being single, unemployment, low income or student status, which is in line with literature (Kuss et al., 2014).

In a general review of large epidemiological studies of Internet addiction in adolescence and adult age (studies with $n \geq 1000$), Kuss et al. (2014) noted a considerable heterogeneity of findings, with prevalence estimates ranging from as low as 0.8% in Italy to 26.7% in Hong Kong. It is largely unclear to what extent these differences may be due to sociocultural differences or the heterogeneity of employed assessment approaches and diagnostic criteria (Kuss et al., 2014). Therefore, the more conservative estimates derived from representative German population samples should represent more realistic estimates. Additionally, there is evidence suggesting that a younger age, along with student status, is associated with an increased risk of Internet addiction (Kuss et al., 2014).

1.2.2 Course of Internet addiction

While there are studies showing a fairly high stability of online game addiction, such as the rate of 84% across a period of two years found by D. Gentile et al. (2011), other studies have found considerable lower stability rates of 50% across a period of one year (Van Rooij, Schoenmakers, Vermulst, Van Den Eijnden, & Van De Mheen, 2011) or roughly 26% across a period of two years (Scharnow, Festl, & Quandt, 2014). This low temporal stability is corroborated by studies of the general form of Internet addiction, showing stability rates as low as 14% across a period of two years (Strittmatter et al., 2015) or around 50% across a one year period (Ko et al., 2014; Ko, Yen, Yen, Lin, & Yang, 2007). This is in line with the general finding of a rather low stability of behavioral addiction syndromes including online behaviors (Konkolj Thege, Woodin, Hodgins, & Williams, 2015).

Therefore, the nature of the temporal course of the various forms of Internet addiction would seem to be transient, given the presently available empirical evidence. Several factors have been found to be predictive for remission or an amelioration of symptoms, such as higher levels of perceived life success in young adults (Scharnow et al., 2014), female gender (Yu & Shek, 2013), good family functioning (Ko et al., 2015; Yu & Shek, 2013), a low level of emotional problems (Strittmatter et al., 2015), and certain personality characteristics (Ko et al., 2007).

1.2.3 Psychosocial and mental health factors in Internet addiction

A host of psychosocial correlates of Internet addiction has been identified and these seem to differ depending on subjects' age (Kuss et al., 2014). Therefore, the present discussion will focus on identified correlates in samples of emerging adulthood and university students.

Reviews of correlates of Internet addiction have found several *social environmental factors* such as the presence of intra-familial conflict or a lack of intimate social relationships to be associated with Internet addiction (Kuss et al., 2014; Lam, 2014). *Psychological correlates* of Internet addiction include personality characteristics such as heightened levels of impulsivity or hostility, as well as heightened levels of introversion or low self-esteem (Dong, Wang, Yang, & Zhou, 2013; Kuss et al., 2014; Lam, 2014), among other things. Moreover, factors indicative of a person's *level of social adaptation* such as poor relations with school/university, academic problems, life stress, the experience of loneliness or homesickness have been associated with Internet addiction (Kuss et al., 2014).

As only few longitudinal studies assess the predictive power of the enlisted factors (see also Section II.1.2.2 of this chapter), and as there are only few overlaps between the constructs assessed and the measures used across studies (Lam, 2014), these results should only be regarded as tentative. Nevertheless, the breadth of associated factors should not be overlooked in etiologic models and studies of Internet addiction.

There is now firm evidence that the occurrence of Internet addiction is associated with a co-occurrence of other mental health problems (Carli et al., 2013; Ko, Yen, Chen, & Chen, 2012; Kuss et al., 2014). These studies have shown that Internet addiction is associated with heightened levels of depressive symptoms, social anxiety disorder, attention-deficit/hyperactivity disorder (ADHD), hostility/aggression, substance use disorders and symptoms of obsessive-compulsive disorder (Carli et al., 2013; Ko et al., 2012). As reviewed by Lam (2014), there also is prospective evidence linking psychopathological symptoms (depression, ADHD, anxiety, hostility) to the subsequent development of Internet addiction, at least in adolescent populations. Findings such as these are of major relevance for etiological accounts of Internet addiction and should be acknowledged in studies of the syndrome.

1.3 Etiological accounts of Internet addiction

There are several different accounts of Internet addiction, each putting somewhat different emphasis on the role of certain biological and psychological factors hypothesized to be involved in the disorder process. Nonetheless, to understand the addiction process, it seems worthwhile to first discuss some of the characteristics of the addiction stimulus, i.e. the Internet, before turning to the etiological models themselves.

1.3.1 Addictive properties of the Internet

As noted by Greenfield (2011), it is the possibility to engage in online activities that lead to pleasurable psychophysiological consequences, including heightened transmission of dopamine at the brain level, that potentially leads to the establishment of an addictive reinforcement structure. Greenfield (2011) takes a strong neurobiological and behaviorist position, when he outlines some of the features of digital media giving rise to the vicious circle of addiction by eliciting the experience of pleasure at the psychological and the transmission of dopamine at the brain level.

He states that it is not so much that the Internet and its ongoing development brought along some completely new and pleasurable activities and characteristics. Rather, it is the sheer intensity, portability and unlimited accessibility/availability of digital content (formerly unavailable) that allow for a diverse range of pleasurable effects to be obtained in a need-specific manner and in a host of everyday contexts. This “*god in a box*” feature of *Internet content* might underlie the potency of the Internet at providing addictive stimulus content to its users (Greenfield, 2011, p. 141). As regards addictive content, pornographic content and interactive (online) games are of particular importance as these are associated with severe expressions of disorder (Greenfield, 2011; Meerkerk et al., 2006; Pawlikowski et al., 2014; Young, without year). Other relevant factors relate to the *accessibility/affordability and the process of*

engaging with online content. The Internet can be accessed anytime, at low costs, and in a manner highly convenient for the user. The desired functions and information are available without delays of gratification, making its use highly rewarding. The process of being online has been associated with mood-/consciousness-altering effects, e.g. with a subjective loss of one's sense of time/space, lessened self-awareness, with escape as well as the experience of boundlessness (Greenfield, 2011; Suler, 2004). On the whole, these features of the Internet make it an easily available and highly attractive agent, the effects of which could also be compared to the intoxication with a psychoactive substance (Greenfield, 2011). It is these positive experiences and primary gains that act as the leading *reinforcement factor* of Internet use behavior, but another aspect related to secondary gain factors should not be overlooked in this respect. An increasing amount of highly pleasurable Internet use comes to displace other activities that might have been experienced as ambivalent or aversive (e.g. stressful in-person social interactions, effortful school work, family obligations etc.). The behavioral principles of reinforcement and extinction also seem to translate to activities performed in the online realm (Greenfield, 2011). Especially important in the present context is the social environment of the Internet, which enables a well-controlled amount and quality of social interactions by the reduction of socio-emotional channel information, thus representing one of the major reinforcers of the online realm (Greenfield, 2011). The approach taken by Greenfield (2011) highlights both the importance of general Internet characteristics and the fact that the specific context and type of use should be analyzed when investigating Internet addiction.

In response to the “how” question of Internet addiction, the presentation of Greenfield (2011) roots addictive use in the establishment of a maladaptive reinforcement structure, linking Internet use to (subjective) positive consequences (pleasure and other process factors) and a “charge” of central dopamine in the brain. However, Greenfield (2011) has little to offer regarding the “why” and “who” questions of Internet use. One is left with the question why not every single user of the Internet sooner or later gets trapped in a vicious cycle of Internet addiction. In a recent critique of the reductionist type of thinking employed in behavioral addiction research, which allows for almost every behavior to be conceptualized as addictive, Billieux et al. (2015) point to the importance of identifying the underlying processes and motives governing the excessive behavior in the addicted individual. In the online context, this could be accomplished by a more fine-grained analysis of the respective behaviors enacted and the motives underlying them. By doing so, one might identify individual risk factors associated with specific types and motives of Internet use. This could open up avenues to understand Internet addiction from a functionalist perspective and in terms of compensatory Internet use, as certain activities might represent especially strong reinforcers for certain types of

individuals (Kardefelt-Winther, 2014a). There are models of Internet addiction which adopted such a type of thinking and deserve a detailed presentation.

1.3.2 *Neuropsychological account of Internet addiction*

The neuroscientific study of Internet addiction has risen in prominence over the last few years. This trend can be regarded against the background of the general opening of the addiction conceptualization above and beyond the different forms of substance dependency to include behavioral addictions. This type of thinking is reflected in the syndrome model of addictions proposed by Shaffer et al. (2004). Of note in this context is evidence derived from preclinical studies that points to the general comparability of addictive psychoactive substances and natural reinforcers (e.g. sex, food) in their neurochemical effects and the neuroanatomical substrates involved in the regulation of these appetitive behaviors (Burkett & Young, 2012; L. Clark et al., 2013; Hone-Blanchet & Fecteau, 2014; Leeman & Potenza, 2013; Olsen, 2011).

By now, there is a bulk a neuroscientific research in Internet addiction, the results of which are generally in line with the addiction conceptualization of the syndrome (Brand, Young, et al., 2014; Montag & Reuter, 2015; Sepede et al., 2016; Turel, He, Xue, Xiao, & Bechara, 2014). For example, Internet addicts have been shown to display a greater reactivity toward Internet-activity-associated cues (Brand & Laier, 2015; L. Liu et al., 2016; Lorenz et al., 2013; Thalemann, Wölfling, & Grüsser, 2007; Voon et al., 2014). Moreover, evidence from functional brain imaging studies points to the fact that limbic and prefrontal cortex areas, known to be involved in cognitive control processes and motivational behavior regulation, are involved in Internet addiction (Brand, Young, et al., 2014).

1.3.3 *Cognitive-behavioral model*

A very prominent model of Internet addiction is the cognitive-behavioral model proposed by Davis (2001) and Caplan (2002, 2003). It posits that psychosocial problems like loneliness or social anxiousness exert an indirect and conditional effect on the development of a pathological form of Internet use. This effect would manifest itself only in the interplay with actual Internet use and lead to the development of maladaptive cognitions and expectations (e.g. *“Without the Internet, I am no one!”*). These cognitions are hypothesized to gain control over a person’s behavior and lead to a vicious cycle of problematic use behaviors, finally manifesting in a behavioral syndrome marked by the affective and behavioral features of addiction outlined above (see Section II.1.1).

While scientific evaluations of this and conceptually related models were successful (Brand, Laier, & Young, 2014; Caplan, 2002, 2003, 2005, 2007, 2010; Davis, Flett, & Besser, 2002; D. Li, Zhang, Li, Zhen, & Wang, 2010; Morahan-Martin & Schumacher, 2003), it is interesting to note

that certain key assumptions of the theory have remained untested. Although Davis introduced the separability of a generalized, content-overarching form of generalized pathological Internet use (GPIU) and several forms of content-specific pathological Internet use (SPIU), this prediction concerning the *separability of GPIU and SPIU* has remained largely untested until today (Montag et al., 2015). Furthermore, while the *actual use of the Internet* (by its amount and/or type) was deemed central in the explanation of the cognitive symptoms of the disorder within the account (Davis, 2001), none of the subsequent empirical evaluations captured this use dimension. Furthermore, it was Caplan (2003) in particular who restricted the *conceptual breadth of the cognition construct* to an abnormal preference for online social interaction (rather than in-person interaction) in order to predict the development of Internet addiction. From the present perspective, this narrow and rather unsubstantiated restriction to only one maladaptive use motive for the prediction of addictive use seems problematic for several reasons: First, normative investigations of the gratifications that could be obtained from the Internet have shown that these encompass other dimensions as well, e.g. convenience, fun, and entertainment or information access (Ruggiero, 2000; Schenk, 2007). Overlooking these potential gratifications and resulting motives for use would neglect their potential importance in Internet addiction, as has been shown by several investigations (Dhir, Chen, & Nieminen, 2015; Kardefelt-Winther, 2014c; Khang, Kim, & Kim, 2013; J. Kim & Haridakis, 2009). Second, by constraining the analysis to a social use motive (i.e. the preference for online social communication) as an effect mediator, the type of psychosocial problems potentially involved in the addiction process might be restricted in advance. This restriction might give chief importance to certain psychosocial problems indicative of social incompetence (social anxiety, lack of social support, loneliness) for the explanation of Internet addiction (Caplan, 2003, 2005, 2007). However, there are many other psychosocial and psychopathological correlates of the syndrome, as already outlined above (see Section II.1.2.3).

In a related, empirically substantiated model, Brand, Laier, et al. (2014) posit that the actual use of specific Internet applications interacts with a person's psychosocial characteristics and expectations in an iterative process to shape potentially maladaptive use expectancies. In their model, a person's specific cognitions (i.e. dysfunctional use and coping expectations) play a central role, as they act as mediators between psychosocial problems and (the generalized form of) Internet addiction. In contrast to the social deficit model of Caplan (2003), their model was open to other psychosocial and psychopathological factors of potential relevance for Internet addiction. These authors also speculated about the iterative and usage-dependent process giving rise to specific Internet use expectancies at the conceptual level, when they state: *"The reinforcement that is experienced when using the Internet may then strengthen the Inter-*

net use expectancies, which in turn may result in ignoring other ways to cope with negative mood. The client may focus his/her view on the world and the own cognitions on Internet-related issues and these cognitions are permanently reinforced (both positively and negatively) by using the Internet." (Brand, Young, et al., 2014, p. 9). However, the authors did not translate this line of thinking—which would be open to the analysis of usage- and content-specific influences on different types of Internet use expectancies—into the empirical realm (see Brand, Laier, et al., 2014).

As there are several accounts rooted in media science, which explain the development of media use expectations, an adoption of these might be fruitful for the conceptual development of Internet addiction theory.

1.3.4 *Uses and gratifications: extension of the cognitive-behavioral model?*

People are thought to have inherent basic needs and strive toward fulfilling them (e.g. Deci & Ryan, 2000). These needs might translate to media-related needs when people eventually experience the satisfaction of certain psychological needs (e.g. information, social status, intimacy) by the use of a specific medium (Schenk, 2007). Media like daily newspapers might differ regarding their potential to satisfy the diverse range of human needs and might be apt at satisfying some (e.g. information needs) while being inappropriate for the satisfaction of others (e.g. intimacy needs) (e.g. Breunig & Ridder, 2015). Socialization within a media environment like modern western societies is accompanied by the acquisition of experience-based expectations regarding the potential of different media to gratify certain psychological needs. According to the Uses & Gratification Account (Katz et al., 1973; Palmgreen, 1984; Schenk, 2007), media choice is contingent on the gratifications sought/expected from the use of a respective medium. Moreover, this gratification-oriented choice is based on an empirical evaluation on the side of the user: only when a user actually obtains the gratifications he actually was looking for, will he choose that medium for respective need-satisfaction in the future (Katz et al., 1973; Palmgreen, 1984). The concept of an active audience is central to this approach, in that an individual is said to weigh up several (non-)media alternatives against each other and to decide for using the alternative perceived to have the best cost-benefit-ratio for the gratification of a respective need. The different (non-)media options could be regarded as functional alternatives for the satisfaction of needs (Palmgreen, 1984). When a respective medium comes to be the only (perceived) alternative for the satisfaction of a specific need, a dependent media relationship is established (Rubin & Windahl, 1986). A dependent media relationship exists when the satisfaction of a person's needs becomes solely contingent on the provisions a respective media channel has to offer. An interesting finding in the present context comes from a recent

study conducted by Q.-X. Liu, Fang, Wan, and Zhou (2016) who investigated the differential role of psychological needs and their satisfaction in online versus offline contexts in order to predict the severity of Internet addiction in a sample of adolescents. They found evidence for heightened levels of Internet addiction in those reporting more need satisfaction in the online context whereas the reverse was true for those reporting higher levels of need satisfaction in offline contexts. Moreover, a subjectively perceived advantage of online needs satisfaction (over offline satisfaction) fully mediated the effect of unmet psychological needs on Internet addiction severity. These findings clearly show that the Internet is a more important kind of functional alternative for the satisfaction of various psychological needs in those affected by Internet addiction.

In the case of lonely persons, it might well be that they come to experience the social provisions of the Internet with its manifold opportunities at establishing and maintaining online relationships as a viable functional alternative for the fulfillment of social needs. By repetitively engaging in online social activities and experiencing the gratification of social needs unmet in in-person life, the Internet might become the functional alternative with the best cost-benefit-ratio in terms of social need gratification. This would be in line with evidence concerning the communicative features of the online environment, which have been shown to be especially attractive for the socially inept and lonely (Caplan, 2003, 2007). This line of thinking generally parallels much of what Davis (2001), Caplan (2003), and Brand et al. (2014) were reasoning about when they highlighted the importance of cognitions/use expectancies that acted as effect mediators of psychosocial vulnerabilities in the addiction process. However, the Uses and Gratifications account could be used to extend these predictions by explicitly supplying a conceptual framework within which the usage-dependent development of cognitions/use expectancies could be analyzed more thoroughly. Only by using the Internet in certain ways (e.g. by using social web applications), certain gratifications could be obtained (e.g. satisfaction of intimacy needs). Only when repetitively and successfully using the Internet in social-compensatory ways to deal with one's lonely state it might happen that the Internet comes to be perceived as the most central way of relating with others. This means that the type and amount of Internet use could be regarded as a boundary condition that helps to explain how psychosocial characteristics of the person come to shape cognitions/use expectancies regarding the Internet. While former theorists also speculated on this usage-dependent development of expectations and cognitions (Brand, Laier, et al., 2014; Brand, Young, et al., 2014; Davis, 2001), they did not translate this kind of thinking into their conceptual models and empirical hypotheses. Thus, while one might expect lonely persons to display a heightened levels of social-compensatory use motives due to the communicative features of the Internet (Caplan,

2003), one might additionally expect that lonely persons who actually make use of these communicative features will even more do so (see Figure II.1). This possibility of intensity-related effects of Internet use has, to the knowledge of the author, not yet been tested in empirical evaluations of Internet addiction and might provide a valuable conceptual extension.

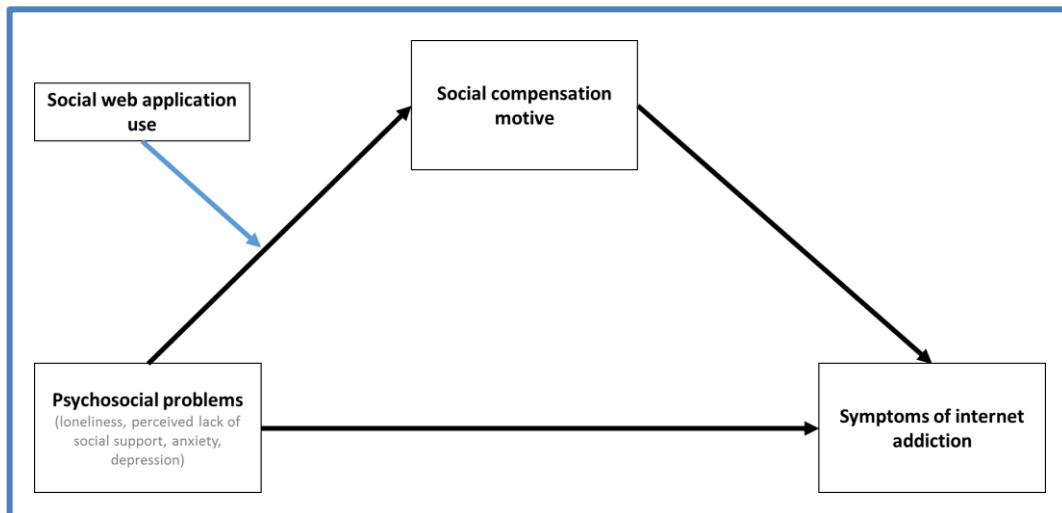


Figure II.1

Conceptual scheme of usage-contingent indirect effects of psychosocial problems in the Internet addiction process

The recent years have seen a tremendous increase in U&G-oriented work in the field of Internet addiction. In general, these investigations point to the importance of considering both the actual activities and the underlying use motives for Internet use. In terms of actual Internet use, there clearly is a positive association between overall levels of Internet use and Internet addiction (Tokunaga & Rains, 2010). This relationship does not hold for every specific type of use, however. There actually is some evidence for a negative association between the amount of information/education purpose use and Internet addiction (Morrison & Gore, 2010; Özcan & Buzlu, 2007; Whang, Lee, & Chang, 2003), whereas the intensity of engagement in social web applications, entertainment services, Internet games or pornography have altogether been found to be positively associated with syndrome severity (Bergmark, Bergmark, & Findahl, 2011; Chou & Hsiao, 2000; Gámez-Guadix, Orue, & Calvete, 2013; Kuss et al., 2014; Leung, 2014; Meerkerk et al., 2006; Özcan & Buzlu, 2007; Pawlikowski et al., 2014; van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008; Whang et al., 2003; Yan, Li, & Sui, 2014). This pattern of results is also reflected in the reported motives for Internet use, as user orientation toward entertainment/relaxation, arousal/emotion regulation and social compensation have all been found to be associated with syndrome severity (Bozoglan, Demirer, & Sahin, 2014; Brand, Laier, et al., 2014; Dhir et al., 2015; Khang et al., 2013; H.-K. Kim & Davis,

2009; J. Kim & Haridakis, 2009; Leung, 2014; S.-M. Li & Chung, 2006; Morahan-Martin, 1999; Morahan-Martin & Schumacher, 2000; Smahel, Brown, & Blinka, 2012; I. Song, Larose, Eastin, & Lin, 2004; Whang et al., 2003; Yang & Tung, 2007). Internet use driven by information and education purposes, on the contrary, is negatively associated with Internet addiction (Bozoglan et al., 2014; Dhir et al., 2015; I. Song et al., 2004). Taken together, these findings highlight the fact that previous models of Internet addiction such as the cognitive-behavioral model outlined above have preemptively narrowed their conceptual focus on social web application use and the social gratifications of the Internet. The actual type and amount of Internet use and its underlying user orientations should hence be assessed more thoroughly to arrive at a more nuanced understanding of risks and correlates of the syndrome.

1.4 The role of loneliness in Internet addiction – empirical results

Loneliness can be defined as the disquieting experience of a felt internal distance between oneself and others and is conceptually linked to the desire for and eventual attempts at reconnecting with others (Schwab, 1997). Loneliness and underlying social contact problems are highly prevalent in emerging adult as well as university student samples (Hahne, 1999; Qualter et al., 2015; Rokach, 2001), making this age group an important target of developmentally sensitive approaches to the study of loneliness and loneliness coping. As coping with loneliness has repeatedly been shown to take the form of media consumption in general and Internet use in particular (Breunig & Ridder, 2015; Rubenstein & Shaver, 1982a; Schwab, 1997), a study of loneliness coping in emerging adults seems to be justified. The age groups of adolescents and emerging adults have been shown to be highly equipped in terms of (mobile) Internet-ready devices and to use the Internet with its manifold services as the prime medium for a variety of uses including the alleviation of loneliness (Breunig & Ridder, 2015; Engel & Breunig, 2015).

Therefore, it seems warranted to analyze the role loneliness plays in determining various aspects of Internet use. As per the U&G account, the different aspects of use could be arranged to include the amount and type of actual use, the type and degree of underlying use motives (*“gratifications sought”*), and the type and degree of resulting media effects. In the present context, the media effect of prime importance is the occurrence and degree of Internet addiction. The following subsections will summarize the current state of empirical results concerning the associations between loneliness and motives for Internet use (I.1.4.1), actually endorsed Internet activities (I.1.4.2), and Internet addiction (I.1.4.3).

1.4.1 Loneliness as a correlate of motives for Internet use

The study of psychological and social predictors of the underlying media use motives are conceptually essential from a U&G point of view (Schenk, 2007). The psychosocial characteristics

of a person could be regarded as the determinants of a need structure that drives a person toward using certain media in particular need-fulfilling ways. One important prediction that could be derived from this line of thinking is that psychosocial characteristics like loneliness should be associated with divergent motivational orientations toward a respective medium. There has been some early work mainly involving student samples in the context of television use which linked loneliness to the reported gratifications sought. These studies provided a quite consistent picture of results, in that loneliness was associated with *lower* tendencies to use television (or specific program types) for information purposes, for its entertainment and mood-regulation capabilities or some social-compensatory functions (Canary & Spitzberg, 1993; Finn & Gorr, 1988; Perse & Rubin, 1990; Rubin et al., 1985). The study of Canary and Spitzberg (1993) was the only one to include and compare different categories of media options, namely broadcast (television, radio), print (newspapers, magazines), leisure (books, film, records) and interpersonal (friends, family) media. The pattern of results suggested that severe loneliness was associated with this less instrumental orientation toward all media categories, which clearly would be suggestive of a rather unspecific disengagement from instrumental media use. In line with this is the finding of Rubin and colleagues, who were able to show that loneliness is associated with a stronger pastime orientation in television program use (Perse & Rubin, 1990; Rubin et al., 1985). In sum, this evidence could be taken to suggest that loneliness seems to be associated with a passive-avoidant type of coping orientation in the case of television viewing.

It is interesting to note that findings concerning the Internet as a medium integrating manifold social web applications and a possibly higher adaptiveness for an instrumental (i.e. social need-fulfilling) use in the lonely have provided a quite different and by far more complex picture of results. While five studies adopted a straightforward loneliness measure (Brand, Laier, et al., 2014; Caplan, 2002, 2003; Matsuba, 2006; Morahan-Martin & Schumacher, 2003; Seepersad, 2004), one study (Hollenbaugh & Ferris, 2014) used an achieved belongingness scale that is highly and negatively associated with measures of loneliness (r 's between $-.66$ and $-.80$; see Malone, Pillow, & Osman, 2012). Each study adopted an individualized, partly data-driven ad hoc solution for the assessment of user motivation, therefore complicating a straightforward summary of results (see Table II.3). Only one of two studies found pastime motives to be significantly associated with loneliness (Morahan-Martin & Schumacher, 2003, but not Hollenbaugh & Ferris, 2014). Additionally, Seepersad (2004) grouped his young adult sample according to their favorite Internet use category and found those with a proclivity toward entertainment use to be the loneliest (with no difference between information and communication users). Beyond that, however, there is considerable evidence for an instru-

mental use orientation toward the Internet in the lonely. Several studies found it to be associated with an emotion-regulatory use motives (Brand, Laier, et al., 2014; Caplan, 2002, 2003; Morahan-Martin & Schumacher, 2003). Moreover, loneliness was consistently associated with social-compensatory use motives (Brand, Laier, et al., 2014; Caplan, 2002, 2003; Hollenbaugh & Ferris, 2014; Matsuba, 2006; Morahan-Martin & Schumacher, 2003), such as using the Internet in order to meet people, to gain emotional support, to relieve situational feelings of loneliness or to experience companionship.

Table II.3
Summary of loneliness studies in Internet use motives

Study	Sample	Motive Measures
Caplan (2002, 2003)	N: 386 Age: 20 Student	<i>Mood Alteration</i> , based on EFA
Morahan-Martin & Schumacher (2003)	N:277 Age:20.7 Student	List of 17 stated reasons, incl. 1. <i>relax</i> 2. <i>work</i> 3. <i>meeting people</i> 4. <i>emotional support</i> 5. <i>talking to others</i> 6. <i>pastime</i>
Seepersad (2004)	N:429 Age:19.5 Mixed	Favorite Internet use category (<i>entertainment</i> , information, communication)
Matsuba (2006)	N:203 Age:20.5 Student	Internet motives, based on EFA; 1. <i>Communication</i> 2. Entertainment 3. Information
Brand et al. (2014)	N:1019 Age:25.6 Mixed	Mixed Factor, including Positive Mood and Avoidance/Escape (" <i>instrumental emotion regulation</i> ")
Hollenbaugh & Ferris (2014)	N:301 Age:31.9 Mixed	Facebook motives, based on EFA; 1. virtual community 2. <i>companionship</i> 3. <i>exhibitionism</i> 4. relationship maintenance 5. pastime

Annotations. Italic, underlined motives are sign. associated with the loneliness/belongingness measures adopted by the studies.

Thus, and in contrast to the television studies reviewed above, there is considerable evidence for an instrumental use of the Internet in the lonely. A major drawback, however, is the large methodological differences between the studies, including differences in sample composition (see Table II.3), motive measures, and statistical procedures used. Nonetheless, a rather clear picture of results seems promising. Additionally, there are several studies assessing a wider

area of psychosocial problems including aspects of social anxiety and the unwillingness to communicate (Gross, Juvonen, & Gable, 2002; Papacharissi & Rubin, 2000; P. Sheldon, 2008a; Shepherd & Edelman, 2005), aspects of perceived social support (Leung, 2007), a person's life satisfaction (Vas & Gombor, 2009), or indicators of psychosocial wellbeing (Weiser, 2001) in their relations to Internet use motives. These studies found evidence for a disengagement from traditional instrumental uses and gratifications like information-seeking, relationship maintenance, and entertainment functions in the presence of psychosocial problems (Leung, 2007; Papacharissi & Rubin, 2000) with a concomitant increase in social-compensatory, affect-regulatory, and pastime motives (Gross et al., 2002; Papacharissi & Rubin, 2000; P. Sheldon, 2008a; Shepherd & Edelman, 2005; Vas & Gombor, 2009; Weiser, 2001). This picture of results is similar to the findings about loneliness, thus substantiating the role psychosocial factors play in user orientations toward media options like the Internet.

None of these studies, however, sought to establish a usage-contingent analysis of Internet use motives in the lonely, as mentioned and discussed above (see Section II.1.3.4). While Seepersad (2004) found a stronger proclivity of lonely youth to name entertainment uses as their favorite Internet use category, loneliness has been associated with a diverse range of other use motives, even within the same study (e.g. Morahan-Martin & Schumacher, 2003). Hence, one might be inclined to think that conceptualizing the loneliness-motive association beyond a straightforward and usage-independent main effects model might be worthwhile. From a U&G point of view, the current level of use motives ("gratifications sought") should be thought of as reflective of one's past history of gratifications obtained from a respective medium (Palmgreen, 1984). Only through (1) a repeated engagement in social web applications and (2) the actual repeated gratification of social-(compensatory) needs can positive expectations regarding the respective medium's gratification potential develop. This can be seen in epidemiological studies of media use and attitudes, where stronger expectancies regarding the Internet's loneliness-alleviating potential exist in those (i.e. the younger age groups) who make heavier use of social web applications (Breunig & Ridder, 2015; Engel & Breunig, 2015). While this conclusion is framed at the level of whole age groups, one might be inclined to adopt this line of thinking to the individual-difference level and to a more fine-grained analysis of an individual's type of Internet use.

The types of use adopted might be indicative of divergent use orientations toward a medium, in that a largely entertainment-related use might be associated with a stronger pastime and/or affect-regulatory orientation. On the other hand, heavy use of social web applications like social networking sites might be indicative of a stronger social-compensatory use orientation. Therefore, it seems warranted to posit a research question concerning the association

between loneliness and social-compensatory use motives that is hypothesized to be contingent on the actual use of social web applications.

RQ1: Is there an association between loneliness and social-compensatory Internet use motives? Is this relationship contingent on the actual use of social web applications?

Such an analysis certainly should be open to consider different types of Internet motives that have been found in relation to loneliness, such as mood-regulation and entertainment (Brand, Laier, et al., 2014; Seepersad, 2004), functions related to work and personal development (Morahan-Martin & Schumacher, 2003) and the social-compensatory use dimension (see Table II.3) in order to establish the eventual specificity of effect-contingency.

1.4.2 Loneliness as a correlate of Internet use behavior

While psychosocial characteristics might influence the motives underlying media use from a U&G point of view (Schenk, 2007), it would seem quite obvious that this should also be reflected in the actual type, amount, and some qualitative features of observable media use behaviors. Hence, one could suspect to find some correlations or even predictive relations between loneliness and quantitative/qualitative features of Internet use. Media effect researchers might yet take another perspective and posit that the type and amount of Internet use might be predictive of subsequent levels of loneliness. This is precisely what Kraut et al. (1998) have found in their longitudinal “HomeNet” study and called the “Internet Paradox” when they state “*that the Internet is a social technology used for communication with individuals and groups, but it is associated with declines in social involvement and the psychological well-being that goes with social involvement*” (p. 1029). However, in a follow-up and a replication study, the same authors were unable to replicate the earlier negative findings, but found considerable evidence for positive psychosocial effects when investigating the overall sample (Kraut et al., 2002). In considering conditional effects, they found evidence for a “rich-get-richer” effect, in that increased amounts of Internet use were related to lower levels of loneliness for the more extraverted persons of their sample. For introverts, the pattern was the reverse and larger amounts of Internet use were related to heightened levels of loneliness (“poor-get-poorer” effect). This finding could be interpreted as signifying the potential harm of Internet use for the psychosocially vulnerable, in that a lack of strong and intimate social bonds could not be compensated by the rather weak ties that are typically established in newly formed online relationships (Kraut et al., 2002).

While these early findings already hint at the complexities in linking psychosocial traits to observable media use behaviors in any straightforward way even in longitudinal research designs, the majority of studies in loneliness research adopted a cross-sectional design. Huang (2010) reviews a large pool of studies assessing this link and finds evidence for a small, but negative association between psychosocial wellbeing and amount of Internet use. The author takes an unqualified media effect position and asserts that “[a]lthough research on the relationship between Internet use and psychological well-being has improved understanding of the **consequences of Internet use**, some important issues remain. Because Internet use has small but **negative consequences for psychological well-being**, it is important to understand the best methodology for examining Internet use” (Huang, 2010, p.247; bold declaration inserted by the author). Note that from a U&G perspective, this same relation could be interpreted in the reverse direction, in that a reduced psychosocial wellbeing might be associated with a stronger reliance on Internet use as a functional alternative for a host of functions including gratifying social needs or emotion regulation (Caplan, 2003; 2005, see also section II.1.4.1). Contrary to Huang (2010), the following summary will focus on loneliness studies that have been published in peer-reviewed journals. Furthermore, only studies that did not employ some form of service-specific focus sampling like the gamer sample recruited by Shen and Williams (2011) will be considered. Additionally, in doing so, the current state of knowledge regarding the precise, content-specific type of use in establishing a loneliness—Internet use connection will be analyzed.

A total of eight studies were identified that related a measure of loneliness with some use-related measure concerning **general, i.e. content-independent Internet use** (Davis et al., 2002; Engelberg & Sjoberg, 2004; Gross et al., 2002; Kraut et al., 1998; Matsuba, 2006; Moody, 2001; Morahan-Martin & Schumacher, 2003; Yoder, Virden, & Amin, 2005). All but one of these studies (Kraut et al., 1998) were cross-sectional in design, recruited mainly student samples and used various indicators of overall use levels (frequency of Internet use/logs, duration of overall use; see Table II.4 for summary). Based on correlation analyses and path models, Kraut et al. (1998) showed that earlier loneliness is not significantly related to the subsequent amount of Internet use ($r = -.09$), whereas the amount of weekly Internet use was significantly and positively related to subsequent levels of loneliness ($r = .15$), even after controlling for baseline levels of loneliness. Four of the cross-sectional studies found a positive association between loneliness and amount of Internet use (Engelberg & Sjoberg, 2004; Matsuba, 2006; Morahan-Martin & Schumacher, 2003; Yoder et al., 2005), while three other studies found loneliness to be unrelated to the overall quantity of use (Davis et al., 2002; Gross et al., 2002; Matanda, Jenvey, & Phillips, 2004) and one study even found a negative association between loneliness

and the overall frequency of Internet logs (Moody, 2001). Taking things together, the overall pattern of results is somewhat inconsistent and does not appear to be easily attributable to certain methodological differences such as sample characteristics or the measures adopted, as summarized in Table II.4.

Table II.4

Summary of loneliness studies assessing general Internet use

Study	Sample	Usage Measure
Kraut et al. (1998)	N:165 Age: n/a Mixed	Log-based data of use duration, average of weekly use duration across study period
Moody (2001)	N:166 Age:19.2 Student	Subjective rating of the frequency of Internet logs
Davis et al. (2002)	N:211 Age:21.7 Student	Estimation of average weekly amount of use (hours)
Gross et al. (2002)	N:130 Age:12.2 Student	Scale-based assessment of typical daily use amount
Morahan-Martin & Schumacher (2003)	N:277 Age:20.7 Student	Estimation of weekly amount of use (hours)
Engelberg & Sjöberg (2004)	N:41 Age:20.1 Student	Vaguely defined questions concerning weekday/-end amount of use
Matanda et al. (2004)	N:158 Age:38.8 Mixed	Estimation of weekly amount of use (hours)
Yoder et al. (2005)	N:400 Age:n/a Mixed	Scale-based assessment of typical daily use amount and frequency of weekly Internet use
Matsuba (2006)	N:203 Age:20.5 Student	Estimation of overall duration of yesterday's Internet use

Besides these studies, there are several investigations regarding the association between loneliness and **specific types of Internet service use** (Amichai-Hamburger & Ben-Artzi, 2003; Bonebrake, 2002; Gross et al., 2002; Leung, 2002; Matanda et al., 2004; Morahan-Martin & Schumacher, 2003; Ryan & Xenos, 2011; Seepersad, 2004; Stepanikova, Nie, & He, 2010; van den Eijnden et al., 2008; Whitty & McLaughlin, 2007; Yoder et al., 2005). In line with current definitions of Internet user typologies (Brandtzæg, 2010), the present review will summarize content-specific types of Internet use into three broad domains, namely instrumental service use, entertainment service use and social web application use (see Table II.5).

Table II.5

Summary of loneliness studies assessing content-specific Internet use

Study	Sample	Usage Measure
Gross et al. (2002)	N:130 Age:12.2 Student	<u>Instrumental</u> : websites, list-servs/ newsgroups (2) <u>Social</u> : email, chat rooms, message boards, instant messaging (2) <u>Entertainment</u> : games, multi-user dungeons (2)
Leung (2002)	N:576 Age:20.3 Student	<u>Instrumental</u> : - <u>Social</u> : ICQ use (1,2) <u>Entertainment</u> : -
Bonebrake (2002)	N:104 Age:n/a Student	<u>Instrumental</u> : - <u>Social</u> : <i>general</i> (1) <u>Entertainment</u> : -
Amichai-Hamburger & Ben-Artzi (2003)	N:85 Age:26.6 Student	<u>Instrumental</u> : <i>general</i> (2) <u>Social</u> : <i>general</i> (2) <u>Entertainment</u> : <i>general</i> (2)
Morahan-Martin & Schumacher (2003)	N:277 Age:20.7 Student	<u>Instrumental</u> : - <u>Social</u> : email use (1) <u>Entertainment</u> : -
Seepersad (2004)	N:429 Age:19.5 Mixed	<u>Instrumental</u> : <i>general</i> (3) <u>Social</u> : <i>general</i> (3) <u>Entertainment</u> : <i>general</i> (3)
Matanda et al. (2004)	N:158 Age:38.8 Mixed	<u>Instrumental</u> : information, commerce (1) <u>Social</u> : <i>general</i> (1) <u>Entertainment</u> : <i>general</i> (1)
Yoder et al. (2005)	N:400 Age:n/a Mixed	<u>Instrumental</u> : - <u>Social</u> : - <u>Entertainment</u> : pornography (2)
Whitty & McLaughlin (2007)	N:150 Age:20.6 Student	<u>Instrumental</u> : information about entertainment, facilitation of offline entertainment (2) <u>Social</u> : - <u>Entertainment</u> : <i>general</i> (2)
Van der Eijnden et al. (2008)	N:660 Age:13.37 Student	<u>Instrumental</u> : surfing, downloading, information seeking (2) <u>Social</u> : email, chatting, instant messaging (2) <u>Entertainment</u> : gaming, pornography (2)
Stepanikova et al. (2010)	N-T1:13.776 N-T2:2.754 Age: 46.57 representative	<u>Instrumental</u> : surfing, browsing (1, 4) <u>Social</u> : email, other social services (1,4) <u>Entertainment</u> : -
Ryan & Xenos (2011)	N:1324 Age:n/a Mixed	<u>Instrumental</u> : - <u>Social</u> : Facebook use (2) <u>Entertainment</u> : -

Annotations. (1)-participant estimates of usage duration; (2)-scale-based participant ratings; (3)-sum of category-related individual activities adopted by the user; (4)-time diary-based estimates of usage duration.

Studies of *instrumental service use* assessed Internet activities such as gathering information about the entertainment world (Whitty & McLaughlin, 2007), general information service use (Amichai-Hamburger & Ben-Artzi, 2003; Matanda et al., 2004; Seepersad, 2004; van den

Eijnden et al., 2008), the use of commerce services (Matanda et al., 2004) or browsing web sites (Gross et al., 2002; Stepanikova et al., 2010; van den Eijnden et al., 2008). Stepanikova et al. (2010), in a longitudinal panel survey of a representative US general population sample, found the amount of web browsing to be positively associated with levels of loneliness in cross-sectional models and to be predictive of changes in loneliness levels. In other words, heightened levels of browsing were associated with a subsequent increase in loneliness levels. Nonetheless, this findings could not be substantiated in a longitudinal study involving an adolescent sample (van den Eijnden et al., 2008). Furthermore, all other studies found loneliness to be unrelated to the amount of respective service use in their cross-sectional analyses. Thus, there is at present only weak evidence for a link between loneliness and heightened levels of instrumental/information service use. Future studies should pay more attention to a possible moderating role of participant age in establishing a link between loneliness and instrumental service use.

Studies of *entertainment service use* captured a wide range of activities including online game use (Gross et al., 2002; van den Eijnden et al., 2008), multi-user dungeon use (Gross et al., 2002), broadly defined forms of leisure/entertainment service use (Amichai-Hamburger & Ben-Artzi, 2003; Matanda et al., 2004; Seepersad, 2004; Whitty & McLaughlin, 2007) or pornography use (van den Eijnden et al., 2008; Yoder et al., 2005). Three studies found evidence for a positive association between loneliness and measures of general entertainment service use (Matanda et al., 2004; Seepersad, 2004; Whitty & McLaughlin, 2007), while one such study failed to do so (Amichai-Hamburger & Ben-Artzi, 2003). Studies employing content-specific items of online entertainment use provided rather inconsistent results regarding an association with loneliness (Gross et al., 2002; van den Eijnden et al., 2008; Yoder et al., 2005). It seems that these divergent results might be partly attributable to the type of entertainment use measure employed or some characteristics of the study samples, as most of the negative findings stem from studies involving adolescent samples (see Table II.5). This might be especially true for pornography use, since the adolescent sample of van der Eijnden et al. (2008) was about 13.5 years of age, which might explain the lack of relationship in their study, as opposed to the consistent links in terms of usage frequency and duration in an adult sample (Yoder et al., 2005).

Studies of *social web application use* partly focused on some very specific forms of service use, such as the social networking site Facebook (Ryan & Xenos, 2011), the instant-messaging service ICQ (Leung, 2002) or use of emails (Morahan-Martin & Schumacher, 2003; Stepanikova et al., 2010), which will be subsumed with the results of other studies to form a more general category of social web application use. Overall, the studies did not reveal a clear picture re-

garding an association between loneliness and the amount of social web application use. Six out of ten studies found null results (Amichai-Hamburger & Ben-Artzi, 2003; Bonebrake, 2002; Gross et al., 2002; Leung, 2002; Matanda et al., 2004; Seepersad, 2004) and three studies found a positive association between loneliness and the amount of such use (Morahan-Martin & Schumacher, 2003; Ryan & Xenos, 2011; Stepanikova et al., 2010). Notably, Stepanikova et al. (2010) in their longitudinal study found evidence for these positive associations in both cross-sectional and longitudinal analytic designs and for a variety of different measures (global estimates vs. time diary data; duration of email use vs. other mode of communication) in a representative population sample. While Stepanikova et al. (2010) only adopted the analytic design of Kraut et al. (1998) and replicated findings regarding the loneliness-increasing effects of Internet use with more specific indicators of the use of social web applications, in their longitudinal study van den Eijnden et al. (2008) took a more thorough approach in their attempt to explain Internet use from earlier psychosocial characteristics of their adolescent student sample. Adopting the analytic design of Kraut et al. (1998) or Stepanikova et al. (2010), they were unable to show any predictive relations between different forms of social web application use (email, chatting, instant messaging) and subsequent levels of loneliness. In their cross-sectional models, there also were no consistent and significant relations between loneliness and the amount of different social web application use. However, van den Eijnden et al. (2008) were able to show that baseline levels of loneliness were predictive of a lower level of subsequent instant messenger use. This finding is qualified by a longitudinal study of S. J. Lee (2009) using a representative adolescent sample, who was able to show that the baseline quality of social relationships positively predicted the subsequent amount of online communication tool use (which, in turn, was predictive of better social adaptation). These findings could be interpreted according to Kraut et al. (2002) as signifying a rich-get-richer/poor-get-poorer effect in the context of social web application use. Thus, there is at present conflicting evidence regarding the direction of predictive relations between social web application use and loneliness. It may well be that these conflicting results are partly due to age differences in the samples studied, since Stepanikova et al. (2010) studied a mainly adult sample, while Lee (2009) and van der Eijnden et al. (2008) studied adolescent samples. However, particularly the cross-sectional findings also point to a rather inconsistent relationship between trait measures of loneliness and the amount of social web application use.

As reviewed above, there appears to be no firm and consistent predictive or cross-sectional relationship between loneliness and the amount of Internet use, neither in terms of general use nor in the use of specific categories of applications. Nonetheless, for the present purposes, a research question is posited concerning the association between loneliness and the amount

of general/ content-specific Internet use. Furthermore, as the heterogeneity of findings might at least partly be due to some measurement aspects, it will be investigated whether these relations are contingent on the type of Internet use measure. Therefore, several different indicators of Internet use will be assessed and compared regarding their strength of association with a loneliness measure.

RQ2: Is there an association between loneliness and the amount of general and/or content-specific Internet use? Is this relationship contingent on the type of Internet use measure used?

1.4.3 Loneliness as a correlate of Internet addiction

Cross-sectional studies have amassed considerable and consistent evidence for an association between loneliness and Internet addiction. This association has been found in adolescent, university student, and adult samples in both simple correlational designs and regression models (Andreou & Svoli, 2013; Ang, Chong, Chye, & Huan, 2012; Bozoglan, Demirer, & Sahin, 2013; Caplan, 2003, 2007; Ceyhan & Ceyhan, 2008; Davis et al., 2002; Engelberg & Sjoberg, 2004; J. Kim & Haridakis, 2009; Koo & Kwon, 2014; Matsuba, 2006; Odacı & Çelik, 2013; Odacı & Kalkan, 2010; Özcan & Buzlu, 2007; Pontes, Griffiths, & Patrão, 2014; Tutgun, Deniz, & Moon, 2011), controlling for a diverse range of covariates including psychopathological and personality aspects such as depression, social anxiety, self-esteem, extraversion, aggression, impulsivity, as well as psychosocial factors like parental monitoring, perceived availability of social support, or disruptive classroom behaviors. This consistency of results, as well as the robustness of results irrespective of covariate control, gives further credence for the identified association. This finding is corroborated by results from ex post facto designs involving group comparisons between addicted, problematic, and non-addicted user groups, which additionally substantiated the linearity of this relationship even when adopting a categorical/syndromic approach. In other words, the dependent/pathological user groups were found to be the loneliest, followed by the problematic user groups and the non-addicted user groups (Kubey, Lavin, & Barrows, 2001; Morahan-Martin & Schumacher, 2003; Whang et al., 2003). Likewise, severely lonely (vs. non-lonely) adolescents have been found to score significantly higher on an Internet addiction scale (Pontes et al., 2014).

There are also several investigations performing theory-based evaluations concerning the role of loneliness in the addiction process, making use of path modeling (in the case of observed variables) or structural equation modeling techniques (in the case of latent variable

modeling). Despite being based on cross-sectional survey data, proponents of the cognitive behavioral model of Internet addiction deemed loneliness to be a (causal) antecedent variable that indirectly influences Internet addiction either by shaping a preference for online social interaction (Caplan, 2003), positive use expectancies regarding instrumental emotion regulation (Brand, Laier, et al., 2014) or by diminishing self-control (Ozdemir, Kuzucu, & Ak, 2014). Other researchers paid more attention to the cross-sectional nature of their data and tested causal models in a bidirectional manner, with loneliness both as a cause and as a consequence of a person's level of Internet addiction (Celik, Yesilyurt, Korkmaz, & Usta, 2014; J. Kim, LaRose, & Peng, 2009).

From a U&G perspective, it would be very interesting to show that usage-contingent relations between loneliness and different types of Internet gratifications/ use motives do exist. As has been shown above, there are indications of social-compensatory, pastime, as well as entertainment/affect-regulatory use motives in the lonely (see Section II.1.4.1), which might be contingent on a person's actual pattern of content-specific media use. Therefore, it would be worth considering the dimensions of several Internet use motives and investigating the existence of usage-contingent associations between the latter and loneliness.

For this purpose, a research question concerning the usage-contingent effects of loneliness on Internet addiction is posited. In line with the cognitive-behavioral model of Internet addiction, it is hypothesized that loneliness will indirectly be related to a person's level of Internet addiction, namely through use motives. In addition, it is expected that these indirect effects are not necessarily restricted to social-compensatory ones. Moreover, these indirect effects are hypothesized to be contingent on a person's actual use of Internet service categories. More specifically, and in line with the predictions of the cognitive-behavioral model, loneliness effects are hypothesized to be contingent on the actual use of social web applications.

RQ3: Is there an association between loneliness and Internet addiction? Is this relationship mediated by different types of Internet use motives? Are the indirect effects contingent on a person's actual level of social web application use?

2. Research questions and hypotheses

Mainly in the service of replication purposes, this study will investigate the relationships between loneliness and indicators of psychosocial adjustment and mental health. In line with the existing body of research already outline above (see Sections I.1.1 and I.1.2), it is assumed that loneliness will be associated with a lower level of psychosocial functioning and increased levels of mental health problems. Indicators of psychosocial adjustment will encompass measures of perceived social support, global self-esteem, beliefs about self-efficacy and indicators of career-related strain in the university context. Mental health indicators include measures of social anxiety, substance abuse, depression, and generalized anxiety disorder. Furthermore, the role loneliness plays in stress-related coping behaviors will be investigated. It is generally assumed that loneliness will be associated with more passive-avoidant and less active, problem-focused coping (see Section I.1.3). In line with this thinking, it is assumed that loneliness will be associated with an increased tendency toward using the Internet to escape from the situational pressures of stress (as this might represent an especially significant way of passive-avoidant coping for those lacking active or social coping resources). These analyses are meant to set the ground for the main research questions of this study:

Research Question 1: One main research question of this study is concerned with the role loneliness plays in user orientations toward the Internet. Whereas theoretical models of Internet addiction suggest an unusual preference for online social relationships in the lonely (Caplan, 2003), studies investigating amount of specific application use, usage preferences or reported use expectancies have yielded some inconsistent results concerning the primacy of social-compensatory as opposed to mood management uses (Brand, Laier, et al., 2014; Leung, 2007; Morahan-Martin & Schumacher, 2003; Seepersad, 2004). Therefore, it is assumed that Internet use motives reflecting social-compensatory purposes (e.g. for not feeling alone or being close to one's significant others) and mood management purposes will both be related to a person's level of loneliness. Furthermore, based on existing evidence (J. Kim et al., 2009) and the predictions of the U&G account, it is assumed that the gratifications sought from a medium are contingent on a person's history of medium use and thus the history of gratifications obtained from such use (Palmgreen, 1984). Hence, it is hypothesized that the strength of relationship between loneliness and social-compensatory Internet use motives will specifically be contingent on the actual amount of social web application use a person is engaging in.

Research Question 2: Another research question concerns the relationship between loneliness and behavioral measures of Internet use. As reviewed above, there is inconsistent evidence regarding the association of loneliness and several types of content-specific as well as general Internet use levels. As these inconsistencies might well be contingent on the diverse range of Internet use measures, this relationship will be investigated in more detail, using several different measures including duration estimates, scale-based assessments, and subjectively rated favorite use categories. Due to the conflicting evidence available, no directional hypotheses are posited.

Research Question 3: In line with the existing body of evidence and the cognitive-behavioral model of Internet addiction, it is assumed that loneliness will be positively related to a person's level of Internet addiction. In line with the existing theoretical accounts, this relationship is hypothesized to be mediated by underlying Internet use motives. This prediction will be specified in two important ways: First, as there is considerable evidence pointing to the importance of Internet use motives other than social-compensatory ones, it is assumed that (a) different use motives will be associated with Internet addiction and (b) act as mediators of loneliness effects (see Section II.1.3.4). Second, it is hypothesized that the size of indirect loneliness effects will be contingent on the level of social web application use employed. In line with current evidence (J. Kim et al., 2009), it is assumed that the strength of association between loneliness and social-compensatory Internet motives will be contingent on the actual amount of social web application use, in that lonely persons engaging in higher levels of social web application use will also report a stronger inclination toward using the web for social compensation. The strength of these conditional indirect effects of loneliness on Internet addiction will be assessed and quantified in this usage-contingent analysis.

3. Methods

3.1 Sample

A total of 690 participants completed the survey (about 64% of all participating subjects), of whom 445 fulfilled the data requirements for the subsequent analyses (minimum age of 18 years, being enrolled as a student at a university, providing full information to all questions of the web survey, German language stated as mother tongue). Figure II.1 specifies the process of data reduction with respect to the exclusion criteria used.

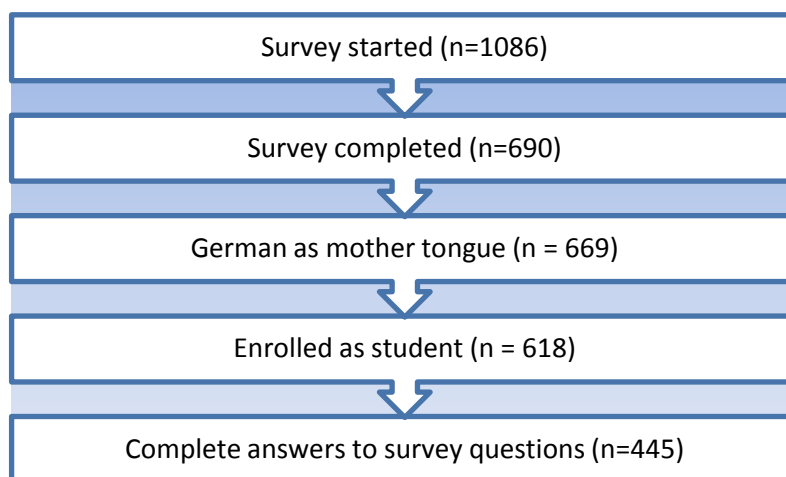


Figure II.2

Diagram specifying the steps and the criteria used during the process of data preparation

As can be seen, a large number of students ($n = 173$) had to be excluded from the subsequent analyses because of providing only incomplete information to survey questions. All of these subjects provided incomplete data regarding the amount and/or frequency of specific Internet application use, which was deemed necessary for the analyses to-be-presented.

The complete sociodemographic information of the final sample can be found in Table II.3. As can be seen, the sample was about 24 years of age and predominated by female participants (~61% of the sample). While the vast majority of the sample was unmarried, more than half of the participants reported to be in a relationship (56%). Most of the participants reported living in urban (20,000 to 100,000 inhabitants) or metropolitan (above 100,000 inhabitants) areas and only about 16% of the sample reported residing in rural or small town areas. Subjects mainly reported to live in one of four types of household arrangements (appearing in descending order of importance): shared flat (~36%), alone (~26%), together with spouse (~21%) or at parents' home (~16%).

Table II.6
Sociodemographic information of the study sample

	M (SD)	
Age	23.84 (3.702)	
Persons in household	2.73 (2.42)	
		N (%)
Gender	female	270 (60.7%)
	male	175 (39.3%)
Marital status	married	15 (3.3%)
	unmarried/divorced	430 (96.6%)
Partner status	in relationship	249 (56%)
	single	196 (44%)
Household arrangement	alone	114 (25.6%)
	at parents'	71 (16%)
	with spouse	94 (21.2%)
	shared flat	159 (35.7%)
	other	7 (1.5%)
Residential area	metropolitan (above 100,000 inhabitants)	238 (53.5%)
	urban (20,000 to 100,000 inhabitants)	138 (31%)
	small town (2,000 to 20,000 inhabitants)	42 (9.4%)
	rural (less than 2,000 inhabitants)	27 (6.1%)

		N (%)	n – males (%)
Field of study	linguistic and cultural studies	62 (13.9%)	13 (21%)
	social sciences	83 (18.7%)	23 (27.7%)
	engineering	53 (11.9%)	29 (54.7%)
	theatre and arts	7 (1.6%)	3 (42.9%)
	teacher training program	50 (11.2%)	13 (26%)
	medicine and health care	35 (7.9%)	8 (22.9%)
	natural sciences	136 (30.6%)	78 (57.4%)
	law and business sciences	14 (3.1%)	7 (50%)
	other fields of study	5 (1.1%)	1 (20%)
Highest level of education obtained	university-entrance diploma	280 (62.9%)	
	bachelor's degree	132 (29.7%)	
	master's degree	29 (6.5%)	
	other	4 (0.9%)	
occupational status	no gainful occupation	201 (45.1%)	
	mini/ irregular jobs	179 (40.2%)	
	paid form of university studies	17 (3.8%)	
	part-/full-time employment	48 (10.8%)	

As can be seen from Table II.3, about half of the student sample held down a job and pursued some form of gainful occupation alongside their university studies. The bulk of the student sample (about 63%) consisted of undergraduate students, with a university-entrance diploma

as highest level of education reported. Roughly 30% of the sample consisted of graduate students with a bachelor's degree and only a small subset consisted of students with a master's degree (6.5%). The participating students were distributed across several different fields of study, with a substantial portion (~31%) engaging in some form of natural science studies (e.g. mathematics, physics, chemistry, biology, computer science). See Table II.3 for further details.

3.2 Instruments

In the following, a brief description of the instruments used and the implementation of the survey on a web server of the University of Regensburg will be given.

3.2.1 Implementation of Limesurvey™

The freely available online-survey application Limesurvey™ (LimeSurvey Project Team & Schmitz, 2012) in Version 1.92+ was installed and implemented according to the installation guidelines of the software manual. The installation of the software and the implementation of a database for the response data was performed on web space provided on a webserver of the University of Regensburg and in cooperation with employees of the university's computing center. The survey layout "Skeletonquest_192" was uploaded and adapted for use in the current study. All questionnaires and scales were adapted to the digitized format of presentation by making use of the different preprogrammed question types provided with the software. The survey layout and question settings were adapted to fit different types of displays and screen resolutions.

In order to ensure the confidentiality of the recorded data and anonymity of the participant, the activated web survey was set up as follows: participants were not allowed to print their responses after completion, no statistics/data of survey participation were publicly accessible, no cookies were set on survey completion, and IP addresses and the referrer URLs were not recorded. To enhance the chance of complete answers, participants were allowed to store their responses temporarily for later completion. Hence, participants were required to sign-up for a temporary account and provide an email address. Hence an email was sent to the participant, containing a link to the survey with the buffered response data. This information was not saved to the database containing the regular response data of participants.

3.2.2 Questionnaires and Scales

An overview of the questionnaires and the collected sociodemographic and Internet use data will be provided in order of appearance within the actual web survey.

3.2.2.1 Sociodemographic information

At the beginning of the survey, participants were asked to provide information concerning their age, biological gender, marital and relationship status, residential area, size and type of household arrangement, their educational level and their occupational status. Furthermore, participants were asked, whether they were currently enrolled as a student at a university and, if so, into which field of study their majors could be classified.

3.2.2.2 Internet usage and preferences

Information was gathered with respect to the types of Internet access used (e.g. via smartphone, tablet, PC, game console, etc.) as well as the amount of usage of specific types of Internet activities. First, a list of 12 different types of Internet activities (see Table II.8 for details) was presented as multiple choice items, from which subjects could select the activities they were engaging in. Additionally, subjects had the possibility to state up to five additional activities. Subsequently, they were adaptively surveyed about usage frequency and duration of the specific Internet activities selected. Frequency information was surveyed for each selected activity with single 5-point Likert-type items, ranging from 1 (“*several times a day*”) to 5 (“*less than once per week*”). Duration information was obtained as an estimate of hours per week for each activity performed at least once a week (i.e. this activity had a frequency score of 1 to 4). After that, participants were asked to rank order the activities they pursued from the subjectively most indispensable to the least essential one.

Information about specific Internet activities was recoded after the completion of data acquisition so as to obtain more general categories of activities marked by similar purposes. In a first step, the additional activities provided by participants were subsumed into six different categories according to their underlying purpose, as displayed in Table II.7.

Table II.7

Categorization scheme and examples for additional Internet activities stated by participants

private organizational and productive activities	selling things, scheduling and coordination of activities, visiting client portals etc.
IT- and web-related activities	programming, server administration, remote desktop control, website administration etc.
digital authoring	blogging, podcasting, writing and publishing etc.
specific forms of communication	emails, voice chat, video chat etc.
news reading and concrete information purposes	reading news/blogs/articles, online dictionary use, different forms of e-learning, gathering weather information etc.
specific forms of audiovisual entertainment	listening to podcasts, reading fanfiction/comics, streaming videos, Internet television etc.

In a second step, the 12 predefined and the six newly formed categories of Internet activities (see Table II.8) were subsumed into seven broad main categories of Internet activity, which were used for subsequent analyses. These main categories and their constituting sub-categories are shown in Table II.8.

Table II.8

Overview of the seven main categories of Internet use and their allocated sub-categories

Main category	Allocated sub-category
social purposes	keeping in touch with acquaintances establishing new acquaintances active participation in bulletin boards <i>specific forms of communication</i>
audiovisual entertainment	watching/downloading videos listening to/downloading music <i>specific forms of audiovisual entertainment</i>
gaming	playing online games
pornography	watching pornographic contents
specific information purposes	any form of directed information search <i>news reading and concrete information purposes</i>
surfing	any form of undirected Internet use/ information search
productive and every-day activities done online	online banking online shopping <i>private organizational and productive activities</i> <i>IT- and web-related activities</i> <i>digital authoring</i>

Annotations. Bold items in the “allocated sub-category” column represent the predefined categories that participants could select. Note that only eleven subcategories are listed within this table. The twelfth option, online gambling, was dropped from further analysis, as only 6 persons (1.3%) selected this option and thus, the importance of this category of Internet activity was regarded as negligible in this student sample. Italic items in the “allocated sub-category” column represent the post hoc defined categories of Internet activities, as outlined in Table II.7.

For each of the seven main categories, information regarding usage frequency, duration and subjective importance of associated subcategories was pooled. For the usage frequency parameters, the lowest number of all selected subcategories (corresponding to the activity performed most often) was used for each of the seven main categories. Likewise, for the subjective importance parameters, the highest rank of a selected subcategory was used as indicator of the main category’s subjective importance. For the usage duration parameters, the durations (estimated in hours of usage per week by the participant) were summed for all the sub-categories allocated to a specific main category.

3.2.2.3 Motives for Internet use

In order to assess different motivational aspects regarding Internet use, an established set of items were mixed with newly created ones to form a scale. The established item pool was taken from the 2010 collection of data within the longitudinal study “Massenkommunikation” by the “*Arbeitsgemeinschaft der öffentlich-rechtlichen Rundfunkanstalten*” (ARD) and the “*Zweites Deutsches Fernsehen*” (ZDF) (Engel & Best, 2010; Ridder & Engel, 2010; van Eimeren & Ridder, 2011) and was adapted for the present web survey. The set of 9 Likert-type items originally was developed for the use in computer-assisted telephone interview (CATI) methodology. Each item comprises a specific reason for the use of the Internet (e.g. “*because it is fun to me*”; “*because I want to get informed*”; “*because I want to distract myself*”) and the respondent is asked to rate each of these items along a 5-point Likert-type scale to express the degree to which this statement would fit his or her Internet use (from 1 – “*I don’t agree at all*” to 5 – “*I totally agree*”).

This set of 9 items was expanded by seven items created ad hoc by the author. These seven items were thought to reflect additional motivational aspects of Internet use, which might combine with the existing set to form different motivational dimensions.

The initial pool of 16 items was analyzed using exploratory factor analysis (EFA) conducted with the R-plugin “R Factor” (Version 2.3.2; Basto & Pereira, 2012) for “*Statistical Package for the Social Sciences*” (SPSS, Version 23). The EFA was conducted with principal axis factoring as extraction method, the correlation matrix was based on polychoric correlations (estimated by the two-step procedure) and Varimax rotation was employed to obtain orthogonal factors. Based on the guidelines specified by Costello and Osborne (2005), items had to fulfill the following criteria in order to be retained in the final model: item communalities had to be 0.40 or higher, items had to load at least at 0.32 on one factor and show no cross-loadings greater than 0.32 on any other factor. Furthermore, the number of factors to be retained was grounded in the results of Horn’s Parallel Analysis (Horn, 1965) and Velicer’s MAP criteria (Velicer, 1976), as suggested by Costello and Osborne (2005). Based on the final factor solution, factor scores were calculated on the basis of the sum of raw scores for all items loading on a factor, because this procedure is deemed suitable for exploratory scale solutions (DiStefano, Zhu, & Mindrila, 2009).

Both MAP criteria and Parallel Analysis suggested a three-factorial solution, which was further analyzed in the subsequent EFA. Keeping in line with the guidelines of Costello and Osborne (2005), seven items were dropped from the model because of low communalities or cross-loadings. These items, along with the nine items comprising the final three-factorial solution, are listed in Table II.9.

The extracted solution yielded three factors comprised of three items each and explained a total of 57.3% of the variance among items, with the single factors roughly explaining between 10 and 32% of the variance (see Table II.9). The first factor was coined "*Fun & Relaxation*" (M1_fun) as it contained items relating to fun, entertainment, and relaxation uses of the Internet. The second factor was coined "*Information & Learning*" (M2_inf) as it contained items relating to Internet use for informational purposes and personal development through learning. The third factor was coined "*Social & Personal Unfolding*" (M3_soc) as it contained items relating Internet use to the alleviation of loneliness and the realization of personal identity and social needs. As can also be seen from Table II.9, internal consistencies were acceptable given the low number of items per scale. Higher scores indicate that a subject's Internet use is more strongly characterized by the respective motivational dimension.

Table II.9

Overview of the 16 primary items of the motivation scale, their descriptive statistics, and the final three-factorial solution with the allocated items, their factor loadings and internal consistencies of the scales (Cronbach's α)

Item #	Item	Item Loadings			% of variance explained	M	SD
		Factor 1	Factor 2	Factor 3			
Factor 1: Fun & Relaxation					Factor 1		
5	... because it is fun to me	.845	.147	.182	32.087	4.01	(.948)
4	... because I can relax while online	.799	.062	.230		3.67	(1.101)
12	... because it offers excitement and entertainment	.666	.203	.153		3.73	(.940)
Factor 2: Information & Learning					Factor 2		
3	... because I want to inform myself	.145	.810	-.138	15.223	4.51	(.703)
2	... because it gives me food for thought	.091	.650	.262		3.70	(.960)
9	... because thereby I learn about things useful for everyday life	.108	.632	.034		3.98	(.870)
Factor 3: Social & Personal Unfolding					Factor 3		
6	... because then I do not feel lonely	.234	-.040	.719	9.980	2.27	(1.140)
11	... because it is the place, where I get the support I need	.061	.178	.700		2.33	(1.149)
15	... because this is where I can be the real me	.252	-.009	.644		2.19	(1.170)
excluded items					Overall		
					(loadings in primary solution)		
10	... because thereby I can relieve stress	.664	-.026	.431	57.291	2.75	(1.204)
13	... because thereby I can forget about troubles of everyday life	.578	-.100	.486		2.60	(1.210)
7	... because I want to distract myself	.490	.085	.272		3.42	(1.15)
8	... because it is by habit that it is a part of my life	.327	.136	.280		3.60	(1.136)
14	... because it is useful and convenient	.365	.378	.051		4.27	(.807)
1	... so I can keep up and talk with others	.098	.303	.273		2.84	(1.123)
16	... because thereby I can feel close to persons important to me	.142	.078	.480		2.89	(1.284)
Cronbach's Alpha		.794	.654	.694			

Annotations. In both the 16 and 9 item pools, the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity suggested a factorizable association matrix (16 items: KMO value of .843, Bartlett's test – χ^2 -value: 2881.081, p-Value < .001, df: 120; 9 items: KMO value of .758, Bartlett's test – χ^2 -value: 1402.374, p-Value < .001, df: 36).

3.2.2.4 Short Version of the Internet Addiction Test (sIAT)

In order to assess the presence and severity of symptoms related to Internet addiction, an updated and shortened form of the original Internet addiction test, a 20-item scale developed by Young (1999), was used. This 12-item scale was developed, psychometrically evaluated and validated in German language by Pawlikowski, Altstötter-Gleich, and Brand (2013). The 12 items are rated on a 5-point Likert scale (“never,” “rarely,” “sometimes,” “often,” “very often”) and were found to represent different core aspects of Internet addiction (Pawlikowski et al., 2013). The raw item scores are summed to form a scale assessing the overall severity of Internet addiction. Although there are no established clinical cut-offs, Pawlikowski et al. (2013) make some suggestions regarding content-based and statistical considerations for establishing preliminary/exploratory cut-off values. They suggest a scale score above 30 to indicate problematic forms of Internet use, whereas scores above 37 indicate pathological forms of Internet use in terms of an addiction syndrome (op. cit.).

3.2.2.5 Rosenberg Self-Esteem Scale (RSES)

A revised German version of the Rosenberg Self-Esteem Scale (von Collani & Herzberg, 2003a, 2003b), a widely used instrument for the assessment of aspects related to global self-esteem (M. Rosenberg, 1965), was used for the present study. The scale consists of 10 items, summed after the recoding of negatively phrased ones to form a single scale measure of global self-esteem. In the present context, the items were rated on a 5-point Likert scale (“Doesn’t apply at all,” “Applies a bit,” “Applies somewhat,” “Applies mostly,” “Applies completely”), although the scale was developed for use with a 4-point Likert scale (M. Rosenberg, 1965; von Collani & Herzberg, 2003a, 2003b) and was validated and normed in the German population using a 6-point Likert scale quite recently (Roth, Decker, Herzberg, & Brähler, 2008).

3.2.2.6 Short Form of the Global Self-Efficacy Scale (GSE-6)

The GSE-6 (Romppel et al., 2013), a short form of the German language self-efficacy scale by Schwarzer and Jerusalem (1999), comprising only six items, was used. The self-efficacy construct of the GSE-6 refers to the conviction to master future problems and circumstances in general (i.e. items do not prompt any specific situation or problem in life, but are worded at a more general level). The six items were rated on the same 5-point Likert scale as the items of the RSES and were intermixed with them.

3.2.2.7 Impulsive Behavior Scale-8 (I-8)

A strongly reduced version German version of the impulsivity scale by Whiteside and Lynam (2001) was used for the present study. The theoretical model underlying the original scale

conceptualizes impulsivity as multidimensional in nature and posits a four-factorial personality construct, comprised of the dimensions of “Urgency” (i.e. the tendency to act impulsively in case of negative affect), “(Lack of) Premeditation” (i.e. acting before thinking), “(Lack of) Perseverance” (i.e. the inability to stay on task in situations/contexts experienced as boring) and “Sensation Seeking” (i.e. the tendency to try out new things that are potentially dangerous and/or the tendency to actively seek for and enjoy exciting activities). This model has been termed the “UPPS model” of impulsivity.

Based on the UPPS scale, originally comprising 46 items (Whiteside & Lynam, 2001; Whiteside, Lynam, Miller, & Reynolds, 2005), Kovaleva, Beierlein, Kemper, and Rammstedt (2012) developed a brief scale of only 8 items (with 2 items per impulsivity factor) available in German language, which they evaluated psychometrically in terms of scale reliability and validity. The 8 items were rated on the same 5-point Likert scale as the items of the RSES (see above) and were intermixed with the other scale items. Scores were calculated for each of the four subscales by summing the raw scores of each of the two corresponding items to form four subscales: the urgency subscale (I-8_urgency), the premeditation subscale (I-8_premed; higher scores indicating the ability to think before acting), the perseverance subscale (I-8_persev; higher scores indicating the ability to stay on task) and the sensation-seeking subscale (I-8_sensation)

3.2.2.8 Strain because of Career-related Problems Scale (LPB)

In order to assess insecurities and worries with respect to university career-related issues, the 22 item questionnaire by Seifert (1992), kindly provided by Brandstätter (2015)², was used for the present research. The LPB consists of three subscales, with one scale encompassing the sense of feeling too uninformed in order to opt for a career path with certainty (LPB-inf, 6 items), a second scale related to the general feeling of insecurity with respect to the adequacy of career paths against the background of one’s skills and interests (LPB-sec, 13 items) and a third scale dealing with pessimism and feelings of insecurity regarding one’s job career in the future (LPB-job, 3 items). The items were rated on a 5-point Likert scale (“Doesn’t apply at all,” “Applies a bit,” “Applies partly,” “Applies quite much,” “Applies very much”) and summed correspondingly in order to form each of the three subscales.

3.2.2.9 Multidimensional Scale of Perceived Social Support (MSPSS)

The MSPSS, as developed by Zimet, Dahlem, Zimet, and Farley (1988) is a measure of perceived social support from different sources, namely family, friends and/or a significant other.

² Professor emeritus and former colleague of Seifert (†) at the Institute of Education and Psychology of the University of Linz.

The scale comprises 12 items rated on a 7-point Likert scale (“Completely disagree,” “Largely disagree,” “Rather disagree,” “Neutral,” “Rather agree,” “Largely agree,” “Completely agree”). Item responses can be used either to form a total score or three subscales, each comprised of four items related to a specific source of social support (i.e. family, friends, a significant other). Although the instrument has already been used in German speaking populations (Koydemir, Şimşek, Schütz, & Tipandjan, 2013), the author translated the items of the MSPSS to German language. For the present study, only the total score of the scale was used in the analyses to-be-presented, with higher scores indicating higher levels of perceived social support.

3.2.2.10 Loneliness Scale (LSC)

The 11-item loneliness scale, developed by de Jong-Gierveld and Kamphuls (1985), was used for the assessment of subjective feelings of loneliness, which are thought to result from a discrepancy between what one perceives to have in terms of established social bonds and what one wishes to have (de Jong-Gierveld & Kamphuls, 1985; de Jong-Gierveld & van Tilburg, 1999). Items of the LSC were scored on a 5-point Likert scale (“NO!,” “no,” “more or less,” “yes,” “YES!”). After recoding, the item responses of the 11 items were summed to form a single scale score of perceived loneliness, with high scores being indicative of loneliness.

3.2.2.11 Perceived Stress Scale (PSS)

The PSS by Cohen, Kamarck, and Mermelstein (1983) is a widely used instrument for the assessment of recent occurrences of stressful situations, as perceived subjectively by the subject. While the original scale consists of 14 items, several short forms encompassing 10 or 4 items have been put forward since the development of the PSS. For the present study, the original 14-item PSS, as translated and adopted by Haselbeck (2013), was used. The items are rated on a 5-point Likert scale (“never,” “rarely,” “sometimes,” “frequently,” “very often”) and are to be judged according to the last 30 days. The single item scores are summed to form a scale measure of perceived stress.

3.2.2.12 Short form of Carver’s Coping Inventory (briefCOPE)

In order to assess individual differences in the handling of problems and stressful life circumstances, a short form of the Coping Inventory developed by Carver, Scheier, and Weintraub (1989) was used. This short form, called briefCOPE within the realm of this study, comprises 28 items instead of the 60 items of the original form (Carver, 1997; Carver et al., 1989) and is available in German language (Knoll, Rieckmann, & Schwarzer, 2005). The 28 items are allocated to 14 different subscales (2 items each), which are to be rated according to a 4-point Likert scale (“not at all,” “a little,” “somewhat,” “very much”). The original scale solutions could not always be replicated, leading to the creation of factorial solutions in a sample-dependent

manner (see Krägeloh, 2011 for a thorough overview of the different studies, factorial solutions as well as factor-analytic approaches employed to obtain them). Therefore, the 28 items and 2 additional items related to stress-related coping through Internet use (“*I used the Internet to feel better,*” “*I used the Internet in order to not think about it*”) were subjected to an exploratory factor analysis, using the criteria and guidelines as outlined above (see Section II.3.2.2.3).

With the initial item pool, MAP criteria and Parallel Analysis diverged and suggested a solution consisting of three (MAP) to seven (Parallel Analysis) solutions. An initial screen of a seven-factorial solution hinted at communality problems (including a Heywood case) and cross-loadings of two items encompassing stress-related substance (ab)use. Therefore, these two items were dropped from the analysis, and the procedure was rerun with the reduced pool of 28 items. Both MAP criteria and Parallel analysis hence suggested a 6-factorial solution, which was further analyzed. Keeping in line with the guidelines of Costello and Osborne (2005), ten additional items were dropped from the model because of either low communalities or cross-loadings. These items, along with the 18 items comprising the final six-factorial solution, are listed in Table II.10³.

The extracted solution yielded six factors comprised of two to six items and explained a total of 67.3% of the variance among items, with the single factors roughly explaining between 5 and 25% of the variance (see Table II.10). The first factor was coined “*Social Support Seeking*” (C1_social), as it contained items related to seeking and receiving advice, understanding or emotional support from others. The second factor was coined “*Self-Reproach*” (C2_self-reproach), as it contained items relating to self-accusations and giving up when faced with adversity. The third factor was coined “*Religious Coping*” (C3_religion) and contained items related to resorting to religion and spirituality in order to cope with stress. The fourth factor, coined “*Humorous Coping*” (C4_humour), described attempts at coping through cognitively reframing the stressful situation as less wearing by means of humor. A fifth factor, comprised of the two newly created items related to Internet use in times of stress, was coined “*Distractive Use of the Internet*” (C5_Internet use). The sixth factor was coined “*Active Problem-Solving*” (C6_active) and was comprised of items relating to active, problem-oriented attempts at eliminating the source of stress. As can also be seen from Table II.10, most internal consistencies were acceptable, given the rather low number of items per scale. Note that higher scale scores indicate a stronger use of the respective form of coping.

³ Both in case of the 28- and the 18-item pools, the KMO as well as Bartlett’s test of sphericity suggested a factorizable association matrix (28 items: KMO value of .686, Bartlett’s test – χ^2 -value: 8648,947, p-Value < .001, df: 435; 18 items: KMO value of .715, Bartlett’s test – χ^2 -value: 4498.338, p-Value < .001, df: 153).

Table II.10

Overview of the 28 coping-related items, their descriptive statistics, and the final six-factorial solution with the allocated items, their factor loadings and internal consistencies of the derived scales (Cronbach's α)

Item # / content	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	% Var explained	M	SD
16 getting comfort and understanding from someone	.834	-.075	-.016	.026	-.076	.131	25.2%	2.77	(1.012)
25 trying to get advice [...] from other people	.811	-.012	.146	.096	-.045	.267		2.58	(.945)
10 getting help and advice from other people.	.768	-.033	.090	.108	-.030	.284		2.56	(.918)
5 getting emotional support from others	.729	-.041	.075	.133	-.055	.148		2.80	(.880)
9 saying things to let my unpleasant feelings escape	.656	.038	.089	-.013	-.005	.057		2.22	(.905)
22 expressing my negative feelings	.597	.173	.009	-.068	.106	.007		2.08	(.835)
13 criticizing myself	.064	.883	.007	-.087	.164	-.048	14%	2.32	(.927)
28 blaming myself for things that happened	.000	.785	.032	-.044	.108	-.087		2.13	(.947)
6 giving up trying to deal with it	.004	.361	.208	.152	.236	-.304		1.51	(.709)
24 trying to find comfort in my religion or beliefs	.132	.011	.924	.070	.034	.117	9.6%	1.38	(.772)
29 praying or meditating	.125	.081	.868	.031	.065	.151		1.33	(.712)
19 making jokes about it	.123	.089	.041	.894	.029	.046	7.5%	2.28	(1.024)
30 making fun of the situation	.022	-.185	.059	.815	.002	.149		2.27	(.940)
15 using the Internet to feel better	-.032	.161	.041	.031	.885	.017	5.8%	1.89	(.825)
23 using the Internet in order not to think about it	-.025	.160	.050	-.009	.856	-.129		1.76	(.823)
7 taking action to try to make the situation better	.225	-.192	.134	.118	-.118	.811	5%	2.78	(.870)
14 trying to come up with a strategy about what to do	.150	-.021	.072	.124	-.002	.710		3.05	(.813)
2 concentrating efforts on doing something about it	.297	-.035	.126	.005	-.018	.646		2.55	(.855)
1 turning to work, etc. to take my mind off things	.055	.298	-.043	-.013	-.418	.138		2.30	(.910)
3 saying to myself "this isn't real."	.061	.665	.024	-.160	.049	-.138		1.25	(.551)
8 refusing to believe that it has happened	.190	.534	-.050	-.101	.041	-.102		1.48	(.770)
12 trying to see it in a different light [...] more positive	.149	-.102	.551	-.069	.129	.404		2.76	(.847)
17 giving up the attempt to cope	-.110	.647	-.003	.010	-.255	-.408		1.38	(.693)
18 looking for something good in what is happening	.193	.032	.544	-.154	.095	.378		2.44	(.958)
20 doing something to think about it less	.239	.150	.246	-.057	-.423	.087		2.67	(.872)
21 accepting the reality that it has happened	.071	.019	.510	.028	-.094	.098		2.53	(.928)
26 learning to live with it	.107	-.031	.576	-.049	-.028	.156		2.56	(.910)
27 thinking hard about what steps to take	.288	.297	.054	-.098	-.153	.401		2.96	(.814)
Cronbach's Alpha	.854	.678	.829	.781	.814	.763			

3.2.2.13 Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

The ASSIST (Humeniuk et al., 2008; Humeniuk, Henry-Edwards, Ali, Poznyak, & Monteiro, 2010; WHO ASSIST Working Group, 2002) originally was developed by the World Health Organization (WHO) as a psychometrically sound and valid screening interview schedule for use in primary care settings. The interview serves the assessment of presence and severity of problems in relation to the consumption of different classes of psychoactive substances.

Besides the interviewer-administered form, however, the ASSIST has been used in self-administered forms including questionnaire and was generally found to be suitable for this use (Barreto, de Oliveira Christoff, & Boerngen-Lacerda, 2014; McNeely et al., 2014). Therefore, the ASSIST schedule was adapted to an adaptive questionnaire design. Figure II.3 provides a list of the assessed groups of psychoactive substances (with listed examples). Participants also had the possibility to state the non-medical use of other psychoactive substances not captured by this list of predefined response options (up to three substances could be stated and were hence integrated into the adaptive questionnaire design).

- **Tabak:** *Zigaretten, Zigarren, Kautabak, etc.*
- **Alkoholische Getränke:** *Bier, Wein, Spirituosen, etc.*
- **Cannabis:** *Marijuana, Gras, Haschisch, etc.*
- **Kokain:** *Koks, Crack, etc.*
- **Amphetamine:** *Speed, Appetitzügler, Ecstasy, etc.*
- **Inhalantien:** *Stickstoffverbindungen, Klebstoff, Benzin, Lösungsmittel etc.*
- **Schlaf-/Beruhigungsmittel:** *Valium, Oxazepam, Rohypnol, etc.*
- **Halluzinogene:** *LSD, Meskalin, Ketamin, Atropin/Skopolamin (z.B. Engelstrompete, Stechapfel) etc.*
- **Opiate:** *Heroin, Morphium, Methadon, Codein, etc.*

Figure II.3

List of substance groups with examples of specific allocated substances (as provided to participants during the survey)

First, participants were asked to state the lifetime prevalence of substance use for any of the substance groups and/or up to three substances not already enlisted (question group 1). Hence, participants were adaptively screened for the three-month prevalence of substance use for any of the previously selected substance groups (question group 2). For any of the substances consumed at least once during the past three months, participants were further screened for the presence of specific substance(s)-related craving (question group 3), the presence/occurrence of health-related, financial, legal or social problems because of the consumptions of the respective substance(s) (question group 4) and the inability to meet daily demands because of the consumption of the respective substance(s) (question group 5) during

the past three months. The last two question groups were asked for all substance groups with stated lifetime prevalence and asked whether it ever happened that social surroundings held worries concerning the participant's consumption of the respective substance(s) (question group 6) and whether there ever were unsuccessful attempts at discontinuation of the respective substance(s) (question group 7). An eighth question, actually part of the interview schedule and concerning the lifetime-prevalence of needle use in the consumption of any of the respective substance(s), was dropped from the questionnaire used herein, since participant responses given to that question are not considered for the calculation of substance-specific problem scores (see Humeniuk et al., 2010 for details). Response options were provided and participant responses coded and summed for each of the substance groups according to the manual of the ASSIST (Humeniuk et al., 2010), with higher scores generally indicating more substance-related problems.

Because of the low prevalence of use for most of the illegal drugs, only the problem scales for tobacco (ASSIST_nicotine), alcohol (ASSIST_alcohol) and cannabis (ASSIST_cannabis) will be used for the analyses to-be-presented.

3.2.2.14 Generalized Anxiety Disorder Scale (GAD-7)

The GAD-7 is a brief screening instrument for the assessment of symptoms of Generalized Anxiety Disorder, as defined by the DSM-IV (Kroenke, Spitzer, Williams, & Löwe, 2010; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; R. L. Spitzer, Kroenke, Williams, & Löwe, 2006). The scale is widely used, and has long established its reliability and validity (Kroenke et al., 2010).

The scale encompasses seven items that are to be rated on the basis of the past two weeks, each concerning specific symptoms of the disorder (e.g. *“Not being able to stop or control worrying”*). The items are rated on a 4-point Likert scale and participants are asked to rate them according to the frequency they were bothered by them (*“never,” “several days,” “more than half the days,” “nearly every day”*). Item responses are summed, with higher scores indicating a higher amount of participant burden through the presence of symptoms of generalized anxiety disorder.

3.2.2.15 Depression Scale of the Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a widely used measure screening for the presence and severity of symptoms of Major Depression according to the DSM-IV and has established reliability and validity (Gräfe, Zipfel, Herzog, & Löwe, 2004; Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001; Kroenke et al., 2010; Löwe, Spitzer, Zipfel, & Herzog, 2002).

The scale consists of nine items which are to be rated according to the past two weeks, each related to one of the symptom criteria used to establish a diagnosis of Major Depression

(e.g. *“Little interest or pleasure in doing things”*). As with the GAD-7, items are rated on a 4-point Likert scale according to the frequency participants felt bothered by them (*“never,” “several days,” “more than half the days,” “nearly every day”*). Item responses are summed, with higher scores indicating a higher amount of participant burden through the presence of depressive symptoms.

3.2.2.16 MINI Social Phobia Inventory (Mini-SPIN)

The Mini-SPIN is an ultra-brief measure of only three items, used for screening the presence and severity of symptoms of social phobia or the generalized form of social anxiety disorder (Brähler, Zenger, & Kemper, 2013; Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001). The scale has been shown to have sound psychometric characteristics (Connor et al., 2001; Seeley-Wait, Abbott, & Rapee, 2009).

The three items are to be judged based on the past seven days and encompass self-referred statements encompassing core characteristics of social phobia (e.g. *“I avoid activities in which I am the center of attention”*). Subjects are to make use of a 5-point Likert scale in order to indicate their level of agreement to each statement (*“not at all,” “a little bit,” “somewhat,” “very much,” “extremely”*). Item scores are summed, with higher scores reflecting a heightened level of socially phobic behavior as rated by the participant.

3.2.2.17 Adult ADHD Self-Report Scale (ASRS)

The ASRS (version 1.1) is a WHO self-report screening instrument for the assessment of both presence and severity of ADHD symptoms in adult populations (Kessler et al., 2005; Kessler et al., 2007). The instrument consists of six items, each encompassing problem behaviors in a variety of situational contexts known to be problematic for persons with ADHD (e.g. *“How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?”*). The subject is asked to rate each item according to the past 6 months, using a 5-point Likert scale (*“never,” “rarely,” “sometimes,” “often,” “very often”*).

Item responses were scored and dichotomized according to a weighted scoring scheme (Kessler et al., 2007). Higher scores reflect a stronger severity of ADHD symptoms.

3.3 Procedure

After the implementation of Limesurvey™ and the digitization of the various questionnaires, participant recruitment was initiated.

To approach a broad sample of university students, a contact list of student representatives of various fields of study at universities in German-speaking countries (e.g. mathematics, biology, chemistry, medicine, psychology, social studies, politics, study of languages, physics, engineering, information technologies, nautics, geology, etc.) was collected through web search. Hence, a total of 1970 different student representatives were contacted by means of email, Facebook or contact forms of websites and requested to transfer an appeal to contribution containing the web link of the survey to their fellow students. Upon accessing the web link, subjects were forwarded to a welcome screen containing information about the content and duration of the survey, a notice of confidentiality and a declaration of informed consent. Proceeding to the next screen, the survey questionnaire was delivered and demographic information, Internet use data and scales measures were surveyed in the order displayed in Figure II.4.

Upon completion of the survey, participants had the possibility to give their consent and sign up to participate in a raffle of 5x25 Euros. To sign up, participants were required to provide potentially sensitive personal information, namely their email addresses. In order to ensure the anonymity of the surveyed responses, these email addresses had to be stored strictly separated from the response data. In order to do so, a PHP script (kindly provided by Dr. Benjamin Wankerl and Dorottya Bornemissza, both former employees of the Chair of Psychology III at the University of Regensburg) was run, which would record and transfer the email addresses to an email account, from where this information was deleted as soon as saved to an offline list file. Data acquisition took place between Jun 22, 2015 and Jul 30, 2015.

3.4 Statistical analyses

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, Version 23) with the PROCESS macro (Hayes, 2013, version 2.15) installed. All inferential tests

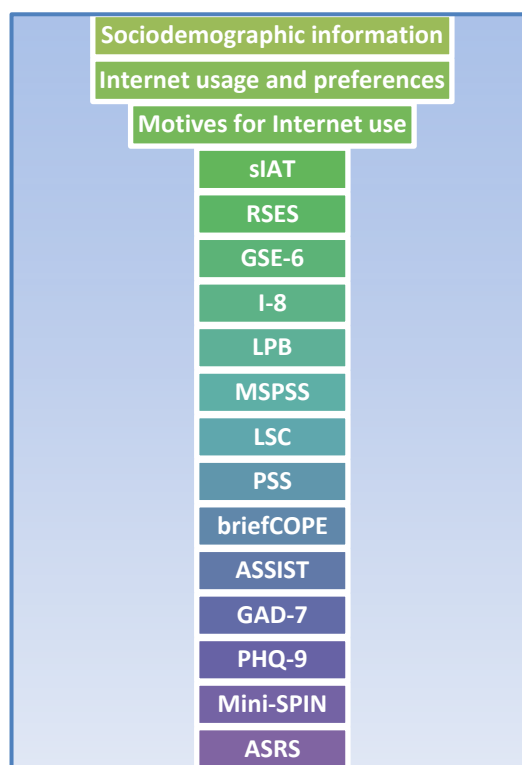


Figure II.4
Scheme of survey question order

were performed using the standard alpha criterion (i.e. $\alpha \leq .05$), unless otherwise stated. Descriptives of all scale scores were calculated assuming metric scale level (i.e. means, standard errors, Cronbach's alpha).

The first set of analyses concerning the associations between loneliness and indicators of psychosocial health and coping were conducted by the calculation of bivariate correlations, using the Bravais–Pearson product-moment correlation coefficient. Correlations between dichotomous indicators and indicators measured at scale-level (e.g. the association between gender and loneliness) were calculated using point-biserial correlations. Correlations between two dichotomous variables were calculated using the Φ -coefficient (i.e. the association between gender and partner status).

With a view to investigating research questions 1 and 3, a moderated mediation model was developed for the sIAT score as a criterion measure of Internet addiction and the three Internet motive dimensions (fun & relaxation, information & learning, social & personal unfolding) as mediating variables (see the conceptual model in Figure II.5).

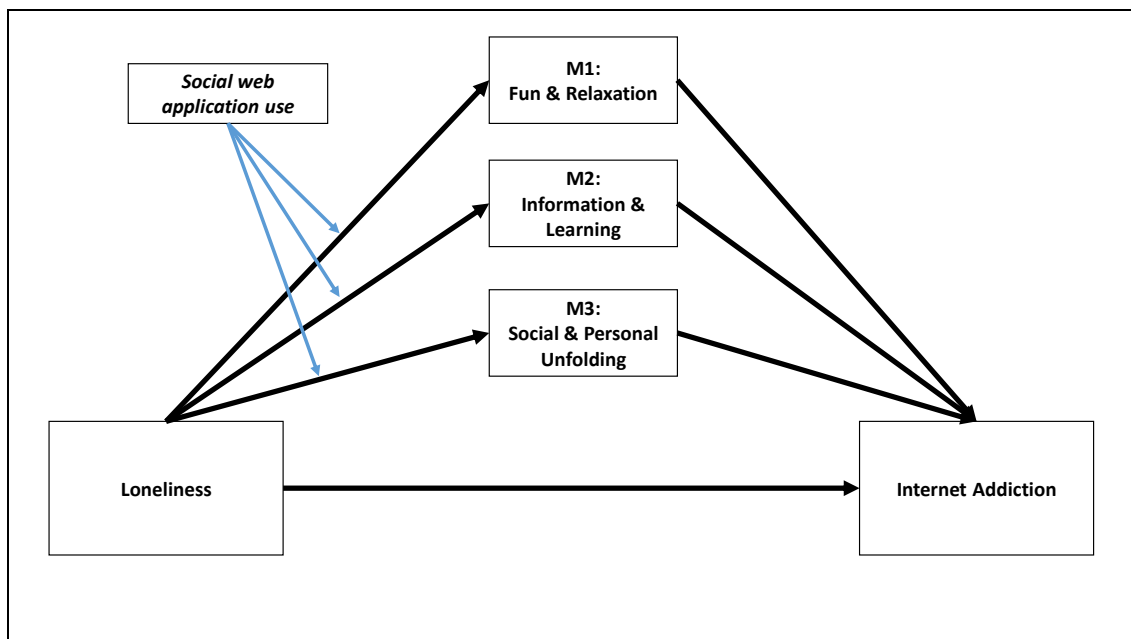


Figure II.5

Conceptual model depicting conditional indirect effects of loneliness on Internet addiction, as moderated by the amount of social web application use

In the first step of this analysis, a parallel multiple mediator model with several parallel mediator variables (i.e. Internet motive dimensions) was specified (using PROCESS model 4). The LSC score was entered into the model as an exogenous variable influencing Internet addiction both directly and indirectly through the Internet motive dimensions. In the second step, the parallel

multiple mediator model was extended to include conditional effects in the indirect effect paths of loneliness (i.e. first-stage moderated parallel multiple mediator model; PROCESS model 7). As hypothesized, the amount of social web application use (represented by the estimated weekly use duration) was entered as a moderator of loneliness effects on the three Internet use motives, while controlling for the effects of overall Internet use duration. Identified conditional indirect effects were further analyzed and visualized using the PROCESS macro for SPSS (Hayes, 2013), using the Quantile approach. Hereby, the strength of relationship between predictor and criterion variable is assessed at the 10th, 25th, 50th, 75th, and 90th percentile values of the moderator variable (Hayes, 2013). Statistical significance of indirect effects (Model 4) as well as conditional indirect effects (Model 7; i.e. moderated mediation effects) at different values of the moderator variable were assessed against the background of 95% bias-corrected bootstrap confidence intervals, based on n=10.000 bootstrap samples. In order to judge the presence of effect contingency (i.e. moderation) in the indirect effect paths, Hayes' index of moderated mediation (Hayes, 2013, 2015) was used. Conditional total effects were quantified and compared at the 10th, 25th, 50th, 75th, and 90th percentiles of the moderator variable, again by using 95% bias-corrected bootstrap confidence intervals based on the same n=10.000 bootstrap samples. To investigate the robustness of identified moderated mediation effects, the model was rerun in a subsequent exploratory analysis, controlling for several sociodemographic and psychosocial covariates. The entered psychosocial covariates were identified in a separate stepwise multiple regression model (data not shown) using the sIAT score as a criterion measure and keeping the Internet use motive scores in the model (while excluding the loneliness score). Hence, sociodemographic indicators (age, gender, partner status) and several psychosocial problem indicators (I-8 subscales: perseverance, urgency; LPB-sec score; nicotine and cannabis abuse subscales of the ASSIST; GAD-7 score) were entered into the moderated mediation model as covariates, and effects on the direct and the conditional indirect effect paths were investigated. All presented regression coefficients will be expressed in their unstandardized form and dichotomous covariates (gender, partner status) were coded 0/1 (gender: 0-female, 1-male; partner status: 0-single, 1-romantically linked).

To investigate research question 2, several analyses involving the loneliness scale score and different types of Internet use measures were conducted. Bivariate correlations using Spearman rank correlation coefficients were calculated for the association of the loneliness score with the service-specific frequency of use parameters. For weekly use duration parameters, bivariate correlations using the Bravais-Pearson product-moment correlation coefficient were calculated. Concerning the association of loneliness with the most preferred Internet activity, two different procedures were employed. In order to obtain a measure of overall association,

the square root of eta-squared, eta, was calculated, by cross-tabulating the favorite Internet activity parameter (i.e. subjects' TOP1 Internet activity) and the loneliness score. This kind of procedure is suggested by Eid, Gollwitzer, and Schmitt (2015, p. 568) in order to obtain a measure of association between a multicategorical nominal variable and a measure at metric scale level. In order to analyze the associations between loneliness levels and specific Internet use preferences, the loneliness score was trichotomized based on the 33%- and 66%-percentiles: participants obtaining scale scores between 11 and 19 were subsumed to form a "*no-loneliness*" group. Participants scoring between 20 and 26 points on the scale were subsumed to form a "*low-loneliness*" group, and participants scoring between 27 and 55 points were subsumed to form a "*severe loneliness*" group. This ad hoc group indicator variable was then cross-tabulated with the favorite Internet activity parameter and a Fisher-Freeman-Halton test (with a Monte Carlo confidence interval of 99.9% for the exact p-value, based on n=10,000 samples) was conducted, as some of the cells had expected frequencies lower than five.

4. Results

4.1 Descriptive statistics

4.1.1 *Internet use data*

In terms of Internet access, the vast majority of the study sample made use of more than one way of Internet access. Private personal computers and laptops (99.1%) were the most frequently used device, followed by smartphones (81.3%). A large part of the sample also used working stations in educational and/or occupational settings in order to access the Internet (71.5%). Less common were tablet devices (24%), Internet-ready video game consoles (10.8%) or other hardware like television devices or e-book readers (2.9%). The visit of Internet cafes was very uncommon among the study sample (.4%).

Large parts of the sample used the Internet for more than one purpose: when asking participants which Internet activities they were generally engaging in, a large majority of the sample acknowledged to make use of several of the following activities: social web applications (96.6%), audiovisual entertainment services (95.1%), specific information services (98.7%) or some “life-practical” activities (88.8%). While aimless surfing was also quite prevalent (72.8%), the use of online games (39.8%) and pornographic services (33.3%) was not as common.

When asking about the frequency of engagement in these different activity domains, a more nuanced pattern of results emerges (see Table II.11). As can be seen from Table II.11, the use of social web applications was the most frequently endorsed Internet activity, with more than 80% of the sample engaging in it at least once per day. More than 55% of the sample made use of some form of audiovisual entertainment and some specific form of information service daily, whereas less than 5% of the sample used some form of productive or life-practical Internet service. Sporadic use of these services was much more common, as about 44% of the sample used such services less than once per week. The same seems to hold for online gaming services, since just above 5% of the sample were engaging in it on a daily basis, whereas the majority of gamers endorsed some sporadic forms of use. Surfing the web was a common activity, since more than 40% of the whole sample reported engaging in it on a daily basis. The use of pornographic web content was also rather infrequent, although more than 14% of the whole sample reported such use on a daily basis. Note that only about 4% of the total sample did not use the Internet on a daily basis.

Table II.11

Frequency of engagement in different Internet activity domains (given as percentages of the total sample)

	SOC	AV	INF	LP	SURF	GAME	PORN	Overall Use
No use	3.4	4.9	1.3	11.2	27.2	66.7	60.2	-
< 1x/week	.9	2.2	2.7	44.5	2.2	10.1	7.9	-
1x/week	1.3	7.2	3.8	22.0	7.6	3.1	4.9	-
>1x/week	11.5	29.9	35.7	18.0	22.0	14.6	12.6	4.3
1x/day	16.6	25.8	29.0	3.4	21.6	3.6	9.0	16.6
> 1x/day	66.3	29.9	27.4	.9	19.3	1.8	5.4	79.1

Annotations.

SOC: social web application use; AV: audiovisual entertainment service use; INF: specific information and learning service use; LP: productive and everyday life-practical services; SURF: web surfing and undirected information search; GAME: online game use; PORN: pornographic content consumption.

The descriptive statistics for the estimated durations (in hours per week) of a specific service and overall Internet use are given in Table II.12 for the whole sample and only for those who reported use of such services. As can be seen, the overall sample reported a mean duration of almost 35 hours of overall Internet use per week. About 60% of this time (~21h) was devoted to either social web application or audiovisual entertainment use. Consistent with highly prevalent, but rather infrequent service use, productive and life-practical services were used for only about one hour per week. Online gaming, on the other hand, was used for an average of more than four hours per week despite its low prevalence and the infrequent nature of service use. It is notable that, while the use for surfing and pornographic purposes was of rather low duration in the whole study sample, the mean service use durations were 2–3 times higher in those actually engaging in them (see Table II.12).

Table II.12

Duration of engagement in different Internet activity domains (given as hours per week) collapsed across the whole sample and only for actual users of respective services

		SOC	AV	INF	LP	SURF	GAME	PORN	Overall Use
Whole Sample	M	9.49	11.51	5.41	.96	2.58	4.21	.71	34.88
	S.E.	.557	.580	.268	.084	.286	.299	.088	1.368
	n	445	445	445	445	445	445	445	445
Service Users	M	9.82	12.11	5.48	1.08	5.79	6.49	2.15	
	S.E.	.570	.596	.270	.093	.375	.611	.223	
	n	430	423	439	395	324	177	148	

Annotations.

M: mean; S.E.: standard error of the mean; SOC: social web application use; AV: audiovisual entertainment service use; INF: specific information and learning service use; LP: productive and everyday life-practical services; SURF: web surfing and undirected information search; GAME: online game use; PORN: pornographic content consumption.

When asking participants about their most indispensable and favorite Internet activities, the primacy of social web applications—as already indicated by the more objective data regarding usage frequency and duration—could also be found at the level of subjective experience (see Table II.13): More than 87% of the whole sample stated social web applications to be among the top three of their most indispensable Internet activities, with almost half of the sample stating them to be the most important type of activity they engaged in. While not as prevalent in terms of usage frequency and duration, Internet use for information & learning purposes held the second rank in terms of subjective importance, ranging in the top three for 82.5% of the whole sample. Despite its high prevalence in terms of usage frequency and duration, Internet use for audiovisual entertainment purposes was rated by a minority of 12.4% to be their most important type of Internet activity, with just below two thirds of the whole sample naming it to be in their top three of types of Internet activity. Internet activities rated as not so indispensable were: life-practical and productive types of Internet activity, web surfing, gaming and pornography (see Table II.13).

Table II.13

Rank ordering of participant ratings regarding their top three of most indispensable Internet activities

Category of Use	TOP1	TOP2	TOP3	Σ
social web applications	49.7%	22.2%	15.5%	87.4%
information & learning	30.8%	34.4%	17.3%	82.5%
audiovisual entertainment	12.4%	20.7%	31.7%	64.8%
life practical and productives	3.8%	9.0%	18.2%	31.0%
surfing	1.3%	7.9%	10.6%	19.8%
gaming	2.0%	4.9%	3.8%	10.7%
pornography	0%	.7%	2.0%	2.7%

Annotations.

Note that percentages within each column do not necessarily add up to 100% (of the sample), as not all participants stated to engage in three different categories of Internet activity.

4.1.2 Psychometric scale data

As can be seen from Table II.14, most of the scales had acceptable-to-good internal consistency values well above .700, as assessed by Cronbach’s alpha. With the notable exception of the ASRS, all scales with alpha values below .700 were comprised of only 2–3 items each (i.e. M2_inf; M3_soc; I-8_urgency; I-8_persev; C2_self-reproach). As the height of alpha values depend on both inter-item correlations and the numbers of items comprising a scale (L. A. Clark & Watson, 1995), it was decided to keep these scale scores for further analyses. The low alpha value of .537 of the ASRS (despite its six items) was deemed unacceptable and the scale was excluded from further statistical analyses.

As can also be seen from the minimum and maximum values of the scales (see Table II.14), participants made use of the whole range of possible scale scores, with mean scale scores falling well in-between the ceiling and bottom values of the different psychometric scales (with the notable exception of the C3_religion score, which was near the bottom value). Likewise, there was considerable variability in scale scores, as can be seen from the standard deviation values given in the table.

Table II.14

Descriptive statistics of the employed psychometric scales

Instrument	M	S.E.	Min	Max	SD	Cronbach's Alpha	Scale Range
M1_fun	11.41	.120	3	15	2.524	.794	3–15
M2_inf	12.19	.093	5	15	1.962	.654	3–15
M3_soc	6.79	.129	3	15	2.724	.694	3–15
sIAT	23.84	.295	12	44	6.221	.816	12–60
RSES	33.83	.381	11	50	8.046	.920	10–50
GSE-6	22.24	.167	11	30	3.519	.786	6–30
I-8_urgency	2.67	.043	1	5	.902	.684	1–5
I-8_premed	3.71	.042	1	5	.886	.875	1–5
I-8_persev	3.50	.042	1	5	.889	.640	1–5
I-8_sensation	3.10	.045	1	5	.940	.916	1–5
LPB_sec	2.61	.044	1	5	.923	.922	1–5
LPB_inf	2.16	.042	1	5	.894	.874	1–5
LPB_job	2.69	.054	1	5	1.142	.834	1–5
MSPSS	5.78	.058	1	7	1.214	.939	1–7
LSC	24.14	.405	11	55	8.535	.908	11–55
PSS	25.59	.407	2	54	8.586	.871	0–56
C1_social	15.00	.198	6	24	4.186	.854	6–24
C2_self-reproach	5.96	.096	3	12	2.030	.678	3–12
C3_religion	2.71	.065	2	8	1.372	.829	2–8
C4_humour	4.55	.084	2	8	1.781	.781	2–8
C5_Internet use	3.65	.072	2	8	1.514	.814	2–8
C6_active	8.38	.099	3	12	2.092	.763	3–12
ASSIST_alcohol	6.84	.313	0	33	6.611	.759	0–39
ASSIST_nicotine	3.50	.322	0	30	6.790	.870	0–31
ASSIST_cannabis	1.53	.218	0	37	4.590	.859	0–39
GAD-7	5.58	.220	0	21	4.648	.882	0–21
PHQ-9	6.27	.244	0	24	5.153	.868	0–27
Mini-SPIN	6.55	.149	3	15	3.148	.824	3–15
ASRS	1.73	.069	0	6	1.449	.537	0–6

Annotations. M: mean; S.E.: standard error of the mean; MIN: minimal participant score; MAX: maximal participant scale score; SD: Standard Deviation.

4.2 Loneliness, psychosocial adjustment and mental health

4.2.1 Loneliness and indicators of psychosocial adjustment

As expected, loneliness was associated with a broad variety of indicators of psychosocial adaptation in statistically significant and conceptually meaningful ways. The LSC score showed strong negative associations with measures of perceived social support (MSPSS; $r = -.730$) and self-esteem (RSES; $r = -.599$). There were also weak-to-moderate positive associations between the LSC score and different indicators of career-related strain in the university context (LPB_sec, LPB_inf, LPB_job; see Table II.15), which is also reflected in a moderate negative association with general beliefs about self-efficacy in the face of adversity (GSE-6; $r = -.385$). Furthermore, loneliness was moderately and positively associated with current life stress, as indicated by the Perceived Stress Scale (PSS; $r = .459$). Compared to the pattern of associations of the MSPSS as a more genuine measure of social support, the LSC score showed slightly stronger associations with identity-related problems regarding general and vocational self-concepts, as indexed by the LPB subscales (see Table II.15). Note, however, that the overall pattern of intercorrelations was not specific for either the LSC or the MSPSS scale scores as indicators of (psycho)social adaptation, but also held for the indicators of global self-concept such as the RSES or the GSE-6. Hence, the presence of problems in one domain of psychosocial functioning was also linked, albeit more or less tightly, to the presence of problems in other domains of functioning.

Table II.15

Intercorrelations between loneliness (LSC) and indicators of psychosocial adaptation

	1	2	3	4	5	6	7	8	9	10	11
1. LSC	1	-.730 ^{***}	-.599 ^{***}	-.385 ^{***}	.386 ^{***}	.269 ^{***}	.134 ^{**}	.459 ^{***}	-.010	.225 ^{***}	-.263 ^{***}
2. MSPSS	-.730 ^{***}	1	.466 ^{***}	.267 ^{***}	-.200 ^{***}	-.106 [*]	-.010	-.324 ^{***}	-.098 [*]	-.318 ^{***}	.272 ^{***}
3. RSES	-.599 ^{***}	.466 ^{***}	1	.612 ^{***}	-.451 ^{***}	-.264 ^{***}	-.286 ^{***}	-.671 ^{***}	.022	.009	.096 [*]
4. GSE-6	-.385 ^{***}	.267 ^{***}	.612 ^{***}	1	-.407 ^{***}	-.293 ^{***}	-.313 ^{***}	-.542 ^{***}	.016	.138 ^{**}	.033
5. LPB_sec	.386 ^{***}	-.200 ^{***}	-.451 ^{***}	-.407 ^{***}	1	.745 ^{***}	.450 ^{***}	.425 ^{***}	-.160 ^{**}	-.068	-.064
6. LPB_inf	.269 ^{***}	-.106 [*]	-.264 ^{***}	-.293 ^{***}	.745 ^{***}	1	.429 ^{***}	.279 ^{***}	-.179 ^{***}	-.066	-.009
7. LPB_job	.134 ^{**}	-.010	-.286 ^{***}	-.313 ^{***}	.450 ^{***}	.429 ^{***}	1	.300 ^{***}	.073	-.287 ^{***}	.030
8. PSS	.459 ^{***}	-.324 ^{***}	-.671 ^{***}	-.542 ^{***}	.425 ^{***}	.279 ^{***}	.300 ^{***}	1	-.029	-.104 [*]	.041
9. Age	-.010	-.098 [*]	.022	.016	-.160 ^{**}	-.179 ^{***}	.073	-.029	1	.076	.060
10. Gender^a	.225 ^{***}	-.318 ^{***}	.009	.138 ^{**}	-.068	-.066	-.287 ^{***}	-.104 [*]	.076	1	-.194 ^{***}
11. Partner^a	-.263 ^{***}	.272 ^{***}	.096 [*]	.033	-.064	-.009	.030	.041	.060	-.194 ^{***}	1

Annotations.

^a Correlations between dichotomous indicators and indicators measured at scale-level were calculated using point-biserial correlations; correlations between two dichotomous variables were calculated using the Φ -coefficient; Gender-Coding: 0-female, 1-male; Partner-Coding: 0-No Partner, 1-Partner;

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed)

4.2.2 Loneliness and mental health indicators

Compared to measures of psychosocial adaptation, the pattern of associations between loneliness and indicators of different mental health problems was more specific. Whereas there were statistically significant and positive associations with indicators of anxiety disorders (GAD-7, Mini-SPIN) and depression (PHQ-9) in the moderate-to-strong range (see Table II.16), there were no significant associations between loneliness and ill-/licit substance abuse, as indexed by the nicotine, alcohol and cannabis subscales of the ASSIST. Both generalized anxiety disorder and depression were significantly and positively associated with substance abuse domains, although these associations were generally weak. The Mini-SPIN as an indicator of social phobia, however, was unrelated to the substance abuse domains assessed, which themselves were correlated among each other in the medium range (see Table II.16).

Table II.16

Intercorrelations between loneliness (LSC) and mental health indicators

	1	2	3	4	5	6	7
1. LSC	1	.458 ^{***}	.539 ^{***}	.430 ^{***}	-.065	.064	.050
2. GAD-7	.458 ^{***}	1	.778 ^{***}	.477 ^{***}	.062	.135 ^{**}	.122 [*]
3. PHQ-9	.539 ^{***}	.778 ^{***}	1	.535 ^{***}	.116 [*]	.201 ^{***}	.177 ^{***}
4. Mini-SPIN	.430 ^{***}	.477 ^{***}	.535 ^{***}	1	-.038	.038	-.001
5. ASSIST_nicotine	-.065	.062	.116 [*]	-.038	1	.437 ^{***}	.487 ^{***}
6. ASSIST_alcohol	.064	.135 ^{**}	.201 ^{***}	.038	.437 ^{***}	1	.485 ^{***}
7. ASSIST_cannabis	.050	.122 [*]	.177 ^{***}	-.001	.487 ^{***}	.485 ^{***}	1

Annotations.

^{***} Correlation significant at $p < .001$ (two-tailed); ^{**} Correlation significant at $p < .01$ (two-tailed); ^{*} Correlation significant at $p < .05$ (two-tailed).

4.2.3 Loneliness and stress-related coping behaviors

To investigate the associations of loneliness with stress-related coping behaviors, scale scores derived from exploratory factor analysis (as outlined in Section II.3.2.2.12) of the briefCOPE were used. To investigate the possible importance of associations between loneliness and stress-related coping behaviors for the presence of life-stress, the PSS score was also included in this correlational analysis. As can be seen from Table II.17, the LSC score was significantly related to all but one of the coping behavior subscales, namely religious coping (C3_religion; $r = .021$). The significant associations were all in the small-to-medium range and generally indicative of a more dysfunctional type of stress-related coping. This was indicated by weak-to-moderate negative associations between the LSC score and apparently adaptive coping dimensions such as social support seeking (C1_social; $r = -.402$), active problem-solving (C6_active; $r = -.262$) and humorous coping (C4_humour; $r = -.168$). At the same time, there were moderate

positive associations between the LSC score and apparently dysfunctional ways of stress-related coping, such as rumination and self-reproach (C2_self-reproach; $r = .347$) and engaging in distractive Internet use (C5_Internet use; $r = .324$).

The (mal-)adaptiveness of the identified coping dimensions was assessed preliminarily by exploring their association with current life stress, as indexed by the Perceived Stress Scale (which asked for the presence of stressful situations based on the previous 30 days). This analysis showed that social support seeking (C1_social; $r = -.089$) and religious coping (C3_religion; $r = -.007$) were unrelated to current stress levels. However, rumination and self-reproach coping (C2_self-reproach; $r = .453$) and distractive Internet use (C5_Internet use; $r = .253$) were positively associated with current stress levels in a weak-to-moderate range. Moreover, active problem-solving behaviors (C6_active; $r = -.306$) and humorous coping (C4_humour; $r = -.191$) were negatively associated with current stress levels in the weak-to-moderate range.

Table II.17

Intercorrelations between loneliness (LSC), current life stress and stress-related coping behaviors

	1	2	3	4	5	6	7	8
1. LSC	1	.459 ^{***}	-.402 ^{***}	.347 ^{***}	.021	-.168 ^{***}	.324 ^{***}	-.262 ^{***}
2. PSS	.459 ^{***}	1	-.089	.453 ^{***}	-.007	-.191 ^{***}	.253 ^{***}	-.306 ^{***}
3. C1_social	-.402 ^{***}	-.089	1	-.003	.177 ^{***}	.142 ^{**}	-.043	.395 ^{***}
4. C2_self-reproach	.347 ^{***}	.453 ^{***}	-.003	1	.084	-.060	.302 ^{***}	-.196 ^{***}
5. C3_religion	.021	-.007	.177 ^{***}	.084	1	.104 [*]	.059	.205 ^{***}
6. C4_humour	-.168 ^{***}	-.191 ^{***}	.142 ^{**}	-.060	.104 [*]	1	.009	.187 ^{***}
7. C5_Internet use	.324 ^{***}	.253 ^{***}	-.043	.302 ^{***}	.059	.009	1	-.105 [*]
8. C6_active	-.262 ^{***}	-.306 ^{***}	.395 ^{***}	-.196 ^{***}	.205 ^{***}	.187 ^{***}	-.105 [*]	1

Annotations.

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed).

4.3 Loneliness associations with Internet use dimensions

As shown in Table II.18, there were several statistically significant correlations between the loneliness scale score and the frequency of engaging in specific types of Internet activity. All of these associations were small and in positive direction, i.e. higher levels of loneliness were associated with more frequent use the following: audiovisual entertainment services, information & learning services, online gaming, web surfing and pornographic web content consumption. Loneliness, however, was unrelated to the frequency of the use of social web applications, the frequency of using the Internet for life-practical or other productive purposes, and the overall frequency of Internet use.

This lack of correlation of the LSC score with the overall frequency parameter, despite all the positive correlations with other service-specific parameters, might be secondary to the lack of correlation of the LSC score with the frequency of social web application use. As can be seen from Table II.18, the overall frequency parameter correlated most strongly with the frequency parameter for social web application use. Thus, the overall frequency parameter was governed by the social web application use parameter to a large extent. Remember from the Internet use data presented in Section II.4.1.1 that social applications were used daily by more than 80% of the total sample, with almost two thirds of the sample using them several times per day (see Table II.11 in Section II.4.1.1).

Table II.18

Intercorrelations between loneliness (LSC) and Internet use frequencies for general and specific Internet activities (based on Spearmans rho)

	1	2	3	4	5	6	7	8	9
1. LSC	1	.012	.146**	.129**	-.013	.127**	.164**	.178***	.045
2. FR_CON	.012	1	.126**	.120*	.141**	.134**	.135**	.073	.716***
3. FR_AV	.146**	.126**	1	.278***	.224***	.262***	.356***	.305***	.367***
4. FR_INF	.129**	.120*	.278***	1	.277***	.094*	.351***	.177***	.310***
5. FR_LP	-.013	.141**	.224***	.277***	1	.098*	.239***	.120*	.205***
6. FR_GAME	.127**	.134**	.262***	.094*	.098*	1	.186***	.242***	.227***
7. FR_SURF	.164**	.135**	.356***	.351***	.239***	.186***	1	.360***	.240***
8. FR_PORN	.178***	.073	.305***	.177***	.120*	.242***	.360***	1	.172***
9. FR_OVERALL	.045	.716***	.367***	.310***	.205***	.227***	.240***	.172***	1

Annotations.

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed).

As shown in Table II.19, the LSC score correlated with none but two of the Internet use duration parameters in significant ways. These associations were in positive direction and of small magnitude and encompassed the following service-specific use durations: web surfing, pornography use. All other service-specific parameters and the overall use duration measure were unrelated to the loneliness score. Note from Table II.19 that several service-specific use parameters were strongly and positively correlated (r values $\geq .5$) with the overall use duration parameter: social web applications, audiovisual entertainment, information and learning, web surfing. Other parameters were moderately associated with overall use duration (r values between .3 and .5): online gaming, pornography use. Duration of life-practical service use was only weakly ($r < .3$) associated with overall use duration.

Table II.19

Intercorrelations between loneliness (LSC) and duration of Internet use, for general and specific Internet activities (based on Pearson’s r)

	1	2	3	4	5	6	7	8	9
1. LSC	1	-.064	.061	.031	-.008	.078	.111*	.145**	.055
2. DUR_CON	-.064	1	.242***	.417***	.143**	.087	.361***	.110*	.704***
3. DUR_AV	.061	.242***	1	.267***	.217***	.253***	.442***	.256***	.754***
4. DUR_INF	.031	.417***	.267***	1	.142**	.043	.391***	.174***	.593***
5. DUR_LP	-.008	.143**	.217***	.142**	1	.085	.141**	.059	.292***
6. DUR_GAME	.078	.087	.253***	.043	.085	1	.161**	.150**	.410***
7. DUR_SURF	.111*	.361***	.442***	.391***	.141**	.161**	1	.310***	.692***
8. DUR_PORN	.145**	.110*	.256***	.174***	.059	.150**	.310***	1	.355***
9. DUR_OVERALL	.055	.704***	.754***	.593***	.292***	.410***	.692***	.355***	1

Annotations.

*** Correlation significant at p < .001 (two-tailed); ** Correlation significant at p < .01 (two-tailed); * Correlation significant at p < .05 (two-tailed).

The calculated measure of overall association between the loneliness score and the multi-categorical favorite Internet activity parameter (TOP1 activity), yielded a score of $\eta = .19$, indicative of a small association ($\eta^2 = .036$). This association was analyzed more specifically by cross-tabulating the ad hoc formed loneliness groups (see Section II.3.4) and the favorite Internet activity, as shown in Table II.20.

Table II.20

Cross-tabulation of loneliness group status and frequencies of stated favorite online activities

			TOP1 Internet Activity						Σ
			R1_CON	R1_AV	R1_INF	R1_LP	R1_GAME	R1_SURF	
Loneliness Group	no	obs.	78	13	45	5	2	3	146
		exp.	72.5	18.0	44.9	5.6	3.0	2.0	146
	low	obs.	83	24	30	4	1	2	144
		exp.	71.5	17.8	44.3	5.5	2.9	1.9	144
	high	obs.	60	18	62	8	6	1	155
		exp.	77.0	19.2	47.7	5.9	3.1	2.1	155
Σ	obs.	221	55	137	17	9	6	445	
	exp.	221	55	137	17	9	6	445	

Annotations.

“no” loneliness group: LSC scores 11–19; “low” loneliness group: LSC scores 20–26; “high” loneliness group: LSC scores 27–55; “obs.”: observed frequency; “exp.”: expected frequency.

The Fisher-Freeman-Halton test was significant at p < .05 (F(x): 24.553; exact two-sided p-value: .003, 99.9%-CI: .001 to .005). An inspection of Table II.20 shows marked deviations of observed from expected frequencies in the high-loneliness group, with lower-than-expected frequencies for social web applications and higher-than-expected frequencies for learning and information services. The reverse pattern, i.e. higher-than expected frequencies for social web applications and lower-than expected frequencies for learning and information services, was found for the low-loneliness group. The no-loneliness group, on the other hand, was marked by slightly higher-than-expected frequencies for social web applications and as-expected fre-

quencies for learning and information services. Another noteworthy difference exists for audiovisual entertainment service preferences, as frequencies were lower than expected in the no-loneliness group, higher than expected in the low-loneliness group, and as expected in the high-loneliness group. Also of note is that six out of nine persons citing online gaming as their favorite activity were in the high-loneliness group.

4.4 Moderated mediation analysis of loneliness effects on Internet addiction

4.4.1 Intercorrelations among study variables

A full display of the intercorrelations between the variables fed into the statistical models to be presented can be found in Table II.21.

Looking at the intercorrelations between psychosocial indicators and Internet (ab)use indicators, it becomes clear that the LSC score, while being unrelated to actual Internet use behaviors (see also Section II.4.3 above), was significantly and positively correlated in the weak-to-moderate range with sIAT scores and with two of the Internet use motives subscales, namely fun and relaxation (M1_fun), and social and personal unfolding (M3_soc). This pattern of associations was similar to the one found for problems with vocational self-concept, as indexed by the LPB_sec subscale. A similar, albeit subscale-specific pattern of intercorrelations was found for impulsivity traits, as indexed by the two I-8 subscales.

Turning to the associations between psychopathological measures and Internet (ab)use indicators, the nicotine abuse subscale score of the ASSIST was unrelated to all Internet (ab)use indicators. Contrary to this, the cannabis subscale score showed a significant, albeit weak, positive association with Internet addiction, as indexed by the sIAT. The GAD-7 score was the only psychological trait indicator to be significantly associated with the Internet use motive subscale concerning information and learning (M2_inf), while also being significantly and positively associated in the weak-to-moderate range with the social and personal unfolding motive subscale score (M3_soc) and the sIAT score.

Demographic variables were at best weakly correlated with Internet (ab)use indicators. Males were associated with slightly higher scores on the social and personal unfolding motive subscale, as well as with slightly higher levels of overall Internet use duration. Age was significantly and negatively associated with both the fun subscale of the Internet motives inventory and the sIAT score, although these associations were very weak. Having a partner was associated with slightly higher scores on the information and learning subscale of the Internet use motives inventory.

Among the Internet (ab)use indicators, there were weak-to-moderate significant associations between the sIAT score and the following: fun and entertainment subscale score (M1_fun), social and personal unfolding subscale score (M3_soc), duration of social web application use and overall Internet use duration. Calculating a partial correlation, controlling for overall Internet use duration, rendered the association between social web application use duration and the sIAT score insignificant ($r_{\text{partial}} = -.063$; $df = 442$; $p = .182$), however. As can also be seen from the table, while both the M1_fun and the M3_soc subscale scores were positively and significantly associated with overall Internet use duration, only the M3_soc score was significantly associated with the duration of social web application use.

Table II.21

Intercorrelations between loneliness, personality aspects, mental health indicators, demographic variables and Internet (ab)use related measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. LSC	1	.135**	-.315***	.386***	-.065	.050	.458***	.225***	-.010	-.263***	.112*	.087	.328***	.338***	-.064	.055
2. I-8_urgency	.135**	1	-.258***	.173***	.177***	.175***	.231***	-.020	-.010	.038	.065	.016	.093*	.271***	.049	.042
3. I-8_persev	-.315***	-.258***	1	-.280***	-.112*	-.125**	-.227***	-.206***	-.037	.006	-.172***	.013	-.150**	-.410***	-.006	-.121*
4. LPB_sec	.386***	.173***	-.280***	1	.007	.040	.325***	-.068	-.160**	-.064	.107*	.072	.187***	.358***	-.019	.032
5. ASSIST_nicotine	-.065	.177***	-.112*	.007	1	.487***	.062	.034	.208***	.009	-.081	.034	-.085	.002	-.025	-.025
6. ASSIST_cannabis	.050	.175***	-.125**	.040	.487***	1	.122*	.113*	.104*	-.026	-.056	.082	.013	.160**	.037	.025
7. GAD-7	.458***	.231***	-.227***	.325***	.062	.122*	1	-.143**	-.015	-.006	.091	.160**	.207***	.331***	-.013	.042
8. Gender^a	.225***	-.020	-.206***	-.068	.034	.113*	-.143**	1	.076	-.194***	.077	.046	.101*	.086	-.051	.159**
9. Age	-.010	-.010	-.037	-.160**	.208***	.104*	-.015	.076	1	.060	-.099*	-.062	-.036	-.098*	-.082	-.019
10. Partner^a	-.263***	.038	.006	-.064	.009	-.026	-.006	-.194***	.060	1	-.015	.100*	-.110*	-.004	.014	-.073
11. M1_fun	.112*	.065	-.172***	.107*	-.081	-.056	.091	.077	-.099*	-.015	1	.260***	.343***	.286***	.063	.263***
12. M2_inf	.087	.016	.013	.072	.034	.082	.160***	.046	-.062	.100*	.260***	1	.124**	.060	-.012	.086
13. M3_soc	.328***	.093*	-.150**	.187***	-.085	.013	.207***	.101*	-.036	-.110*	.343***	.124**	1	.395***	.154**	.193***
14. sIAT	.338***	.271***	-.410***	.358***	.002	.160**	.331***	.086	-.098*	-.004	.286***	.060	.395***	1	.121*	.234***
15. DUR_CON	-.064	.049	-.006	-.019	-.025	.037	-.013	-.051	-.082	.014	.063	-.012	.154**	.121*	1	.704***
16. DUR_OVERALL	.055	.042	-.121*	.032	-.025	.025	.042	.159**	-.019	-.073	.263***	.086	.193***	.234***	.704***	1

Annotations.

^a Correlations between dichotomous indicators and indicators measured at scale-level were calculated using pointbiserial correlations; correlations between two dichotomous variables were calculated using the Φ -coefficient; Gender-Coding: 0-female, 1-male; Partner-Coding: 0-No Partner, 1-Partner;

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed);

Variables 1–4: psychosocial indicators; Variables 5–7: psychopathological indicators; Variables 8–10: demographic indicators; Variables 11–16: Internet (ab)use indicators.

4.4.2 Parallel multiple mediator model of loneliness effects on Internet addiction

As can be seen from the statistical model presented in Figure II.6, the hypothesized direct and indirect relations between loneliness and Internet addiction, as mediated by different Internet use motives, translated to four different regression equations, three for each of the indirect effects paths ($X \rightarrow M_i$) and one for the direct effect path ($X, M_i \rightarrow Y$). The total effect of loneliness on Internet addiction, c , could be expressed as the sum of its direct effect c' and its indirect effects through each of the k mediator paths (Hayes, 2013), which can be expressed as a product of the form $a_i b_i$ (with i denoting the respective mediator path):

$$c = c' + \sum_{i=1}^k a_i b_i$$

The direct effect, c' , can be interpreted as the effect of loneliness on Internet addiction, controlling for the effects of the putative mediators, i.e. b_1 - b_3 . Or, in other words, c' is the size of loneliness effects on Internet addiction unaccounted for by the postulated effect mediators. When c' , as compared to c , is substantially smaller, this points to the presence of indirect effects through the postulated mediator paths. The product term $a_i b_i$ denotes the contingencies between mediator effects on the criterion variable and predictor variable effects on the mediators in the path model, and shows that significant indirect effects can result both from large effects of the predictor on the mediator ($X \rightarrow M_i$; i.e. a_i) and from large effects of the mediator on the criterion ($M_i \rightarrow Y$; i.e. b_i). When X has a large effect on a respective variable M_i , a substantial portion of the effect of M_i on Y (even when it is small in magnitude) can be attributed to X . Likewise, even when X has only a small effect on a respective variable M_i , but this M_i variable has a rather large effect on Y , the portion of M_i effects attributable to X might still be large enough to be of substantial importance (see Hayes, 2013).

The regression equations for the three indirect effect paths ($X \rightarrow M_i$) and the direct effects paths ($X, M_i \rightarrow Y$) can be expressed as follows:

$$\begin{aligned} M_1 (M1_fun) &= i_{M_1} + a_1 X + e_{M_1} \\ M_2 (M2_inf) &= i_{M_2} + a_2 X + e_{M_2} \\ M_3 (M3_soc) &= i_{M_3} + a_3 X + e_{M_3} \\ Y (SIAT) &= i_Y + c' X + b_1 M_1 + b_2 M_2 + b_3 M_3 + e_Y \end{aligned}$$

Because X (i.e. loneliness) is modelled to be a causal agent of the three M_i variables, its influence on Y (i.e. Internet addiction) is reflected both in its direct effect (c') and, implicitly, in the effects b_i of the M_i variables on Y . While all these regression coefficients can be judged to be significantly different from zero according to some inference test statistics, the size of the indi-

rect effects $a_i b_i$ of X on Y can be judged in various ways, each associated with different methodological traditions and schools of thought (Hayes, 2013). Within this work, the statistical significance of indirect effects will be judged as per the suggestions of Hayes (2013), i.e. by establishing that a 95% bias-corrected confidence interval of the sampling distribution of $a_i b_i$, as resulting from a large pool of bootstrap samples ($n=10,000$), does not contain zero as a value.

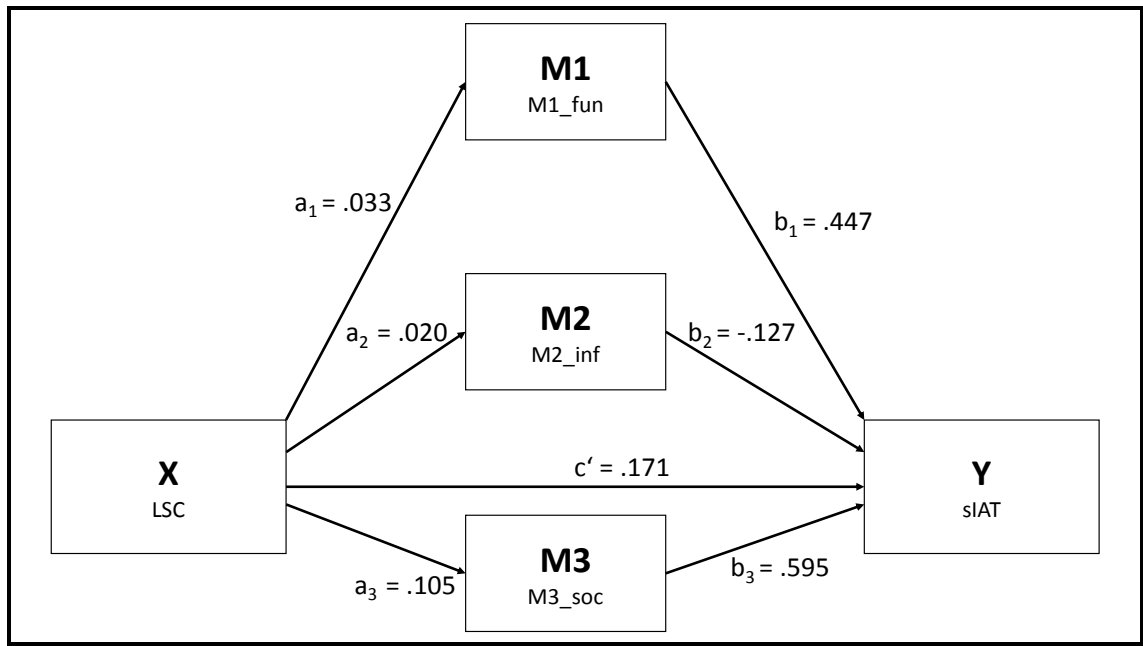


Figure II.6

Statistical model and unstandardized regression coefficients of the parallel multiple mediator model of loneliness effects on Internet addiction, as mediated by Internet use motives

The results of the parallel multiple mediation analysis revealed that loneliness exerted indirect effects on Internet addiction both through its effects on fun-related Internet use motives as well as on social-compensatory Internet use motives. As can be seen from Table II.22, loneliness was positively associated with the fun-related ($a_1 = .033$) and the social-compensatory ($a_3 = .105$) Internet use motive scale scores (see models for M1 and M3). As can also be seen from the model of Internet addiction (model for Y), fun-related Internet use motives ($b_1 = .447$) and social-compensatory Internet use motives ($b_3 = .595$) were positively associated with Internet addiction levels. Contrary to this, loneliness was unrelated to information-related Internet use motives ($a_2 = .020$) and this Internet use motive dimension was unrelated to Internet addiction, as assessed by the sIAT ($b_2 = -.127$). The bias-corrected bootstrap confidence intervals for the indirect effects of loneliness through fun-related use motives ($a_1 b_1 = .015$; CI: .003 to .032) and social-compensatory use motives ($a_3 b_3 = .062$; CI: .035 to .099) did not contain zero, whereas the one for the indirect effect through information-related use motives did ($a_2 b_2 = -$

Table II.22
Unstandardized regression coefficients, standard errors and model summary information for the loneliness parallel multiple mediator model in Figure II.6

Predictor	Criterion														
	M1 (M1_fun)			M2 (M2_inf)			M3 (M3_soc)			Y (SIAT)					
	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p			
X (LSC) a ₁	.033	.014	.018	.020	.011	.068	a ₃	.105	.014	<.001	c'	.171	.032	<.001	
M1 (M1_fun)	—	—	—	—	—	—	—	—	—	—	b ₁	.447	.113	<.001	
M2 (M2_inf)	—	—	—	—	—	—	—	—	—	—	b ₂	-.127	.138	.358	
M3 (M3_soc)	—	—	—	—	—	—	—	—	—	—	b ₃	.595	.107	<.001	
Constant i _{M1}	11.411	.119	<.001	i _{M2}	12.191	.093	<.001	i _{M3}	6.791	.122	<.001	i _Y	16.243	1.849	<.001
			R ² = .013			R ² = .008			R ² = .108			R ² = .232			
			F(1, 443) = 5.612, p = .018			F(1, 443) = 3.357, p = .068			F(1, 443) = 53.577, p < .001			F(4, 440) = 33.192, p < .001			

.003; CI: -.014 to .000). As can also be seen from Table II.22, the direct effects of loneliness on Internet addiction, c' , was significantly different from zero and positive in sign ($c' = .171$), meaning that the sum of indirect effects of loneliness on Internet addiction through Internet use motives ($\sum_{i=1}^k a_i b_i = .075$; CI: .043 to .115) captured only a portion of 30.34% of the total effect of loneliness on Internet addiction ($c = c' + \sum_{i=1}^3 a_i b_i = .171 + .075 = .246$).

4.4.3 First stage moderated parallel multiple mediator model

Moderated mediation refers to a contingency in the mediating process, i.e. when the size of an indirect effect depends on the level of another variable, the so-called moderator (Hayes, 2013, 2015). As outlined above (see Sections II.2 and Section II.3.4), moderation effects were hypothesized to occur in the first stage of the mediation process, i.e. in the effect paths linking loneliness and Internet use motives. Controlling for overall Internet use, it was hypothesized that the amount of social web application use a person is engaging in would interact with his/her levels of loneliness to differentially affect his/her Internet use motives. Extending the four regression equations outlined in the previous section by the hypothesized interaction and the covariate, these can be rewritten as follows (see also Figure II.7):

$$M_1 (M1_fun) = i_{M_1} + a_{11}X + a_{21}W + a_{31}XW + a_{41}C + e_{M_1} \quad (1)$$

$$M_2 (M2_inf) = i_{M_2} + a_{12}X + a_{22}W + a_{32}XW + a_{42}C + e_{M_2} \quad (2)$$

$$M_3 (M3_soc) = i_{M_3} + a_{13}X + a_{23}W + a_{33}XW + a_{43}C + e_{M_3} \quad (3)$$

$$Y (sIAT) = i_Y + c'X + b_1M_1 + b_2M_2 + b_3M_3 + b_4C + e_Y \quad (4)$$

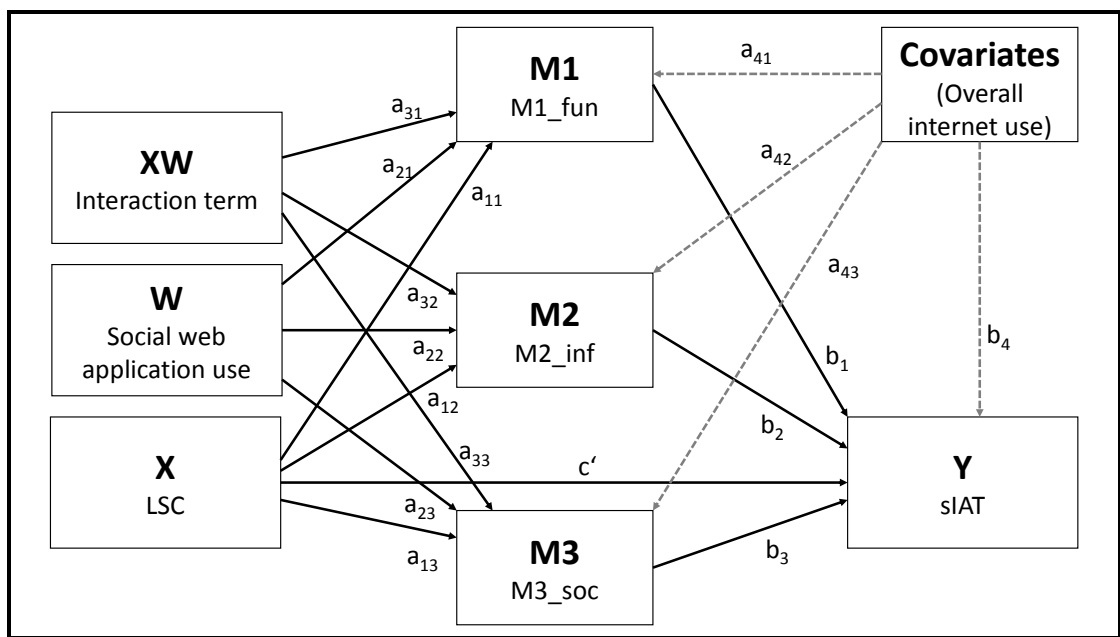


Figure II.7
Statistical diagram of the first stage moderated parallel multiple mediator model of loneliness effects on Internet addiction, as mediated by Internet use motives

Following the rationale outlined by Edwards and Lambert (2007) the M_i parameters in equation (4) can be substituted by their underlying regression equations (Equations 1–3), which yields a more complex equation containing both the conditional indirect and the direct effect components of loneliness effects on Internet addiction:

$$\begin{aligned}
 Y = & i_Y + b_1 i_{M_1} + b_2 i_{M_2} + b_3 i_{M_3} + W * (b_1 a_{21} + b_2 a_{22} + b_3 a_{23}) \\
 & + C * (b_1 a_{41} + b_2 a_{42} + b_3 a_{43} + b_4) \\
 & + X * [b_1 a_{11} + b_2 a_{12} + b_3 a_{13} + W * (b_1 a_{31} + b_2 a_{32} + b_3 a_{33}) + c'] \\
 & + e_Y + b_1 e_{M_1} + b_2 e_{M_2} + b_3 e_{M_3}
 \end{aligned}$$

As can be seen from this equation, the level of the intercept (represented in the first two lines of the equation) is contingent on the values of the moderator W (and the covariate C), although the moderator W originally was not contained within Equation 4. Moreover, it can be seen that the *total effect of the predictor variable X* on the criterion of the regression equation can be decomposed into three parts, i.e. an unconditional direct effect part (c'), an unconditional indirect effect part ($b_1 a_{11} + b_2 a_{12} + b_3 a_{13}$) and a conditional indirect effect part, the size of which is contingent on the level of the moderator variable W ($W * (b_1 a_{31} + b_2 a_{32} + b_3 a_{33})$); each of the product terms $b_i a_{3i}$ represents an *index for the presence of moderated mediation* in the respective indirect effects path, see Hayes, 2015). This signifies that the size of the total effect of X on Y may vary according to the level of a moderator variable W . This conceptualization is well in line with current thinking about moderated mediation analysis and means “[...] *that combining moderation and mediation does not yield a single path model but instead produces a set of models that each portray direct, indirect, and total effects at a particular level of the moderator variable*” (Edwards & Lambert, 2007, p.6).

Therefore, the present analysis will not only assess the presence of moderated mediation for the whole model and for each of the three indirect effect paths in isolation, using the product terms $b_i a_{3i}$ as a quantitative index and judging their significance against the background of 95% bias-corrected confidence intervals based on $n = 10,000$ bootstrap samples (as suggested by Hayes, 2013, 2015), but it will also quantify and compare the size of loneliness effects (conditional total effects; decomposed parts of unconditional and conditional indirect effects) at different values of the postulated moderator variable (the 10th, 25th, 50th, 75th, and 90th percentiles), i.e. at different levels of social web applications use intensity.

A comparison of Tables II.22 and II.23 reveals that the inclusion of the two Internet use intensity parameters, i.e. one for overall Internet use duration and one for social web application use duration (plus the interaction terms), helped to explain an additional of 1.7–9.1% of the variance in criterion scores of the path model, with the largest effects in the M1 ($\Delta R^2 = .091$) and M3 ($\Delta R^2 = .048$) mediator models. As can also be seen from Table II.23, overall Internet use duration as a covariate was significantly and positively associated with Internet addiction levels ($b_4 = .030$), fun-related ($a_{41} = .037$) and information-related ($a_{42} = .011$) Internet use motives, but not with social-compensatory Internet use motives ($a_{43} = .007$). In the model of Internet

addiction, the inclusion of this covariate did not substantially change the pattern of associations between Internet use motives and Internet addiction levels, with both fun-related ($b_1 = .373$) and social-compensatory ($b_3 = .558$) use motives still significantly associated and information-related motives ($b_2 = -.133$) still unrelated to Internet addiction levels. Likewise, the direct effect of loneliness ($c' = .172$), remained essentially unchanged (see tables II.22 & 23). As can also be seen, only in the model of social-compensatory Internet use motives (M3 model) the inclusion of the interaction term LSC*DUR_CON was significant and made up for an additional 1.2% of the variance in criterion scores.

An analysis of the conditional indirect effects revealed that the inclusion of the Internet use parameters rendered the M1 (fun-related Internet use motives) indirect effect path insignificant. Neither did the interaction term in the M1 model (see Table II.23) approach statistical significance ($a_{31} = .000$), nor did the decomposed indicators of the respective indirect effect path. As can be seen from Table II.24, the bias-corrected 95% confidence interval of bootstrap sample estimates for the unconditional ($a_{11}b_1 = .0077$) and conditional parts ($a_{31}b_1 = .0001$) of indirect loneliness effects through fun-related Internet use motives contained zero as a value. Likewise, the interaction term in the M2 model of information-related Internet use motives was insignificant ($a_{32} = .001$; see Table II.23), as were the indicators of both the unconditional ($a_{12}b_2 = -.0009$) and the conditional parts ($a_{32}b_2 = -.0001$) of indirect loneliness effects through this Internet use motive dimension (see Table II.24). Contrary to these findings, the interaction term in the M3 model (see Table II.23) was significant ($a_{33} = .003$) and positive in sign, as were the indicators for both the unconditional ($a_{13}b_3 = .0430$) and the conditional parts ($a_{33}b_3 = .0018$) of indirect loneliness effects. Summing the unconditional parts ($\sum(a_{1i}b_i) = .0497$; CI: .0199 to .0906) and the conditional parts of the three indirect effect paths ($\sum(a_{3i}b_i) = .0017$; CI: -.0005 to .0039) revealed that only the unconditional part of the indirect effect was statistically different from zero and again, positive in sign. Figure II.9 shows this information regarding the conditional size of indirect loneliness effects in the form of line diagrams depicting intercept and slope parameters for both the combined (Panel A) and the single (Panels B to D) indirect effect paths. As can be seen, both the unconditional (intercept) and the conditional (slope) part of indirect loneliness effects are governed in large part by the M3 path through social-compensatory Internet use motives (Panel A vs. Panel D). Summarizing these results, it seemed that loneliness exerted the largest part of its (positive) indirect effects on Internet addiction through social-compensatory Internet use motives. Moreover, this was the sole pathway involving conditional, usage-contingent effects, in that the size of indirect loneliness effects increased in participants engaging in higher levels of social web application use.

The conditional size of total effects of loneliness on Internet addiction and the relative portion of indirect effects are shown in Table II.25 and Figure II.8. As can be seen, the size of total loneliness effects increased with higher levels of social web application use (from .224 at 1h/week to .256 at 20h/week). This also translated to an increase in the relative portion of indirect loneliness effects in total loneliness effects, making up between 23 to 33% of the size of the conditional total effects of loneliness on Internet addiction depending on the level of social web application use (see Table II.25).

Table II.23

Unstandardized regression coefficients, standard errors and model summary information for the constituting parts of the loneliness first stage moderated parallel multiple mediator model in Figure II.7

Predictor	Criterion															
	M1 (M1_fun)			M2 (M2_inf)			M3 (M3_soc)			Y (sIAT)						
	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p				
X (LSC)	a ₁₁	.021	.017	.232	a ₁₂	.007	.014	.623	a ₁₃	.077	.018	< .001	c'	.172	.032	< .001
W (DUR_CON)	a ₂₁	-.050	.015	.004	a ₂₂	-.031	.012	.031	a ₂₃	-.004	.016	.819	—	—	—	—
XW (Interaction)	a ₃₁	.000	.001	.898	a ₃₂	.001	.001	.300	a ₃₃	.003	.001	.013	—	—	—	—
M1 (M1_fun)	—	—	—	—	—	—	—	—	—	—	—	—	b ₁	.373	.114	.001
M2 (M2_inf)	—	—	—	—	—	—	—	—	—	—	—	—	b ₂	-.133	.136	.329
M3 (M3_soc)	—	—	—	—	—	—	—	—	—	—	—	—	b ₃	.558	.107	< .001
C (DUR_OVERALL)	a ₄₁	.037	.006	< .001	a ₄₂	.011	.005	.020	a ₄₃	.007	.006	.254	b ₄	.030	.009	.002
Constant	i _{M1}	10.597	.179	< .001	i _{M2}	11.981	.145	< .001	i _{M3}	6.21	.188	< .001	i _Y	16.390	1.831	< .001
	R ² = .104 (ΔINT = .000)			R ² = .025 (ΔINT = .002)			R ² = .156 (ΔINT = .012)			R ² = .249						
	F(4, 440) = 12.795, p = < .001			F(4, 440) = 2.793, p = .026			F(4, 440) = 20.306, p = < .001			F(5, 439) = 29.127, p = < .001						

Annotations.

To ease the interpretation of coefficients, a score of 11 was subtracted from each individual's LSC score before entering it into the models. Hence, a score of 0 in the LSC corresponds to the lowest achievable scale score, indicating the absence of loneliness feelings.

Table II.24

Decomposed quantification and statistical inference regarding loneliness effects on Internet addiction

Effect Part	Notation	Value	BC_LLCI	BC_ULCI
uncon. total effect part	$(c' + \sum(a_{1j}b_j))$	.2221	.1528	.2926
uncon. direct effect part	c'	.1723	.1011	.2414
cond. indirect effect part	$\sum(a_{1j}b_j)$	.0497	.0199	.0906
	unconditional mediation ($a_{1j}b_j$)			
	M1: $(a_{11}b_1)$	.0077	-.0041	.0253
	M2: $(a_{12}b_2)$	-.0009	-.0129	.0022
	M3: $(a_{13}b_3)$	.0430	.0204	.0791
	conditional/moderated mediation ($a_{3j}b_j$)			
	$\sum(a_{3j}b_j)*W$	.0017	-.0005	.0039
	M1: $(a_{31}b_1)*W$	.0001	-.0011	.0011
	M2: $(a_{32}b_2)*W$	-.0001	-.0010	.0001
	M3: $(a_{33}b_3)*W$	.0018	.0004	.0036

Table II.25

Conditional total and quantification of the relative portion of conditional indirect effects of loneliness on Internet addiction for different levels of social web application use

Social Web Application Use	Conditional Total	Unconditional Direct	Conditional Indirect	% Indirect of Total
1h/ week	.2238	.1723	.0515	23.00%
3h/ week	.2272	.1723	.0549	24.16%
5h/ week	.2306	.1723	.0583	25.29%
10h/ week	.2392	.1723	.0669	27.97%
20h/ week	.2564	.1723	.0840	32.78%

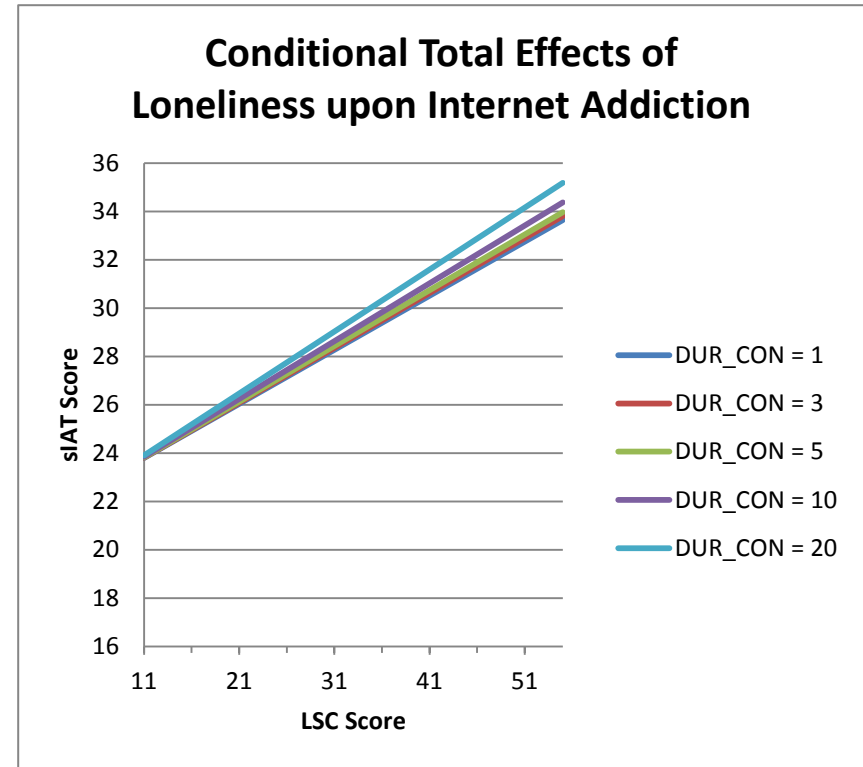


Figure II.8

Loneliness effects upon Internet addiction for different levels of social web application use duration

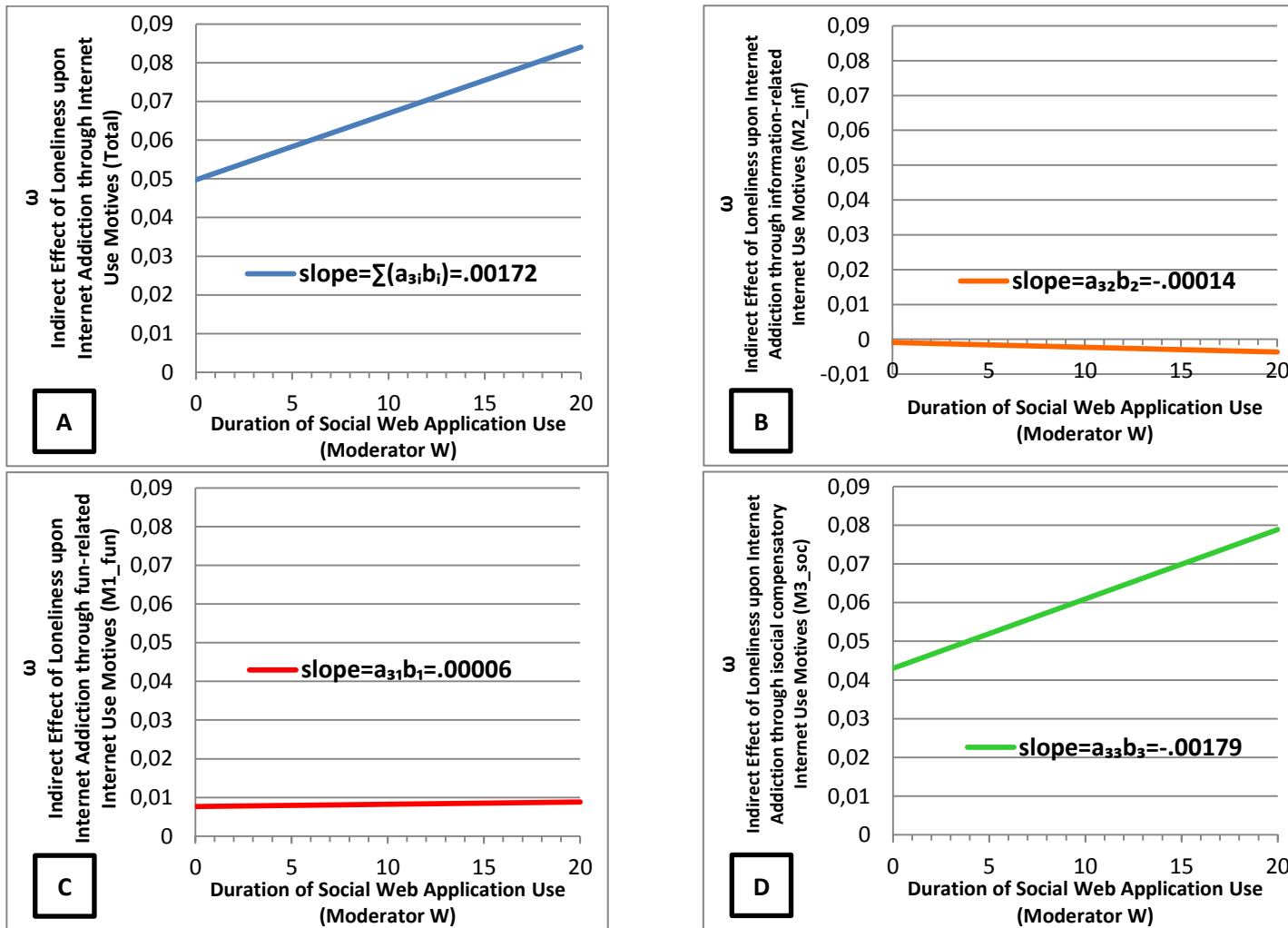


Figure II.9

Size of conditional indirect effects of loneliness on Internet addiction for all mediator paths combined (Panel A) and for each of the mediator paths in isolation (Panels B, C and D)

4.4.4 Covariate-controlled first stage moderated parallel multiple mediator model

In order to assess the robustness of indirect and direct loneliness effects in the path modeling framework, several sociodemographic (age, gender, partner status), psychosocial (impulsivity traits, academic self-concept uncertainty), and mental health indicators (substance use related problems, general anxiety disorder symptoms) were entered as covariates into each of the four models constituting the three indirect effect paths ($X \rightarrow M_i$) and the direct effect path ($X, M_i \rightarrow Y$), yielding the statistical model depicted in Figure II.10.

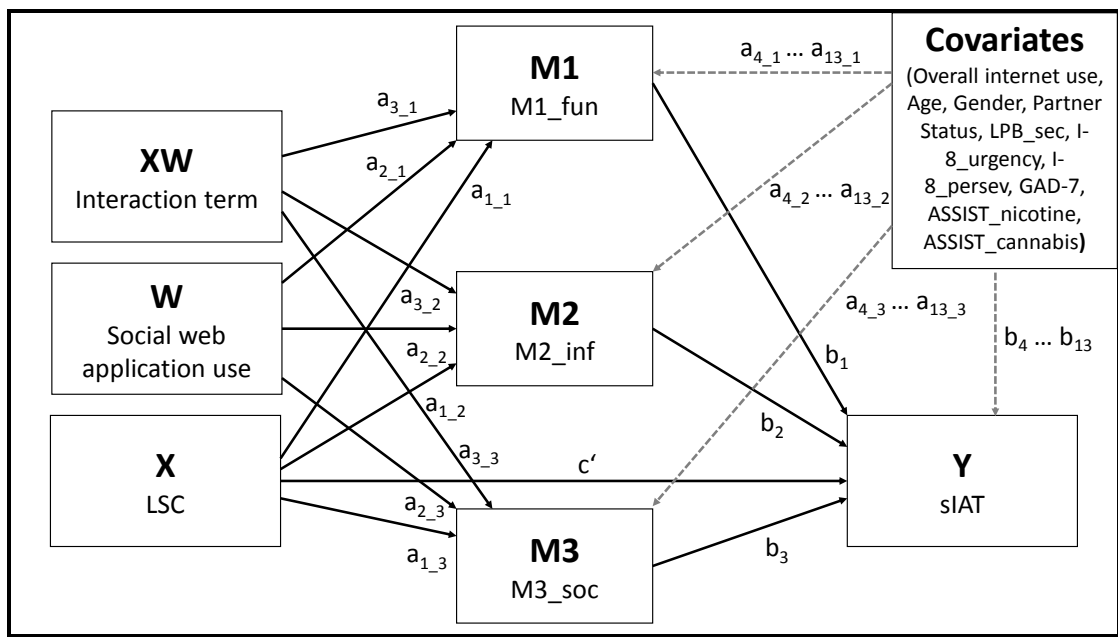


Figure II.10
Statistical diagram of the covariate-controlled, first stage moderated parallel multiple mediator model of loneliness effects on Internet addiction, as mediated by Internet use motives

Again, substituting the M_i parameters by their underlying regression equations in the Y model of Internet addiction yields the following regression equation for the sIAT score:

$$\begin{aligned}
 Y = & i_Y + b_1 i_{M_1} + b_2 i_{M_2} + b_3 i_{M_3} + W * (b_1 a_{2_1} + b_2 a_{2_2} + b_3 a_{2_3}) \\
 & + \sum_{d=4}^{j=10} C_d * (b_1 a_{d_1} + b_2 a_{d_2} + b_3 a_{d_3} + b_d) \\
 & + X * [b_1 a_{1_1} + b_2 a_{1_2} + b_3 a_{1_3} + W * (b_1 a_{3_1} + b_2 a_{3_2} + b_3 a_{3_3}) + c'] \\
 & + e_Y + b_1 e_{M_1} + b_2 e_{M_2} + b_3 e_{M_3}
 \end{aligned}$$

As can be seen, the inclusion of additional covariates only changes the algebraic expression of the intercept part influenced by the covariates (line two of the equation), leaving the mathematical expression for the conditional total effect part of loneliness unchanged. This allows for a straightforward comparison of conditional total effects and their underlying constituent

parts (i.e. unconditional direct and indirect effect parts, conditional indirect effect part) with those derived from the baseline moderated mediation model outlined in the previous section.

As can be seen from comparison of Tables II.23 and II.26, the inclusion of the additional sociodemographic and psychosocial correlates helped to explain additional variance in both the mediator pathway models (ΔR^2 between .016 for the M3 and .057 for the M2 model) and the Y model of Internet addiction, in which additional 15.5% of the variance in criterion scores could be accounted for. Moreover, only in the model of social-compensatory Internet use motives (M3 model) the inclusion of the interaction term *LSC*DUR_CON* was significant, in that it accounted for an additional 1.3% of the variance in criterion scores. Analyzing covariate effects in the mediator models revealed some similarities as well as major differences between the mediator paths: First, none of the 10 covariates entered was significantly associated with social-compensatory Internet use motives (M3 model). For fun-related (M1 model) and information-related (M2 model) use motives, there was a similar pattern of significant associations with three of the covariates: the overall duration of Internet use was positively associated with both motive dimensions ($a_{4_1} = .036$; $a_{4_2} = .012$), while participant age was negatively associated with both use dimensions ($a_{5_1} = -.065$; $a_{5_2} = -.046$). The personality dimension of perseverance (as a subdomain of “*non-impulsivity*”), on the other hand, was negatively associated with fun-related and positively with information-related use motives ($a_{8_1} = -.319$; $a_{8_2} = .231$). Additionally, having a partner was associated with a stronger information-related use orientation ($a_{7_2} = .590$), as were higher levels of general anxiety disorder symptoms ($a_{10_2} = .062$).

The inclusion of the additional covariates in the Y model of Internet addiction diminished the size of the direct effect of loneliness profoundly and even rendered it insignificant ($c' = .042$, as compared to an initial value .171). Contrary to this, besides some reduction in size, the overall pattern of relations between Internet use motive dimensions and Internet addiction levels remained the same (compare the values for b_{1-3} and their p-values, as displayed in tables II.23 and II.26). Among the entered demographic covariates, there were no strong and statistically significant associations with Internet addiction. The overall duration of Internet use still was positively and significantly associated with Internet addiction levels ($b_4 = .026$), as were the newly entered covariates capturing insecurity regarding vocational self-concept ($b_{10} = 1.052$), higher levels of (problematic) cannabis consumption ($b_{12} = .182$) and general anxiety disorder symptoms ($b_{13} = .158$). The entered trait impulsivity dimensions were positively associated with Internet addiction levels, since perseverance (higher scores indicating non-impulsivity, $b_8 = -1.511$) was negatively and urgency ($b_9 = .729$) was positively associated with Internet addiction levels.

An analysis of the conditional indirect effects revealed that the inclusion of the whole set of covariates did not change the picture of results for the single mediator paths. Still, the M1 (fun-related Internet use motives) indirect effect path was insignificant. Neither did the interaction term in the M1 model (see Table II.26) approach statistical significance ($a_{31} = .000$), nor did the decomposed indicators of the respective indirect effect path. As can be seen from table II.27, the bias-corrected 95% confidence interval of bootstrap sample estimates for the unconditional ($a_{1_1}b_1 = .0011$) and conditional parts ($a_{3_1}b_1 = .0000$) of indirect loneliness effects through fun-related Internet use motives contained zero as a value. The same pattern of results held for M2 indirect effect path (information-related Internet use motives). Neither was the interaction term significantly different from zero ($a_{3_2} = .001$; see Table II.26), nor were the indicators of the unconditional ($a_{1_2}b_2 = -.0009$) or conditional parts ($a_{3_2}b_2 = -.0002$) of indirect loneliness effects through this Internet use motive dimension (see Table II.27). Contrary to this, indirect loneliness effects through the M3 (social-compensatory use motives) path remained significant even in the case of the full covariate model. The interaction term was significant ($a_{3_3} = .003$, see Table II.26), as were both the indicator for the unconditional ($a_{1_3}b_3 = .0232$) and conditional part ($a_{3_3}b_3 = .0017$) of this indirect effect (see Table II.27). Summing the unconditional parts ($\sum(a_{1i}b_i) = .0239$ CI: $-.0043$ to $.0605$) and the conditional parts of the three indirect effect paths ($\sum(a_{3i}b_i) = .0015$; CI: $-.0005$ to $.0035$) revealed that the inclusion of the covariates (slightly) diminished the overall sizes of these effect components, rendering both statistically insignificant. This additionally underlines the fact that the M3 effect path is the only conditional indirect effect path that can be substantiated empirically.

Figure II.11 shows that both the unconditional (intercept) and the conditional size (slope) of indirect loneliness effects are governed in large part by the M3 path through social-compensatory Internet use motives (Panel A vs. Panel D). Hence, even in the case of covariate control, loneliness exerted positive indirect effects on Internet addiction, and these effects were specifically mediated through social-compensatory Internet use motives. Moreover, these conditional indirect effects were the only significant effects of loneliness on Internet addiction, as all other effect components, including the unconditional direct effect (c'), were insignificant.

The conditional size of total effects of loneliness on Internet addiction and the relative portion of indirect effects are shown in Table II.28 and Figure II.12. As can be seen, the inclusion of covariates considerably diminished the size of total loneliness effects. Moreover, it can be seen the conditional total effects of loneliness increased with higher levels of social web application use (from $.0672$ at 1h/week to $.0963$ at 20h/week). This also translated to an increase in the relative portion of indirect loneliness effects in total loneliness effects, making up between

37.94 to 56.73% of the size of the conditional total effects of loneliness (see Table II.28). Thus, in the case of the covariate control model, the relative portion of conditional indirect loneliness effects in the total effects of loneliness was considerably higher, even though the conditional total effects were less than half the size (compared to the model outlined in the previous section). This could, to a large part, be attributed to the reduction in the direct effect of loneliness (compare tables II.25 and II.28).

4.4.5 Summary of results from the moderated mediation analysis

Starting with an unconditional parallel multiple mediator model, loneliness was found to be positively related to Internet addiction both directly and indirectly. The indirect effects were mediated through two dimensions of Internet use motives, i.e. fun-related (M1 path) and social-compensatory (M3 path) use motives. Moreover, a portion of 30.34% of the total effect of loneliness could be attributed to the hypothesized indirect effect paths. This analysis also showed that both social-compensatory use motives and fun-related Internet use motives were positively associated with Internet addiction levels.

In a second step, this baseline model was extended to include indicators of Internet use intensity, one for overall use, and one for social web application use, along with a conditional term for the interaction between loneliness and social web application use in the first stage of the mediation process. This path model yielded divergent results in several important ways: not only did the indirect effect through fun-related use motives (M1 path) lose its significance, but also was there a significant interaction between loneliness and social web application use intensity in shaping social-compensatory Internet use motives. The interaction indicated that loneliness was more strongly related to social-compensatory use motives in those engaging in higher levels of social web application use. This stronger relation, in turn, translated to a stronger indirect effect of loneliness on Internet addiction in those with more social web application use. The absolute size of loneliness effects on Internet addiction (both directly and indirectly) was relatively unaltered at this stage of the analysis, except from the fact, that the size of the indirect effect of loneliness had been shown to be contingent on social web application use. At this stage of analysis, both social-compensatory and fun-related Internet use motives (despite lacking indirect effects of loneliness through the fun-related motives path) were still significantly and independently associated with Internet addiction.

In a third and last step of analysis, the robustness of loneliness effects, both in the direct and indirect effect paths, was analyzed by including a broad set of demographic and psychosocial covariates of Internet addiction. The inclusion of these covariates considerably reduced the size of loneliness effects and rendered the direct effect of loneliness insignificant. Moreover,

the size of conditional indirect effects of loneliness also decreased, albeit to a somewhat lesser extent. Despite this, the interaction of loneliness and social web application use in shaping social-compensatory Internet use motives remained significant and none of the covariates was significantly related to this use motive dimension. All in all, the importance of this indirect effect path could be substantiated empirically and it was shown that in the case of covariate control, the relative importance of the conditional indirect effect in the total effect of loneliness gained in size, making up between 37.94% and 56.73% of the total effect of loneliness on Internet addiction. As has been shown, this was due to the tremendous decrease in the direct effect of loneliness. Even under conditions of covariate control, both previously identified Internet use motives dimensions were significantly and independently related to Internet addiction levels.

Table II.26

Unstandardized regression coefficients, standard errors and model summary information for the constituting parts of the loneliness first stage moderated parallel multiple mediator model in Figure II.10

Predictor	Criterion															
	M1 (M1_fun)			M2 (M2_inf)			M3 (M3_soc)			Y (sIAT)						
	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p	Coeff.	S.E.	p				
X (LSC)	a _{1_1}	.004	.021	.854	a _{1_2}	.002	.017	.918	a _{1_3}	.046	.022	.038	c'	.042	.036	.254
W (DUR_CON)	a _{2_1}	-.051	.018	.004	a _{2_2}	-.032	.014	.022	a _{2_3}	-.001	.019	.939	—	—	—	—
XW (Interaction)	a _{3_1}	.000	.001	.924	a _{3_2}	.001	.001	.336	a _{3_3}	.003	.001	.011	—	—	—	—
M1 (M1_fun)	—	—	—	—	—	—	—	—	—	—	—	—	b ₁	.277	.105	.008
M2 (M2_inf)	—	—	—	—	—	—	—	—	—	—	—	—	b ₂	-.198	.126	.119
M3 (M3_soc)	—	—	—	—	—	—	—	—	—	—	—	—	b ₃	.509	.096	< .001
C ₁ (DUR_OVERALL)	a _{4_1}	.036	.006	< .001	a _{4_2}	.012	.005	.012	a _{4_3}	.004	.006	.522	b ₄	.026	.008	.003
C ₂ (Age)	a _{5_1}	-.065	.032	.042	a _{5_2}	-.046	.026	.075	a _{5_3}	.001	.034	.973	b ₅	-.112	.066	.090
C ₃ (Gender)	a _{6_1}	-.002	.268	.993	a _{6_2}	.292	.215	.175	a _{6_3}	.305	.283	.283	b ₆	.215	.539	.690
C ₄ (Partner Status)	a _{7_1}	.145	.242	.550	a _{7_2}	.590	.194	.003	a _{7_3}	-.194	.256	.448	b ₇	.897	.500	.074
C ₅ (I-8_persev)	a _{8_1}	-.319	.144	.027	a _{8_2}	.231	.116	.047	a _{8_3}	-.078	.153	.611	b ₈	-1.511	.299	< .001
C ₆ (I-8_urgency)	a _{9_1}	.092	.135	.496	a _{9_2}	-.058	.108	.592	a _{9_3}	.090	.142	.528	b ₉	.729	.276	.009
C ₇ (LPB_sec)	a _{10_1}	.070	.141	.619	a _{10_2}	.065	.113	.566	a _{10_3}	.191	.149	.201	b ₁₀	1.052	.290	< .001
C ₈ (ASSIST_nicotine)	a _{11_1}	-.020	.020	.317	a _{11_2}	.008	.016	.634	a _{11_3}	-.033	.021	.113	b ₁₁	-.060	.041	.143
C ₉ (ASSIST_cannabis)	a _{12_1}	-.026	.029	.373	a _{12_2}	.031	.023	.177	a _{12_3}	.009	.030	.770	b ₁₂	.183	.059	.002
C ₁₀ (GAD-7)	a _{13_1}	.016	.030	.587	a _{13_2}	.063	.024	.008	a _{13_3}	.043	.031	.169	b ₁₃	.158	.061	.010
Constant	i _{M1}	12.769	1.215	< .001	i _{M2}	11.346	.975	< .001	i _{M3}	5.028	1.286	< .001	i _Y	19.897	2.956	< .001
	R ² = .138 (ΔINT = .000)			R ² = .082 (ΔINT = .002)			R ² = .172 (ΔINT = .013)			R ² = .405						
	F(13, 431) = 5.305, p = < .001			F(13, 431) = 2.943, p = < .001			F(13, 431) = 6.891, p = < .001			F(14, 430) = 20.901, p = < .001						

Table II.27

Decomposed quantification and statistical inference regarding loneliness effects on Internet addiction

Effect Part	Notation	Value	BC_LLCI	BC_ULCI
uncon. total effect part	$(c' + \sum(a_{1i}b_i))$	.0656	-.0159	.1488
uncon. direct effect part	c'	.0417	-.0391	.1228
cond. indirect effect part	$\sum(a_{1i}b_i)$	.0239	-.0043	.0605
	unconditional mediation ($a_{1i}b_i$)			
	M1: $(a_{11}b_1)$	.0011	-.0111	.0140
	M2: $(a_{12}b_2)$	-.0003	-.0112	.0073
	M3: $(a_{13}b_3)$	.0232	.0019	.0539
	conditional/moderated mediation ($a_{3i}b_i$)			
	$\sum(a_{3i}b_i)*W$	.0015	-.0005	.0035
	M1: $(a_{31}b_1)*W$	.0000	-.0008	.0009
	M2: $(a_{32}b_2)*W$	-.0002	-.0010	.0001
	M3: $(a_{33}b_3)*W$	.0017	.0003	.0034

Table II.28

Conditional total and quantification of the relative portion of conditional indirect effects of loneliness on Internet addiction for different levels of social web application use

Social Web Application Use	Conditional Total	Unconditional Direct	Conditional Indirect	% Indirect of Total
1h/ week	.0672	.0417	.0255	37.94%
3h/ week	.0702	.0417	.0285	40.66%
5h/ week	.0733	.0417	.0316	43.14%
10h/ week	.0810	.0417	.0393	48.53%
20h/ week	.0963	.0417	.0546	56.73%

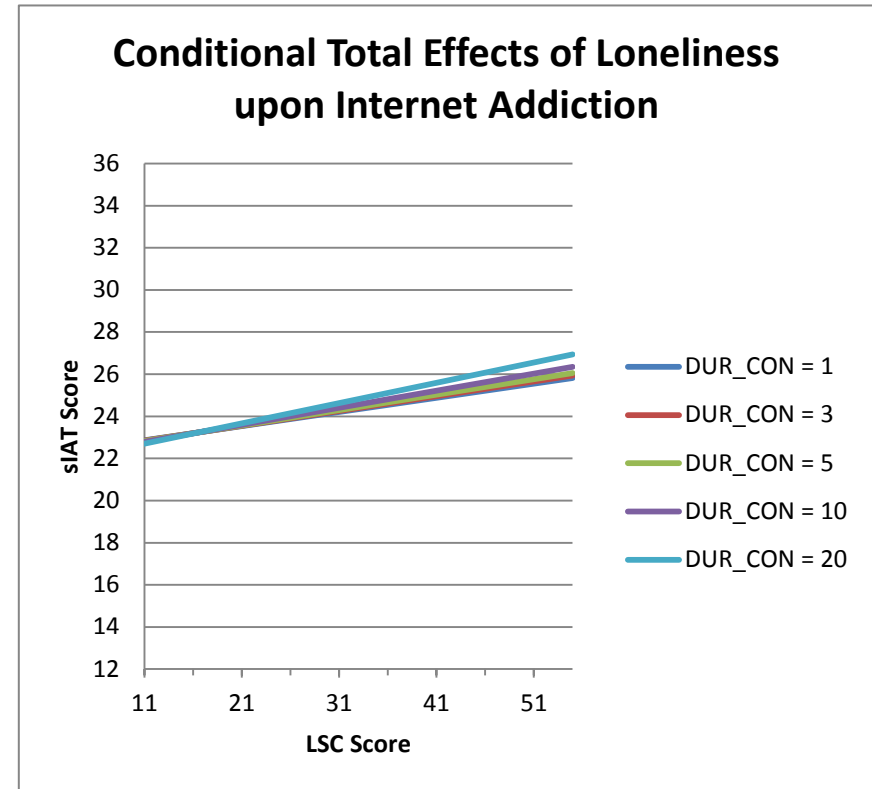


Figure II.11

Loneliness effects upon Internet addiction for different levels of social web application use duration

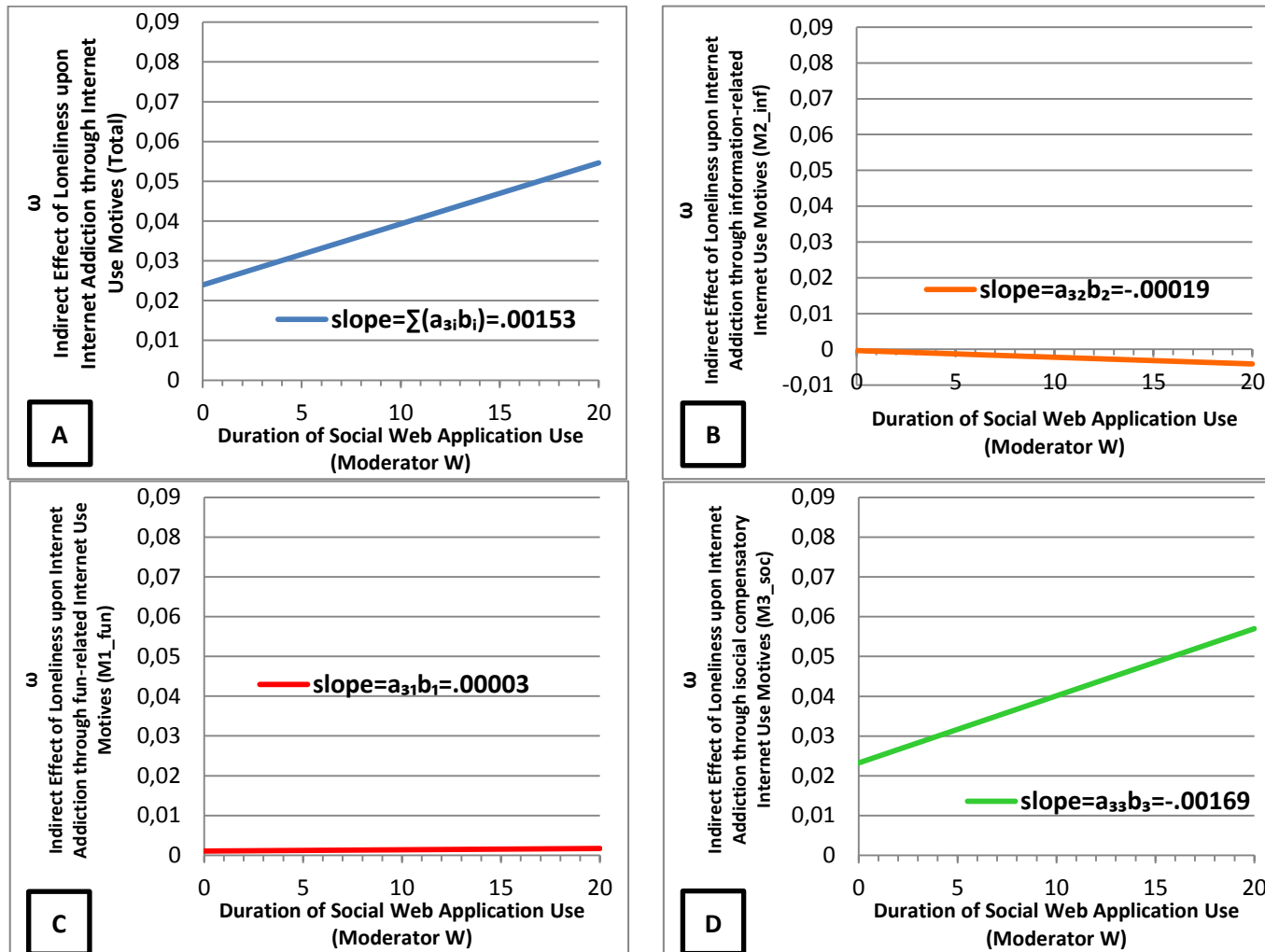


Figure II.12

Size of conditional indirect effects of loneliness upon Internet addiction for all mediator paths combined (Panel A) and for each of the mediator paths in isolation (Panels B, C and D)

5. Discussion

The aims of the present study were multifold. Making use of a convenience sample of university students, it sought to, and actually did, confirm the many and rather unspecific relations between loneliness, psychosocial problems, maladaptive stress coping behaviors and mental health problems. This finding is rather consistent and in line with previous empirical findings (Heinrich & Gullone, 2006; Rubenstein & Shaver, 1982a; Schwab, 1997).

As there is conflicting evidence regarding the potential role of loneliness in qualitative and quantitative aspects of Internet use, this study sought to analyze these potential links more thoroughly by making use of different sets of Internet use indicators. Using frequency-of-use measures, loneliness was found to be weakly and positively related to audiovisual entertainment, information, gaming, pornographic service use, and web surfing. In terms of actual duration of use, there were weak positive associations between loneliness, web surfing, and pornographic service use. Using participant responses regarding their favorite Internet activity, there was a non-linear effect of loneliness, in that low levels of loneliness were associated with a stronger-than-expected preference for audiovisual entertainment and social web application use and lower-than-expected preference for information service use, whereas higher levels of loneliness were associated with a stronger-than-expected preference for information service use and a lower-than-expected preference for social web application use. Thus, in all these analyses, social web application use was rather inconsistently related to levels of loneliness. Nonetheless, pornographic service use and web surfing were found to be consistently related to loneliness levels across different types of measures. Taken together, Hypothesis 2 concerning a role of loneliness in qualitative and quantitative aspects of Internet use could be partly confirmed. Using quantitative indicators, these relations were partly consistent across measures. In qualitative terms, loneliness levels were differently associated with one's favorite Internet use category, underlining the importance of type of Internet use measure in establishing a loneliness link.

The main aim of this study was to develop and empirically substantiate a conceptually extended version of the cognitive-behavioral model of Internet addiction. Based on the empirical literature (see Section II.1.3.4), the sole primacy of social-compensatory Internet use motives in predicting Internet addiction levels was questioned and it was hypothesized that other use motives might as well be related to the syndrome in significant and meaningful ways. This could be confirmed during the moderated mediation analysis conducted, as measures of fun-related Internet use motives as well as social-compensatory ones were associated with Internet addiction. Another prediction, namely that use motives other than social-compensatory

ones might act as mediators of loneliness effects, could not be substantiated, however. While there was a weak and significant indirect effect of loneliness through fun-related Internet use motives in the early stages of model development, this effect proved to be spurious and rather unstable in the case of covariate control. Hence, the only significant indirect effect that could be substantiated even under conditions of covariate control was the one through social-compensatory Internet use motives, which is in line with the cognitive-behavioral model. Therefore, Hypothesis 1 regarding the presence of associations between loneliness and several different Internet use motives could not be confirmed. Likewise, the indirect effect Hypothesis 3 could only partly be confirmed, because only social-compensatory use motives mediated loneliness effects on Internet addiction. Unprecedented up to this point, this study tried to integrate conceptual elements derived from the Uses & Gratifications account of media use into the cognitive-behavioral model. This was done by deeming measures of Internet use intensity an indicator of underlying user orientation. It was hypothesized that only under conditions of a strong user orientation toward the social offerings of the Internet (i.e. heavy use of social web applications) there would be a link between loneliness and social-compensatory Internet use motives. This moderation aspect of the indirect effect Hypothesis 3 could be confirmed only partly: indeed did social web application use intensity moderate loneliness effects on social-compensatory Internet use motives as hypothesized. Unexpectedly, however, loneliness was associated with social-compensatory Internet use motives irrespective of social web application use (i.e. even in case of no such use).

The following discussion of results will be divided into three major parts, dealing with the replication analyses concerning loneliness associations with psychosocial adaptation, mental health and stress coping (Section II.5.1), the role of loneliness in Internet use behaviors (Section II.5.2) and the integration of the moderated mediation analyses into the existing body of empirical and conceptual work regarding Internet addiction (Section II.5.3). The chapter will close with a discussion of major methodological weaknesses of the conducted study and highlight some promising targets for future research (Section II.5.4).

5.1 Loneliness and psychosocial problems

5.1.1 Loneliness and psychosocial adaptation

As has already been outlined above, loneliness as a subjective experience is discussed to share some phenomenological aspects with other psychosocial constructs such as perceived social support or self-esteem (Schwab, 1997). And this study indeed found very strong and negative associations between the employed loneliness measure (LSC) and measures of both self-esteem (RSES; $r = -.599$) and perceived social support (MSPSS; $r = -.730$). While perceived social

support was not as strongly related to self-esteem ($r = .466$), this evidence could be taken together to underline the conceptual meaning of loneliness. As outlined above, loneliness might be defined as *“the disquieting awareness of internal distance between oneself and others and the accompanying desire for connectedness in satisfying, meaningful relationships”* (Schwab, 1997, p.22). While this felt internal distance between self and others might be related to the true availability of meaningful social relationships, it certainly will also relate to the ways a person perceives and evaluates him-/herself as a person. The desire for social connectedness is perceived to be one of the most fundamental psychological needs and is hypothesized to root back into the evolution of the human species itself (Baumeister & Leary, 1995; J. T. Cacioppo, Hawkey, et al., 2006). Failing at fulfilling these social needs hinders a person from self-actualization, which has been shown to be negatively associated with the cognitive appraisal of a person’s self longitudinally (Lemay Jr & Ashmore, 2006). This is well in line with the sociometer hypothesis of self-esteem (Leary, Tambor, Terdal, & Downs, 1995), in that self-esteem might in large part be a psychological indicator of inclusionary status in a person’s encountered major social contexts. This also highlights the amenability and hence the state-/context-dependent nature of psychosocial health indicators, since these global ratings of self-esteem and loneliness might also contain context-dependent appraisals of a person’s (social) fit to his/her (social) context. In case of university students, these social contexts certainly include classroom as well as leisure time settings. Failing at achieving a desired inclusionary status within these contexts might be associated with an increase in feelings of loneliness, as has been shown in studies of university freshmen (Paul & Brier, 2001; Shaver et al., 1985). Loneliness might likewise be associated with negative evaluations of self, as reflected in a lowered global self-esteem and in more specific appraisals of one’s student status (DeBerard et al., 2004; Hunt & Eisenberg, 2010; Riggio et al., 1993; Wohn & LaRose, 2014). It has also been associated with university attrition (Gerdes & Mallinckrodt, 1994; Robbins et al., 2004; Rotenberg & Morrison, 1993). In this study, loneliness was found to be positively associated with a multidimensional scale assessing aspects of career-related strain in the university context (Seifert, 1992). Of the three subscales comprising the scale, loneliness (as well as low self-esteem) was most strongly associated with an indicator of insecurity regarding the chosen career path (LPB_sec, $r = .386$). Hence, these global appraisals of social adjustment are also reflected in university context-specific appraisals of psychosocial adaptation, which, as outlined above, might be indicative of university attrition.

Putting things together, loneliness (as an indicator of a subjectively perceived problematic inclusionary status) shows complex patterns of intercorrelations with global evaluations of self and context-specific appraisals of psychosocial adaptation in the university context. This clearly

shows that loneliness should not solely be regarded as an indicator of social relationship problems, but a more general sign of psychosocial maladjustment (see also Schwab, 1997).

5.1.2 Loneliness and mental health

Loneliness has repeatedly been discussed as an outcome as well as an antecedent of major mental health problems such as depression (J. T. Cacioppo et al., 2010; J. T. Cacioppo, Hughes, et al., 2006; Meltzer et al., 2013; Schwab, 1997; Victor & Yang, 2012), substance use (disorders) (Åkerlind & Hörnquist, 1992; Brennan, Walfish, & Aubuchon, 1986; J. T. Cacioppo et al., 2002; Deckman, DeWall, Way, Gilman, & Richman, 2014; Dyal & Valente, 2015) or anxiety disorders (Heinrich & Gullone, 2006; Meltzer et al., 2013). In a survey of undergraduate students, Anderson and Harvey (1988) were able to show that measures of social anxiety/shyness, depression and loneliness were moderately interrelated. This corresponds perfectly to the picture of obtained results in the present study, as the obtained intercorrelations between the Mini-SPIN as a measure of social anxiety, the PHQ-9 as a measure of depressive symptoms, and the LSC as a trait measure of loneliness were moderate to large (r values between .430 and .539). However, Anderson and Harvey (1988) demonstrated the separability of these interrelated constructs using factor-analytic approaches. While these constructs should be regarded as separable on the conceptual level, this pattern of results nonetheless shows that there is a social dimension to mental disorders, which might relate to psychosocial adaptation including feelings of loneliness in complex and reciprocal ways (Mikulincer & Shaver, 2012; Sroufe et al., 2000).

Contrary to the pattern of association regarding mood and anxiety disorder symptoms, the LSC score was found to be unrelated to all the substance (ab)use subscale scores of the ASSIST (r 's between $-.065$ to $.064$). This finding is only partly consistent with the present body of empirical evidence. First, there is preclinical evidence from (male) rat models that social isolation can be linked to an increased vulnerability toward stress-/anxiety-provoking stimuli (Butler, Karkhanis, Jones, & Weiner, 2016) and to an increased susceptibility toward psychoactive substance effects including alcohol and psychostimulant drugs (Butler et al., 2016; Karkhanis, Locke, McCool, Weiner, & Jones, 2014; Whitaker, Degoulet, & Morikawa, 2013; Yorgason et al., 2016). Since it has been associated with increased dopamine signaling in the mesolimbic branch of the dopamine system, this behavioral hypersensitivity toward drug effects has been taken as evidence for an increased vulnerability toward developing substance use disorders (Butler et al., 2016). In fact, there are findings from diverse human subject samples including university students showing small, yet positive associations between loneliness and cigarette smoking (Dyal & Valente, 2015), illicit drug use (J. T. Cacioppo et al., 2002; Deckman et al.,

2014) and alcohol (ab)use-related problems (Åkerlind & Hörnquist, 1992; Bonin, McCreary, & Sadava, 2000; Brennan et al., 1986; Page & Cole, 1991; Sadava & Thompson, 1986). In the case of alcohol consumption, these effects also have been demonstrated in the context of intimate partnerships, for which higher levels of commitment seem to be associated with reduced levels of drinking (J. L. Fischer & Wiersma, 2012; Sadava & Pak, 1994). However, these findings are inconsistent, in that they are contrasted by findings in young adults including university students, showing either no or even negative associations between loneliness and alcohol use or specific forms of (ab)use such as binge drinking (J. T. Cacioppo et al., 2000; J. T. Cacioppo et al., 2002; Olmstead, Guy, & Bentler, 1991; Schulenberg, Wadsworth, O'Malley, Bachman, & Johnston, 1996). In terms of methodological factors, the present study employed measures of substance (ab)use related problem severity by translating the ASSIST interview schedule to a self-report questionnaire format. A self-report format of the ASSIST has been developed and evaluated in a previous study involving university students (Barreto et al., 2014), which showed that the self-report version was comparable and as-acceptable as the interview version. The internal consistencies of the substance abuse subscales in the present study were generally acceptable-to-good (see Section II.4.1.2) and comparable to those found by Barreto et al. (2014). Nonetheless, the absent association of a loneliness with the substance (ab)use indicators employed might be related to the problem-oriented nature of the ASSIST scale as a clinical screening instrument. For example, Dyal and Valente (2015) evaluated the loneliness-smoking association in terms of current smoking status, i.e. whether or not lonely persons were more/less likely to admit current smoking. Active smoking in young, lonely university students would not necessarily imply the presence of smoking-related problems. Hence, the ASSIST subscales might simply be insensitive to the potentially rather subtle associations between loneliness and substance (ab)use, which might become evident in terms of elevated quantities and frequencies of substance use or a higher frequency of substance use binges not necessarily associated with social/academic/health problems. This should be assessed more thoroughly in future studies investigating the loneliness-substance (ab)use link.

While these inconsistencies cannot be resolved properly within the purview of the present study, the negative findings concerning substance use and its relation to loneliness in university students can be broadened to include nicotine and cannabis (ab)use as well. As has been noted by Dyal and Valente (2015) in discussing the loneliness-smoking connection, such inconsistent findings are hard to reconcile and might be attributable to a host of methodological, sociocultural and contextual factors. Since some early investigations of loneliness coping have revealed that substance use might be one of the maladaptive (*sad passivity*) strategies adopted by the lonely (Rubenstein & Shaver, 1982a; Van Buskirk & Duke, 1991), the present findings

might also be indicative of a change in the ways loneliness is dealt with, at least for the university student sample studied. This may be related to the availability of other and more effective means of overcoming the experience, such as the use of Internet services. These are more readily available across different everyday contexts of student life and might be easier to integrate into the daily affordances of university life, at least when compared to intoxicant substances.

5.1.3 Loneliness, stress and stress-related coping

The present study found loneliness to be moderately positively associated with stress levels ($r = .459$), which is well in line with empirical findings (Schwab, 1997; Thoits, 2011). Social ties have repeatedly been discussed as a buffer against major life stressors, with significance both for physical and mental health (Thoits, 2011). This stress buffer hypothesis should hold when it comes to the actual ways the stress is dealt with: one should expect lonely persons to engage in behaviors that are less appropriate to buffer against or relieve from the occurrence of stress. This study found loneliness to be negatively associated with putatively adaptive ways of stress coping, as reflected in small-to-moderate negative associations with social support seeking, active problem-focused coping, or humorous coping (r 's between $-.168$ and $-.402$). On the other hand, loneliness was moderately and positively associated with seemingly maladaptive ways of stress coping, such as distractive Internet use ($r = .324$) and self-reproaching behaviors ($r = .347$). Altogether, this pattern of associations fits well with the finding that loneliness is associated with avoidance coping (J. T. Cacioppo et al., 2000; Ditommaso et al., 2004; Hörchner et al., 2002; McWhirter et al., 2002; Schreurs & de Ridder, 1997; Shulman, 1993; Terry, 1991). Similarly, the finding of less humorous and more self-reproach coping points to a potential attributional dimension of loneliness, since the occurrence of stress and failures have been shown to be ascribed to stable, internal factors in lonely persons to a stronger degree (Anderson, 1999; Anderson, Horowitz, & French, 1983; Anderson, Miller, Riger, Dill, & Sedikides, 1994; Schwab, 1997). The finding of an increased inclination toward using the Internet as a distractor from stressors also points to an aberrant use orientation toward the medium, which might also be reflected in quantitative/qualitative aspects of general use behaviors and preferences.

5.2 Loneliness and Internet use behaviors

Research question 2 asked for the pattern and strength of association between loneliness and Internet use behaviors. As findings concerning this issue have remained inconclusive, the question was broadened to include methodological aspects by using several types of Internet use

indicators, i.e. frequency-based as well as duration-based estimates. The results of these correlational analyses were far from unequivocal and contingent on the type of measure employed.

Using *frequency-based estimates* of Internet activity, loneliness was shown to be unrelated to the frequency of general, i.e. content-independent Internet use ($r = .045$). When analyzing specific web service use, there were small and positive associations between loneliness and several entertainment service usage frequencies, such as Internet gaming, pornographic, and general audiovisual entertainment service use (r values between $.127$ and $.178$). Moreover, there were small and positive associations between loneliness, web surfing, and information service use frequency (r values between $.129$ and $.164$). However, loneliness was neither associated with social web application use nor with using the web for life-practical and convenience services (e.g. e-banking, online shopping; r values between $-.013$ and $.012$). Using *duration-based estimates* of Internet activity, only two small and positive associations remained significant, i.e. those between loneliness, web surfing, and pornographic service use (r values between $.111$ and $.145$), while all other correlations were insignificant (r values between $-.064$ and $.078$). Putting these findings together, there are only small positive associations between loneliness and some service-specific measures of Internet activity in quantitative terms. Loneliness would seem to be associated with increased frequency of Internet logs for a broad variety of different services, whereas this increased frequency of logs does not translate to an actual increase in overall online time or use duration for most of the activity categories sampled.

In terms of **general Internet activity**, these null findings are in line with findings of some researchers (Davis et al., 2002; Gross et al., 2002; Matanda et al., 2004), while contradicting those of others (Engelberg & Sjoberg, 2004; Matsuba, 2006; Moody, 2001; Morahan-Martin & Schumacher, 2003; Yoder et al., 2005). First of all, neither frequency- nor duration-based measures corroborated the Moody finding of a negative association between loneliness and general Internet use amount (Moody, 2001). These findings are hard to reconcile and are not easily attributable to methodological differences such as sample characteristics or the types of measures employed. For example, a free response format of estimated weekly use duration, employed by three other studies (Davis et al., 2002; Matanda et al., 2004; Morahan-Martin & Schumacher, 2003), yielded inconsistent results. While the present study corroborated the null findings of Davis et al. (2002) and Matanda et al. (2004), Morahan-Martin and Schumacher (2003) found an effect of moderate size when comparing ad hoc groups of lonely vs. non-lonely students regarding their average weekly use duration. Matanda et al. (2004) recruited a mixed sample of higher average age, making age differences between samples a possible explanation for discrepant findings. All three of the mentioned studies made use of the same loneliness measure (the UCLA Loneliness Scale), precluding assessment method as an explana-

tion for the discrepant findings. There also appears to be no clear time trend in the pattern of findings, since the null findings (including the present ones) were obtained across a time period of more than a decade. Hence, time trends in loneliness or development of specific types of Internet services would not seem to be a likely explanation. The null findings hence may be taken to suggest that Internet use within the constraints of people's everyday life is framed in a manner largely independent from psychosocial characteristics of the person. As this study asked participants to estimate their average leisure purpose Internet activity, this finding is quite surprising. The present student sample reported an average of almost 35 hours of weekly Internet use, which might be regarded as high when compared to recent estimates from epidemiological studies of media use (Engel & Breunig, 2015; Ridder & Engel, 2010; van Eimeren & Ridder, 2011). It should be noted, however, that the present study did not consider multi-tasking of Internet activities and summed all service-specific estimates to form a general, service-independent estimate of Internet activity. Hence, the overall duration estimates might be biased, since a student might use audiovisual entertainment services while simultaneously browsing his/her favorite social networking site. Additionally, it did not assess the degree to which this online time is distributed across the Internet devices used by a respective user. One might only speculate that a large part of this online time is due to the use of mobile Internet devices such as smartphones, hence easy to integrate in the ongoing alternations of classroom sessions, spare time, learning sessions and leisure time activities. Such information should be gathered in future studies, since it would allow for the consideration of use contexts beyond the mere quantification of use amount.

Turning to **service-specific Internet activity**, findings of the present study replicate findings from Yoder et al. (2005) concerning the associations of loneliness and pornographic service use. No other measure of entertainment service use (audiovisual entertainment, online gaming) was consistently associated with loneliness, a finding that is only partly consistent with previous findings (Amichai-Hamburger & Ben-Artzi, 2003; Matanda et al., 2004; Seepersad, 2004; Whitty & McLaughlin, 2007). Likewise, loneliness was unrelated to social web application use, a finding that is consistent with the majority of earlier findings (Amichai-Hamburger & Ben-Artzi, 2003; Bonebrake, 2002; Gross et al., 2002; Leung, 2002; Matanda et al., 2004; Seepersad, 2004). As other studies that called for the use of specific Internet services and social networking sites (e.g. Facebook) were able to show a connection between loneliness and the use of specific social web applications (H. Song et al., 2014), service-specific indicators might be more sensitive in detecting the rather subtle associations.

Taking things together, the findings are only partly consistent with the research hypothesis concerning a link between loneliness and Internet use. Moreover, frequency-based assess-

ments, based on a Likert-type scale, were more consistently related to loneliness as compared to duration-based estimates. The posited research question and accompanying hypotheses expected that media use should be attributable—at least to some extent—to psychosocial characteristics of the person, since these might be indicative of underlying media-related needs of a respective individual. As has been shown in previous studies, the Internet is perceived to be a convenient and potent means at alleviating dysphoric moods including feelings of loneliness especially in the young age groups (Breunig & Ridder, 2015). This might lead one to expect rather straightforward links between psychosocial traits and measures of instrumental Internet use behavior such as social web application use. However, this line of thought might just be too simplistic, missing some key factors that might be critical in establishing a loneliness-usage link. First of all, as already outlined, U&G theories of media attendance put large emphasis on the gratification aspect of media in determining usage behavior (Palmgreen, 1984; Schenk, 2007). Only when a medium actually does gratify user needs in a consistent and predictable manner will expectations concerning the medium's gratification potential develop (Palmgreen, 1984). One could expect that only when a medium can alleviate a person's feelings of loneliness in a consistent and potentially cross-situational manner, a person with a social need structure (e.g. a lonely person) might show elevated levels of Internet use and/or social web application use. Within the scope of the cognitive-behavioral model of Internet addiction, the socio-communicative properties of the Internet were hypothesized to attract psychosocially vulnerable persons and to act as strong reinforcers that would gratify their unmet social needs, eventually leading to a vicious cycle of problematic use (Caplan, 2003, 2005; Davis, 2001). Note the difference between the two perspectives: while the latter model would regard the loneliness-usage link rather straightforward, as the communicative context should be salient to all psychosocially vulnerable persons, the U&G account is amenable to a more nuanced view of media attendance. Since media use behavior should be contingent on a person's history of obtained media gratifications, their cognitive appraisals in the form of expected gratifications and self-efficacy beliefs concerning the actual attainment of the desired gratifications (LaRose & Eastin, 2004; LaRose, Eastin, & Gregg, 2001; LaRose, Lin, & Eastin, 2003; LaRose, Mastro, et al., 2001; Palmgreen, 1984), this conceptualization would not necessarily expect to find straightforward links between psychosocial characteristics of a person and his/her present level of Internet service use. A second point that was completely ignored within the present study is the development of media habits (LaRose et al., 2003) that may be very strong determinants of actual use behavior as they diminish the active, conscious and need-oriented choice among media alternatives that is central to the predictions of the U&G account. It may be that leisure time Internet use was governed by habits rather than active and

rational choice for a substantial part of the present student sample. This possibility cannot be ruled out, although a recent review of media habit research showed that habits were a strong predictor alongside traditional gratifications derived from the U&G framework (LaRose, 2010). Hence, habits might be important drivers of media use behavior, although there should still be room for rational and active media choice as predicted by the traditional U&G account. A third point is that of the employed focus of research, as implied by the cross-sectional design of the present study. As already discussed above, whether thinking in terms of the U&G account or in terms of a habit account of media use, much of the predicted relations between media-related needs, psychosocial characteristics and media use behavior are inherently framed in longitudinal terms. Both habits and the gratifications sought are the product of the ongoing history of media use behavior. Therefore, it may be unsurprising to find only inconsistent relations between loneliness and aspects of Internet use behavior in the cross-sectional design employed herein. Alternatively, it may well be that these rather global and context-/situation-insensitive approaches actually miss the point. There is mounting evidence from experience sampling studies, covering a broad variety of different situational contexts within the same individuals over a longer period of time, showing that these predictive relations between social needs and subsequent use of social web applications do exist at the situational level (Kross et al., 2013; Z. Wang, Tchernev, & Solloway, 2012). These studies found situational social need states (including feelings of loneliness) to be predictive of subsequent use of social web applications, for example Facebook (Kross et al., 2013). Most interestingly, however, is the finding of Z. Wang et al. (2012), who were able to show that this predictive relationship is contingent on the overall level of a person's perceived social support. Situational social needs were more tightly linked to the amount of subsequent social media use in those with lower levels of perceived social support (Z. Wang et al., 2012), hence the psychosocially more vulnerable of their sample. Findings such as these could be interpreted to mean that, at the situational level, social web applications come to be used as functional alternatives for social need gratification more strongly in those who generally lack important in-person relationships. This would be in line with the finding of social-compensatory Internet use orientation in the lonely, as reviewed above (see Section II.1.4.1). There certainly is a need for more thorough investigation of these obviously complex relationships in future studies of Internet use in general and social web application use in particular.

5.3 Loneliness, Internet gratifications and Internet addiction

The following discussion will be concerned with research questions 1 and 3 and hypotheses derived from them. For the sake of clarity, it will be further subdivided and begin with a discus-

sion of findings concerning the associations between loneliness and Internet use orientations (i.e. research question 1) before turning to a discussion of findings concerning the proposed extension of the cognitive-behavioral model of Internet addiction (i.e. research question 3).

5.3.1 Specificity of loneliness effects on social-compensatory use orientation

The first hypothesis derived from research question 1 expected to find robust associations between loneliness and Internet use orientations other than social-compensatory ones. In fact, at the bivariate level, was loneliness weakly and positively associated with a motive subscale containing items related to *fun and entertainment seeking* ($r = .112$), which showed some content similarities to other scales used in previous studies (Brand, Laier, et al., 2014; Caplan, 2002, 2003; Morahan-Martin & Schumacher, 2003; but see Matsuba, 2006 for discrepant findings). Contrary to this, loneliness was unrelated to a motive subscale containing *information and learning* related items ($r = .078$), which is consistent with findings from other studies (Matsuba, 2006; Seepersad, 2004). Morahan-Martin and Schumacher (2003), on the other hand, found loneliness to be associated with increased work-related use orientation, which is partly inconsistent with the present findings. These discrepant findings certainly need some clarification. The motive scale items forming the information and learning subscale may have been too general to apply only to information-related Internet activities. Subject agreement to items such as “... because I want to inform myself” or “... because it gives me food for thought” might likewise be applicable to entertainment and socially related Internet activities and might lie at the core of many Internet activities. An inspection of the psychometric scale descriptives (see Table II.14 in Section II.4.1.2) also reveals that this subscale might have been subject to ceiling effects, since the average scale score of 12.19 is near the maximum of 15 points. It would seem then that, based on these content-related considerations, the information-related motives scale would need some further elaboration and clarification in future studies. Social compensatory Internet use orientation, as assessed by a subscale containing items concerning *social and personal unfolding through Internet use*, was positively and moderately associated with loneliness levels ($r = .328$). This replicates the findings of earlier studies that have used very different operationalizations of the social-compensatory Internet use orientation (Brand, Laier, et al., 2014; Caplan, 2002, 2003; Hollenbaugh & Ferris, 2014; Matsuba, 2006; Morahan-Martin & Schumacher, 2003). As the present study also made use of ad hoc scale solutions of motive subscales, this evidence may be taken to give further credence as to the stability of the connection between loneliness and social-compensatory use orientation across different methodological conceptualizations. The stability of this relation even in the case of covariate control was further established within the scope of this study. Even when it came to statistical-

ly controlling for several demographic (age, gender, partner status), psychosocial (impulsivity traits, career-related strain), and mental health indicators (general anxiety disorder, nicotine and cannabis abuse), the association between loneliness and social-compensatory use motives remained significant. Contrary to this, the association between loneliness and fun/entertainment seeking proved to be spurious and lost its significance under conditions of covariate control. This suggests that confounding variables actually are responsible for this association. One possible variable that may remove parts of this spurious association could be the overall intensity of Internet use, which shares a small portion of variance with fun seeking Internet motives at the bivariate level ($r = .263$; $R^2: .069$). Although loneliness is only very weakly associated with overall use intensity ($r = .055$), both variables may share identical parts of common variance with fun-seeking. Another variable of possible importance for this spurious association is one of the impulsivity traits, i.e. perseverance. Perseverance was negatively associated both with loneliness and fun/entertainment seeking (see Section II.4.4.1). One may speculate that a reduced ability to stay on task and finish duties may translate to a general tendency to leave effortful social as well as performance contexts more readily. Impulsive traits hence may eventually lead to less firm social ties and contribute to feelings of loneliness (Savci & Aysan, 2015) on the one hand while also contribute to use media like the Internet in an affect-regulatory manner (Greenwood & Long, 2009).

Based on these results, loneliness indeed would seem to be specifically associated with a social-compensatory use orientation much in the same way as postulated within the cognitive-behavioral model of Internet addiction (Brand, Laier, et al., 2014; Caplan, 2003, 2005; Davis, 2001). As this study only captured three different dimensions of Internet gratifications, however, these findings should not be taken as definitive. As other researchers have established more than these three domains of gratifications (I. Song et al., 2004; Sundar & Limperos, 2013), future studies of loneliness might try to capture these different constructs in order to arrive at more definite results regarding the specificity of loneliness effects. At present, there is a lack of available Internet motives scales encompassing such a conceptual breadth, at least for the German-speaking countries. The development and evaluation of such a comprehensive Internet motives scale certainly would be a valuable research endeavor for the future.

5.3.2 Usage-contingent effects of loneliness on compensatory use orientation

The second hypothesis derived from research question 1 posited that the strength of relationship between loneliness and social-compensatory Internet use motives would be contingent on the actual level of social web application use endorsed. This study actually came up with consistent evidence for the existence and robustness of this moderation effect (even under

conditions of covariate control). The inclusion of the interaction term (loneliness*social web application use) in the regression models helped to explain more than 1% of additional variance in social-compensatory Internet use motives. Moreover, this conditional effect was specific for this Internet use orientation, since the inclusion of the interaction terms in the models of information- or entertainment-related use orientations did not help explain additional variance in criterion scores. However, despite the presence of this conditional effect (component), loneliness was significantly related to social-compensatory Internet use motives across all sampled levels of social web application use, as implied by the size and signs of regression coefficients concerning loneliness effects (see coefficient values a_{1_3} and a_{3_3} in tables II.23 and II.26). Therefore, these results seem to suggest that there are indeed some usage-contingent relations between loneliness and social-compensatory Internet use motives, but they are of rather small magnitude and only make up one part of the strong and consistent association between loneliness and social-compensatory Internet use orientation. Therefore, the second hypothesis derived from research question 1 could only partly be confirmed.

This study used an indicator of social web application use level, estimated in terms of weekly duration of social web application use, as a potential moderator of loneliness effects on social-compensatory Internet use motives. This measure was thought to reflect Internet user orientations toward the social provisions at the behavioral level. Within the constraints of the cross-sectional study design, a stronger social orientation in Internet use behaviors was deemed an indicator of ongoing Internet use history and the gratifications obtained from such use. As already outlined above (see Section II.1.3.4), the U&G account explicitly states that media choice and use behavior is active and contingent on the need structure of a person, the resultant (media-related) gratifications sought and those actually obtained from respective media use (Katz et al., 1973; Palmgreen, 1984; Schenk, 2007). Only when the gratifications sought from a medium are obtained through its use in a consistent and reliable manner, will use of that medium be maintained (Katz et al., 1973; Palmgreen, 1984). Therefore, higher consumption levels of specific media content (such as social web applications) could be regarded as an implicit indicator of positive cost-benefit-ratio in terms of social gratification obtainment. As lonely individuals may have less functional alternatives to choose among for social need satisfaction, such a successful obtainment of social gratifications through social web application use could be expected to lead to a social-compensatory use orientation toward the Internet. As already outlined, this prediction could only partly be confirmed based on present study results, as loneliness was related to social-compensatory Internet use motives irrespective of actual social web application use levels. This main effect of loneliness and other psychosocial problems on social-compensatory Internet use motives is an integral part of the cognitive-

behavioral model of Internet addiction (Brand, Laier, et al., 2014; Caplan, 2003, 2005, 2010). Hence, the present results give further credence to this theoretical account.

Nonetheless, albeit small in effect, the present findings concerning the conditional nature of this loneliness effect also are in line with predictions derived from the U&G account and should not be overlooked too easily. A study of J. Kim et al. (2009) found a similar conditional loneliness effect on social-compensatory use orientation, which was contingent on an individual's Internet use orientation. These researchers had their participants indicate their favorite type of Internet activity and, based on these results, assigned them to one of three different favorite activity groups (downloading/streaming files vs. social networking vs. instant messaging). While generally replicating the predictions from the cognitive behavioral model (i.e. preference for social interaction partly mediates loneliness effects on Internet addiction), Kim et al. (2009) also conducted a multigroup analysis to compare the structural parts of their models between three different favorite online activity groups. Interestingly, they found evidence for a strong direct effect of loneliness on addiction levels in the download group, with only little indication of effect mediation through social-compensatory Internet use orientation. Contrary to this, loneliness effects on Internet addiction were fully mediated through social-compensatory use orientation in the instant messaging group. The social networking group fell somewhat in-between the other groups, as coefficients suggested that loneliness was both directly and indirectly related to Internet addiction levels (i.e. partial mediation effect). Note that this evidence is compatible with the findings of the present study, as a social Internet service preference conditioned stronger relations between loneliness and social-compensatory Internet use motives. To the knowledge of the author, this is the only other finding available in the present literature that specifically draws on the usage-contingent relations between psychosocial characteristics and medium-related attitudes/expectancies. This evidence should be taken to mean that, depending on the precise nature of Internet use adopted by a person, psychosocial factors like loneliness might be differentially related to different motivational underpinnings of use. Findings such as these might be of major significance for the individual tailoring of therapeutic interventions, as they might help shed light on the different syndromic expressions of Internet addiction. This use-specific analysis would also be in line with findings concerning the existence of Internet addiction subtypes (Montag et al., 2015) and might help identify usage-contingent/subtype-specific psychological risk profiles. Showing that certain types of Internet use specifically interact with certain psychological characteristics to directly or indirectly influence the development of Internet addiction might also be of clinical relevance, since it might help to better understand the functional significance of Internet use for the affected individual. A lonely, Internet addicted person who uses the Internet for mood

management purposes and spends a great deal of online time with entertainment watching or online games might be somewhat different from a lonely addict who uses the Internet for the actualization of self and spends great deals of time using social web applications like social networking sites. While both might score high on scales assessing for the presence of Internet addiction symptoms, they might differ considerably in their underlying use expectancies and their adopted coping strategies, hence requiring some individually tailored treatment approaches. These interesting possibilities certainly require further study that might circumvent some conceptual and methodological limitations inherent in the present study design.

Contrary to J. Kim et al. (2009), who grounded their conditional analysis on subjective preference statements, the present study adopted a quantitative indicator of social web application use intensity for the moderation part of analysis. As participants of the present study also were prompted to rank order their endorsed Internet activities from the most to the least indispensable, there actually had been data that could be used to replicate the type of multigroup analysis endorsed by J. Kim et al. (2009). However, it was decided to abstain from such a procedure on the basis of empirical and methodological considerations: first of all, analytic procedures testing for invariance in factorial structures and structural relations across several groups actually require grouping based on naturally occurring groups (Marsh, Wen, Nagengast, & Hau, 2012), as only in such a case will the grouping itself be reliable. When based on continuous observed variables, the introduction of an artificial cut-off as a grouping criterion will always be associated with unaccounted measurement error, loss of information and the problem of sample-dependent cut-off values impairing generalizability of results (Marsh et al., 2012). As J. Kim et al. (2009) based their grouping on a multicategorical indicator variable of putatively nominal scale level (i.e. type of favorite Internet activity), their adoption of a multigroup structural equation analysis framework would seem to be justified. Simply focusing on the one Internet activity stated as a person's favorite might neglect the subjective liking of other types of Internet activities by that respective person and thus be overly simplistic, however. These neglected activities might well include those that other persons' state as their favorite type of activity. Hence, one might expect an ordinal, dimensional structure when it comes to favorite types of Internet activities rather than a discrete one. This is exactly what the present Internet use data concerning subjective preferences imply (see Section II.4.1.1, Table II.13). While almost half of the study sample stated social web applications as their most indispensable type of Internet activity, more than 37% of the sample ranked them as their second or third most indispensable online activity. It is likely that a large portion of those stating information or entertainment related Internet activities as their #1 favorite activity (~43% of the total sample) were among those 37%. Neglecting these gradual differences in online

activity preferences may lead to highly sample-specific study results and bias one's analyses in an unforeseeable manner. Therefore, contrary to J. Kim et al. (2009), it was decided to make use of quantitative indices of behavioral user orientation and to focus on one single type of potential effect moderator (i.e. social web application use) and investigate its effects for three different Internet use motives dimensions.

A finding that has gone unappreciated up to this point is the lack of interaction between loneliness and social web application use intensity in the prediction of both information-related and entertainment-related Internet use motives. One might expect that in people engaging in high levels of social web application use, higher levels of loneliness might be associated with less of a fun and entertainment seeking user orientation, whereas a low level of loneliness might actually be associated with more of such a "positive" user orientation. As loneliness has been associated with the motives of social-compensatory Internet use, one might also suspect that qualitative features of social web application use might differ depending on loneliness levels. For example, Tosun (2012) was able to show that a stronger tendency toward revealing one's true self on the Internet (as compared to in-person contexts) was associated with an increased use of specific features of the social networking site Facebook. Persons marked by such tendencies reported increased use of the site for the following purposes: meeting new friends, initiating/terminating romantic relationships, maintaining long-distance relationships and engaging in passive observational activities. These uses are clearly indicative of a social-compensatory Internet use orientation. Unfortunately, the Facebook uses scale adopted by Tosun (2012) did not contain a factorial measure capturing tendencies to improve and deepen existing relationships of the immediate in-person social environment. One may speculate that subjects with a higher "true self"-revealing tendency would have scored somewhat lower on such a scale measure. Nonetheless, the study of Tosun (2012) clearly shows that engaging in a social web application like Facebook seems to be associated with different uses and use motives depending on characteristics of the person. As the present study did not assess Internet use motives at the level of specific web sites and services, but only at the level of general Internet use, the null findings concerning the conditional effects of loneliness on fun- and information-related Internet services might be due to an overly vague and service-insensitive research approach. This problem might be circumvented in studies of service-specific Internet use motives and feature use. As this study focused on (general) Internet addiction, a restriction to general and service-unspecific Internet uses was regarded as the most viable option and deemed necessary in order to avoid overly high subject burden through a myriad of service-specific questions.

5.3.3 Loneliness and multiple pathways to Internet addiction

Replication hypotheses derived from research question 3 posited that loneliness would be positively associated with Internet addiction levels and that loneliness effects would be mediated by Internet use motives. This tenet of the cognitive-behavioral model was extended by some additional predictions: First, use motives other than social-compensatory ones were hypothesized to (a) be associated with Internet addiction and (b) act as mediators of loneliness effects. Second, the size of these indirect loneliness effects via Internet use motive domains was hypothesized to be contingent on social web application use intensity, in that loneliness and usage were said to interact in shaping a social-compensatory Internet use orientation.

The results of this study are clearly in line with the basic tenets of the cognitive-behavioral model: loneliness was significantly and positively associated, both directly and indirectly via Internet use motives, with Internet addiction. Starting off with the baseline model (i.e. the parallel multiple mediator model outlined in Section II.4.4.2), the largest portion of loneliness effects (almost 70%) could be related to the direct effect path, whereas a somewhat smaller portion could be attributed to the three indirect effect paths. This finding of partial mediation of loneliness effects on Internet addiction is in line with other findings (Celik et al., 2014; J. Kim et al., 2009), while in contrast with others showing full mediational effects (Brand, Laier, et al., 2014; Caplan, 2003). These studies did differ, however, in their mediator measures used and only three of them employed measures of social-compensatory use measures (Brand, Laier, et al., 2014; Caplan, 2003; J. Kim et al., 2009). Moreover, they differed in their extent of covariate control, with either no (Celik et al., 2014), little (J. Kim et al., 2009) or heavy (Brand, Laier, et al., 2014; Caplan, 2003) control of covariates. It is interesting to note that the degree of covariate control might explain these divergent results, as studies controlling for several covariates (possibly sharing variance portions with loneliness and Internet addiction) seemingly showed consistent evidence for full mediation of loneliness effects. Such studies might have been able to elucidate the effect portions that are truly specific to loneliness and not attributable to other forms of psychosocial maladjustment and/or mental health problems, which might also be reflected in ratings of an individual's loneliness (see also Section II.5.1). This explanation could be substantiated by the present study results, since the inclusion of several covariates during model development (the covariate-controlled first stage moderated mediation model outlined in Section II.4.4.4) rendered the direct effect of loneliness statistically insignificant (c' decreased from .172 to .042 in the case of covariate control; compare tables II.23 and II.26). Therefore, researchers in this field of study should properly be aware of their research goal (specific loneliness effects vs. unspecific effects of psychosocial maladjustment) in the design of their measurement and analytic models.

In the initial stages of model development, the significant indirect effects of loneliness ($\sum_{i=1}^k a_i b_i = .075$) could largely be attributed to the M1 path through *fun & entertainment seeking* motives ($a_1 b_1 = .015$) and, by far more strongly, the M3 path through *social-compensatory use* motives ($a_3 b_3 = .062$), whereas the M2 path through *information & learning motives* ($a_2 b_2 = -.002$) did not act an effect mediator. While this initial finding of rather motive-unspecific indirect effects of loneliness would question the predictions of the cognitive-behavioral model (as initially predicted), the indirect effect of loneliness through fun & entertainment seeking motives proved to be spurious throughout the process of model development and lost its significance under conditions of covariate control. This is in harsh contrast to indirect effect of loneliness through social-compensatory Internet use motives. This effect remained significant throughout the course of model development, although somewhat diminished in size under conditions of covariate control (compare Table II.22, Table II.24, Figure II.9-Panel D, Table II.27, and Figure II.12-Panel D). Therefore, and contrary to what had been expected, the full model presented herein favors the specificity-prediction of indirect loneliness effects, as derived from the cognitive-behavioral model of Internet addiction (Caplan, 2003; Davis, 2001). Moreover, this specific indirect effect of loneliness was shown to be contingent on the level of social web application use, in that higher levels of such use led to an increase in effect size. This conditional effect was robust in size and withstood the introduction of covariates (see Tables II.25 and II.28 and Figures II.9 and II.12, Panel D). Therefore, the usage-contingent analysis of Internet addiction risk, as conducted by Kim et al. (2009), could be replicated and hence justifies the incorporation of actual Internet use (orientation) in explanatory models of Internet addiction (see also Section II.5.3.2).

While the present results were largely in line with the cognitive-behavioral model, they contradicted model predictions in one very important way: social-compensatory use orientation was not the only domain of Internet-related cognitions/motives that was significantly related to Internet addiction. Throughout model development, fun & entertainment seeking motives were consistently and positively associated with Internet addiction (b_1 changed from an initial .447 to .277 under conditions of covariate control). Therefore, there would appear to be no primacy for one specific kind of use orientation in explaining addictive Internet use, since motives concerning entertainment, relaxation, arousal and emotion regulation have all been found to be associated with syndrome severity (Bozoglan et al., 2014; Brand, Laier, et al., 2014; Dhir et al., 2015; Khang et al., 2013; H.-K. Kim & Davis, 2009; J. Kim & Haridakis, 2009; Leung, 2014; S.-M. Li & Chung, 2006; Morahan-Martin, 1999; Morahan-Martin & Schumacher, 2000; Smahel et al., 2012; I. Song et al., 2004; Whang et al., 2003; Yang & Tung, 2007). This finding clearly points to the fact that the predictions of the cognitive-behavioral model should

be broadened to include other motivational domains of Internet use. In doing so, one might better be able to explain the precise ways by which a broad array of different demographic, psychosocial and mental health factors are related to Internet addiction.

Another incidental finding of this study that runs counter to the predictions of the cognitive behavioral model was that there appeared to be no single major risk factor for Internet addiction such as loneliness or social skills deficits (Caplan, 2003, 2005, 2007). Not only were there several motivational domains linked to the symptomatic expression of Internet addiction, but also a broad variety of traits at the person level. This study showed that psychosocial and mental health problems other than loneliness (i.e. impulsivity traits, substance use and internalizing/anxiety symptoms) were associated with increased levels of Internet addiction. Therefore, results of the present study call for a broadening of the cognitive-behavioral model of Internet addiction to incorporate multiple mediator pathways (i.e. Internet motives) and predictor variables (deemed risk factors of Internet addiction). Hence, identifying and specifying underlying mechanisms of loneliness effects is but one task among many, since the previous literature identified a broad variety of different risk factors (for review, see: Bauernhofer, Papousek, Fink, Unterrainer, & Weiss, 2016; Kuss et al., 2014). Since all these effects might also be contingent on the actual type of Internet use (orientation), complexity in analytical designs may result. Nonetheless, findings concerning these complex relationships might eventually lead to a deeper understanding of addictive Internet use and should promote future research endeavors in this field of study. This identified breadth of correlates of Internet addiction should not be too surprising, however. Similar findings were obtained in other expressions of the addiction syndrome, such as alcohol use disorders (Hawkins, Catalano, & Miller, 1992; Stone, Becker, Huber, & Catalano, 2012), obesity (Gerlach, Herpertz, & Loeber, 2015; Hemmingsson, 2014; Roberts & Duong, 2013, 2016) or gambling disorder (Grant & Chamberlain, 2015; Johansson, Grant, Kim, Odlaug, & Götestam, 2009; Lorains, Cowlshaw, & Thomas, 2011; Rash, Weinstock, & Van Patten, 2016). Adopting the syndrome model of addiction point of view (Shaffer et al., 2004), these disorders might share some commonalities at the level of vulnerabilities, e.g. at the neurobiological level, yet can be traced in an individual's history of object interactions. From this point of view, it may prove impossible to predict that a respective individual will get hooked to a particular kind of substance and/or activity based on trait indicators of personality or social adaptation. To date, there is only a paucity of (cross-sectional) findings concerning similarities and differences between Internet addiction and other addiction syndromes such as gambling disorder or cell phone use (Dowling & Brown, 2010; Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2007; Tonioni et al., 2014; Zhou, Zhou, & Zhu, 2016). Nonetheless, the few existing studies investigating this matter are generally in line with the syndrome model

notion of “*common etiology – multiple expressions*,” as studies found the different syndromes to be associated with quite similar psychosocial, personality and mental health characteristics. It may be that more proximal measures, concerning attitudes and expectancies, might have more predictive power in explaining the development of certain addictive disorders. Longitudinal studies adopting this broadened view of the addiction syndrome are critically needed to obtain more definite results concerning this matter. Nonetheless, the present results concerning specific loneliness effects through social-compensatory Internet use motives in explaining Internet addiction (contingent on the level of social web application use adopted) might serve as one such example explaining the specific kind of syndrome development. In line with the thinking of the U&G account (Palmgreen, 1984), the findings may be taken to show that successful situational need satisfaction through specific online behaviors feeds back upon the cognitive-motivational underpinnings of Internet use, eventually setting the ground for a stronger reliance on the online realm for respective need fulfillment. One may speculate that the transition from instrumental to habitual/excessive and addictive use will be fastened in the case of a perceived lack of functional (media) alternatives for the sake of psychological need satisfaction, since dependent media relationships will be established (Rubin & Windahl, 1986). The availability of such alternatives may vary depending on an individual’s ongoing life situation, such as major changes in social contexts due to university entry or moving to a new town. Hence, it may be that actual or perceived limits of one’s environment play a crucial role in explaining the development of dysfunctional object interactions. Not much is known about the transition/ breaking point of initially functional alternatives gone addicted, however. As implied by several cross-sectional findings in the field of media science, only part of media choice behavior is active, with a substantial portion of behavior being maintained by habit (LaRose, 2010; LaRose et al., 2003). This transition process is hard to model in cross-sectional studies and should be focused on in longitudinal studies of Internet use and addiction. The multistep theory of transition to addiction proposed by Piazza and Deroche-Gamonet (2013) might provide a valuable conceptual framework for such studies.

Another point that needs to be considered is the nature and meaning of the employed moderator, i.e. social web application use duration in hours per week. This indicator variable is rather unspecific and subsumed activities related to different purposes such as interacting with people already known in-person, getting to know new people and participating in bulletin boards. This indicator hence takes a mere quantitative approach and was thought to reflect the degree of orientation toward social Internet use, a view that could be substantiated by the results of the present study. However, this indicator is essentially unable to tell anything about qualitative features of social web application use and assumes it to be equal irrespective of

psychosocial characteristics of the person. Note that such a view might not be justified, since there is evidence for a conditional role of psychosocial factors in qualitative features of social web application use (Masur, Reinecke, Ziegele, & Quiring, 2014; Nadkarni & Hofmann, 2012; Tosun, 2012; Tosun & Lajunen, 2010). Moreover, this use indicator cannot tell anything about the actual effects resulting from such use. While early accounts were reporting on negative social effects of Internet use and suspected online social interaction to replace in-person social contacts, eventually leading to social isolation (Kraut et al., 1998; Nie, 2001; Nie & Hillygus, 2002), there is now ample evidence that high engagement in social web applications is actually related to higher levels of (in-person) social capital and relationship quality (Antheunis, Schouten, & Kraahmer, 2016; H. Liu, Shi, Liu, & Sheng, 2013; Valkenburg & Peter, 2009). Most interestingly, there is evidence for a moderating role of psychosocial problems in the relations between social web application use and social capital (Ellison, Steinfield, & Lampe, 2007; H. Liu et al., 2013; Steinfield, Ellison, & Lampe, 2008; Valkenburg & Peter, 2009). For example, H. Liu et al. (2013) found that in students with high levels of attachment anxiety, high (vs. low) engagement in social networking sites was unrelated to social capital, whereas level of engagement was positively related to social capital in those students with low levels of attachment anxiety. This evidence could be taken to mean that the social offerings of the Internet may not compensate for a lack of in-person social networks in those with psychosocial problems (Valkenburg & Peter, 2009), although there is also conflicting evidence concerning this matter (Ellison et al., 2007; Steinfield et al., 2008). However, whether or not the heavy use of social web applications translates to social benefits in the real world, it might nonetheless serve a good indicator of actual Internet use orientation. As this study has shown, this use indicator interacted with loneliness to exert conditional effects on social-compensatory Internet use motives. Future studies might attempt to look at specific social activities (e.g. meeting new people, maintaining long-distance relationships, maintaining/deepening everyday social relationships, etc.) in order to clarify the precise role of type of activity in shaping social-compensatory use motives, which have been shown to be associated with Internet addiction within the present study.

5.4 Methodological and conceptual limitations

While the regression models developed in the present study could explain 23.2–40.5% of between-subject variance in Internet addiction scores, this seemingly promising result needs to be qualified against the background of some methodological and conceptual drawbacks.

First, as the sample was restricted to university students, generalizability of the results found might be limited. This calls for a replication in larger, representative and community-

based samples. As a list of 1970 different student representatives of all major fields of study at universities in German-speaking countries were contacted and asked to forward an appeal to contribution to their fellow students, effort was undertaken to guarantee for a broad recruitment of the study sample. Unfortunately, the adopted snowball recruitment strategy does not allow for an assessment of response rate, since the actual size of the reached student population is unknown. And even among those students that actually received and noticed the appeal to contribution, motivational factors might have had a strong effect on participation, hence biasing results. When comparing the demographics and the stated fields of studies of the present sample with representative figures of the German federal office of statistics (2015), it is clear that the present student sample was biased in its composition. This becomes most evidently in the underrepresentation of student from law and business science studies in the present sample (3.1%), which should make up the largest part of a representative student sample according to the representative enrollment rates (Statistisches Bundesamt, 2015). Therefore, it is also unclear whether these results generalize to other student samples of more representative composition. Future studies might mix online and offline recruitment strategies and employ stratified random sampling procedures at the level of the general population, although such a study approach will certainly involve the necessity of fund raising and multicenter cooperation in order to be successful. Survey results might also get biased by a low completion rate (Alessi & Martin, 2010), this problem should not be overlooked. As 64% of the initiated online questionnaires were completed, there was a substantial portion of dropouts during the interviewing process. This may have been due to technical, motivational or other reasons that cannot be identified with certainty. As the present version of the questionnaire format could not easily be adapted to small screen sizes, some dropouts may have been due to the experienced inconveniences of mobile phone respondents⁴. This technical issue should be targeted in future online questionnaire studies, for example by the creation of on smartphone-specific version of the survey that is otherwise comparable in duration and handling convenience.

A second issue is the non-consideration of measurement error in the employed statistical analyses. Moreover, some of the employed scale measures were newly developed and formed in an ad hoc manner based on the results of EFAs (i.e. the Internet use motives subscales and the coping subscales including distractive Internet use behaviors). The meaning and validity of these subscales were judged based on content analysis, while little a priori effort was undertaken to judge them in terms of criterion or construct validity. This was only established by the integration of motive subscales into the path analytical framework, which yielded results con-

⁴ Although respondents were informed that the survey would not be properly and conveniently be displayed on such devices before giving their consent to participate.

sistent with the deemed Internet motive constructs defined. The only inconsistent finding pertains to the second use dimensions identified by the EFA procedure employed, i.e. information and learning related Internet use motives. The items constituting this scale might have been too unspecific to actually reflect genuinely instrumental, information-related Internet use orientation. Therefore, the current scales should be refined and replicated in subsequent studies using confirmatory approaches. As the scales encompassed only three items each, additional items might be constructed in order to increase the internal consistencies of the scales (Floyd & Widaman, 1995). Internal consistencies of the scale measures used within the presented path analyses were generally acceptable. Nonetheless the measurement error inherent in the many different indicator variables used may have attenuated correlations and hence have biased regression coefficient estimates to some extent (Bühner & Ziegler, 2009). A possible solution to this problem would have been the adoption of latent variable modeling and the translation of the present research question into a structural equation modeling framework (Byrne, 2013; Hoyle, 2012; Kline, 2015). As the present research questions also dealt with interactive effects of variables, it is important to note that this analytical framework is amenable to model interactions between indicator variables (Marsh et al., 2012; Maslowsky, Jager, & Hemken, 2015; Muthén & Asparouhov, 2003). This might have helped to alleviate problems related to unreliability of psychometric scale indicators, yet not have resolved the issue of unreliability in the actual moderator variable, i.e. the estimated duration of social web application in hours per week. Since this estimate was based on a single item indicator, the latent-observed variables interaction modeling would nonetheless have contained an unknown amount of measurement error. Research has shown that self-reports on Internet use are unreliable and may actually under-/overestimate the actual duration of use (Scharnow, 2016). Since this study asked participants to separately rate the intensity of all their endorsed Internet activities, this issue might have been even worse in the present case. Participants may have been weighing up use intensities of single activities against each other and, based on their subjective use preferences, may have produced biased intensity estimates. While subjective preference data (at nominal scale level) was available and could have been used as an alternative indicator of user orientation (as was done by Kim et al., 2009), it was decided to abstain from such a procedure due to the presumably dimensional nature of user preferences, as already stated above (see Section II.5.3.2). The use of arbitrarily defined groups in itself would have introduced measurement error into the analysis (Marsh et al., 2012), thus representing no reasonable alternative to the use of duration estimates. A possible solution to this problem might be the adoption of a psychometric scale assessing service-/category-specific Internet use intensity with multiple indicator items.

A third issue pertains to a conceptual flaw directly resulting from the adopted cross-sectional study design. As this study specified effect-mediating variables, interactions between Internet use indicators and psychosocial indicator variables in explaining parameter values of mediating variables, it explicitly adopted a causal modeling approach (Hayes, 2013). While causal inference from cross-sectional data is a matter of long debate (Morgan & Winship, 2014), there is sufficient evidence in Internet addiction research from both cross-sectional and longitudinal studies to discuss this problem in the light of empirical data. As Internet addiction is conceptualized within the established dependence framework, one key component of the disorder is that it leads to negative consequences in major life domains including social relationships (see Section II.1.1.1). These relationship problems might take the form of family conflicts and the actual loss of existing social ties with friends, neighbors, and colleagues. Hence, one might argue that the excessive and addictive use of the Internet might induce feelings of loneliness, stress and mental health problems through its negative effects on existing social relationships and other role obligations. On the other hand, one might take the social compensation account (also taken within the present study) and assert that it will be the lonely and psychosocially vulnerable who are attracted to the (social) offerings of the Internet, hence being at increased risk for the development of excessive and addictive patterns of Internet use. It should not be surprising that there is evidence from both cross-sectional (Celik et al., 2014; J. Kim et al., 2009) and longitudinal studies (Ciarrochi et al., 2016; Gámez-Guadix, 2014; Salmela-Aro, Upadyaya, Hakkarainen, Lonka, & Alho, 2016; Yao & Zhong, 2014) favoring both points of view. In sum, the evidence points to reciprocal effects between psychosocial problems (such as loneliness and depression) and Internet addiction. Therefore, one might accept the one-sided approach taken within the present study as a justified attempt at specifying some of the major predictions of social-compensatory accounts of Internet addiction such as the cognitive behavioral model (Brand, Laier, et al., 2014; Caplan, 2003, 2005; Davis, 2001). Nonetheless, the identified relations and mediating mechanisms should be replicated and qualified by future longitudinal studies.

III. The role of loneliness in emerging adults' everyday use of Facebook – an experience sampling approach

1. Introduction

The last decade has witnessed an explosion in the use of the social network site Facebook. This increasing use of the social network site has stimulated empirical research concerning the potential positive as well as negative effects of social network site use in general (Andreassen, 2015; Steinfield et al., 2008) and Facebook use in particular (Ellison et al., 2007; Kross et al., 2013; Steinfield et al., 2008). However, before discussing the effects resulting from the use of social media and the significance of psychosocial factors in predicting such use, a definition of relevant terms and some background information concerning Facebook seems warranted.

1.1 Background information concerning social media and Facebook

Web services and applications in the 21st century such as Facebook or Twitter are ubiquitously subsumed under different terminological headers such as “*social media*” (Ariel & Avidar, 2015; Kaplan & Haenlein, 2010; Obar & Wildman, 2015) or “*social network site*” (SNS) (boyd & Ellison, 2007). This terminological heterogeneity is complicated by varying definitions of the term “*social media*” and by technological developments that contribute to the versatile and ever-changing nature of these services (Kaplan & Haenlein, 2010; Obar & Wildman, 2015). Obar and Wildman (2015) recently attempted at a more general definition of the term “*social media*” by synthesizing the common elements inherent in the different definitions of the terms. They posit that social media can be regarded as services and applications of the Web 2.0, not only allowing for passive reception but also for active manipulation and generation of web content. The user-generated content, its mutual exchange, its collaborative generation, modification and consumption, lies at the heart of such applications. The individual user of such services most often has to create a service-specific user profile, although services vary highly regarding the degree of required user information. This user profile serves truly social functions within the respective application, in that it allows for approaching and connecting with other user profiles and the management of one’s interactions through a list of (social) network connections. Among the many discussed social media services available are Wikipedia, YouTube, Facebook, Twitter, just to name a few. The rich possibilities to combine aspects of audiovisual entertainment, different information channels and social activities (e.g. instant messaging, chat, commentary functions etc.) to varying degrees and depending on the respective social

media application under study make a clear-cut subcategorization of these applications increasingly difficult.

A recent study by Frees and Koch (2015) found that the German general population aged 14+ spends a daily amount of 42 minutes, i.e. 33% of overall online time, using online communication services like instant messaging, chats, emails or social network sites like Facebook. This figure rises to a daily amount of 98 (!) minutes in the group of emerging adults (aged 14–29 years). This finding is complemented by large proportions of reported use of different social media services among German “onliners” and encompass social media services like WhatsApp (57%), Facebook (42%), Google+ (11%), Instagram (9%), Xing (8%), or Twitter (7%) in the general German onliner population, as reported by Tippelt and Kupferschmitt (2015). These figures rise to a considerable extent when separately looking at the age group of emerging adults, as displayed in Table III.1. As can be seen, Facebook plays a very prominent role in the lives of emerging adults and is used on a daily basis in as much as 45% of this age group (Frees & Koch, 2015; Tippelt & Kupferschmitt, 2015).

Table III.1

Use frequencies of different social media services in the population of German “onliners” aged 14–29 years, compared to the general population of German “onliners” (aged 14+), based on data of the ARD/ZDF-Onlinestudie 2015 (Tippelt & Kupferschmitt, 2015)

Service	General (14+)			14–29 years old		
	Use Frequency			Use Frequency		
	Daily	1-6 d/week	< 1 d/week	Daily	1-6 d/week	< 1 d/week
WhatsApp	44	10	3	69	11	-
Facebook	23	11	8	45	17	9
Instagram	5	2	2	17	4	3
Google+	2	4	6	3	6	8
Twitter	1	3	3	3	6	5
Xing	1	4	3	2	5	3
Tumblr	1	2	1	4	2	2
Pinterest	1	1	1	1	2	1
LinkedIn	1	1	1	1	1	1

Founded in 2004, the number of Facebook users has been continuously on the rise and, according to www.alexa.com (retrieved on 08/16/2016), the service has the fourth largest number of site visits in Germany, just after two domains of the search engine Google (Google.de, Google.com) and the domain of the video-broadcasting service Youtube.com. According to statistics from www.globalmediainsight.com (retrieved on 08/16/2016), Facebook is by far the social network site with the largest global pool of active users (see Figure III.1), with a total of 1.6 billion of active users when adopting a lenient activity criterion of “at least once-a-month.”

As of June 2016, this number even increased to 1.71 billion of active users (Facebook, 2016). More than 90% of these users (1.57 billion) also made use of Facebook Mobile from their cell phones, making the social networking service a very important online service permeating parts of everyday life. Based on the available data in Germany (Frees & Koch, 2015; Tippelt & Kupferschmitt, 2015), one could estimate that at least 23.5 million Germans (aged 14+) are registered users of Facebook, with more than 19 million people reporting to use the social network site (SNS) at least once a week.

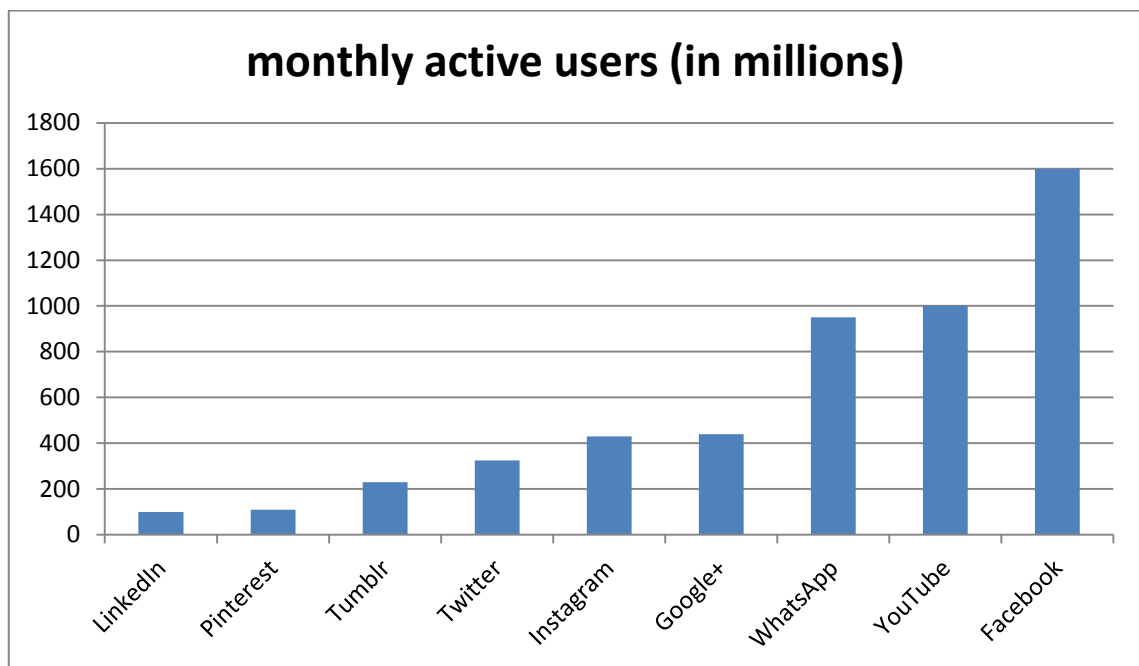


Figure III.1
Monthly active users of different SNS services, based on data published by globalmediain-sight.com (retrieved on 08/16/2016)

To understand the attractiveness of Facebook, a look at some of its integrated features seems warranted. When logged to one’s Facebook profile, a user has control over several features enabling the presentation of personally relevant information (name, date of birth, gender, occupation, history of education etc.), major experiences of one’s (social) life and even information concerning the places visited in in-person life. This information can be complemented by uploaded photos, connected with the user profiles of involved persons and acted upon by other account owners using written commentary functions or the famous “Like” button. Hence, it enables users to create and share a scrapbook containing major aspects of their (social) life history. Besides these (interactive) scrapbook functions, Facebook allows for the establishment, management and maintenance of social contacts and activities through personalized search functions, engaging in the so-called “Groups” or one of the several (video) chat

functions provided. Through its calendric event notification tool, it allows for the efficient organization, sharing and scheduling of events. Personal information regarding culture, occupation, leisure time, and societal topics can be attained by the so-called “sites.” These are public Facebook profiles of artists, organizations, and companies, which can be subscribed to using the “Like” button. Moreover, Facebook enables the use of (embedded) video, audio or gaming services, as well as social exchange. Facebook is a multifaceted SNS, allowing for many different and highly personalized (social) uses of the service⁵.

1.2 Theoretical accounts of Facebook use

Against the background of the broad array of functional features, Facebook has been termed a digital “toolkit” (Smock, Ellison, Lampe, & Wohn, 2011), that may allow for the satisfaction of a diverse range of different media-related needs. From both a psychological and media scientific point of view, it is crucial to understand (a) what different kinds of media-related needs can be gratified by a respective social media service like Facebook and (b) for what reasons and under what circumstances people turn to a respective media alternative. As already discussed by Schweiger (2007), functional accounts of individual media attendance have much to offer in this respect. Two such examples, the Uses and Gratifications account (U&G) and the Mood Management Theory (MMT), will be introduced in the following subsections. Some of the major findings concerning SNS use in general and Facebook use in particular will subsequently be presented.

1.2.1 *Uses and gratifications of Facebook use*

The uses and gratifications (U&G) account established by Katz et al. (1973) is a theoretical perspective that is complementary to traditional stimulus-response models of media effects, as it presents a research strategy that focuses on media audiences and the mechanisms underlying their targeted use of mass media in order to understand resultant media effects (Schenk, 2007; Schweiger, 2007). Its core assumption is that human beings make active and targeted use of mass media in order to fulfill psychological needs (Katz et al., 1973). These needs, in turn, are rooted back in social and psychological factors characteristic of the individual (Katz et al., 1973). As discussed by Schweiger (2007), these psychosocial factors may be predictive of individual differences in attitudes, behavioral styles, coping orientations, and need structures, which may be relevant in understanding media attendance. The actual choice and use of media occurs depending on conscious information-processing and problem-solving processes (Schweiger, 2007), meaning that individuals are sufficiently self-aware and reflective about

⁵ For an up-to-date overview of the many different features, their functions, and accompanying background information, please visit https://en.wikipedia.org/wiki/List_of_Facebook_features (08/16/2016)

their media-related needs and motives (Katz et al., 1973). Media as well as non-media alternatives for the fulfillment of respective psychological needs are weighed up against each other in a competitive manner (so-called “*functional alternatives*”) and are chosen based on a favorable appraisal of their gratification potential in a given situation. The results of these appraisal processes, in turn, are said to depend on the ongoing history of need-based (non-)media choices (i.e. the degree and consistency of respective need gratification obtained from such choices in the past) and the perceived availability of functional alternatives in a given situation (Palmgreen, 1984; Rubin & Windahl, 1986). For example, engaging in an episode of loneliness-alleviating use of an SNS like Facebook will provide feedback on beliefs and expectations regarding functional media/non-media alternatives, eventually influencing the likelihood of similar media choices in similar need states in the future. While much has been speculated about the nature and extent of different media-related needs, to date there exists no sufficient and theoretically grounded catalogue of such needs (Schweiger, 2007). As reviewed in Schweiger (2007), however, there are recurring dimensions of reported gratifications/motives across media that are frequently reported in U&G studies: cognitive motives (e.g. search for information and orientation), affective motives (e.g. relaxation, excitation, distraction), social motives (e.g. para-social relationships, loneliness alleviation, food-for-conversation, social integration) and identity-related motives (e.g. identification, social comparisons, role models).

There have been several U&G studies looking at use motives for SNSs in general and for Facebook in particular (Cheung, Chiu, & Lee, 2011; Y. Kim, Sohn, & Choi, 2011; Oliveira, Huertas, & Lin, 2016; Park, Kee, & Valenzuela, 2009; Pempek, Yermolayeva, & Calvert, 2009; Quan-Haase & Young, 2010; Raacke & Bonds-Raacke, 2008; Rae & Lonborg, 2015; Smock et al., 2011). As can be seen from Table III.2, when classifying the identified motive dimensions into the more general main categories mentioned above, SNSs like Facebook do serve a broad variety of motives already found for traditional mass media, with social motives being the most important and most differentiated ones. In terms of social functions, three motivational sub-dimensions have been identified quite consistently, i.e. maintenance and development of existing social relationships, formation of new social relationships and enhancing/maintaining one’s social status through SNS use. Individual motives subsumed under the “Maintenance” header include the use of SNSs to keep in touch with both current and old/distant friends, for example by sharing and discussing problems and by providing emotional support (e.g. Quan-Haase & Young, 2010). Motives under the “Formation” header include romantic ones (e.g. dating) and those seeking new friends sharing common interests (e.g. Quan-Haase & Young, 2010, Rae & Lonborg, 2015; Smock et al., 2011). Social Enhancement motives encompass keeping up with others by following current trends toward SNS use or developing one’s profession-

al career through SNS use. Additional categories of needs such as habitual needs have likewise been discussed in relation to social media (Z. Wang et al., 2012).

Table III.2

Examples of U&G studies of motives underlying SNS and/or Facebook use, with identified motive dimensions subcategorized along the four main categories identified by Schweiger (2007)

Study	Motive Dimension			
	Cognitive	Affective	Social	Identity
Park et al. (2009)	Information	Entertainment	Socializing Enhancement <i>Status-Seeking</i>	-
Quan-Haase & Young (2010)	Information	Pastime	Maintenance <i>Affection</i> <i>Share problems</i> Formation <i>Sociability</i> Enhancement <i>Fashion</i>	-
Smock et al. (2011)	-	Entertainment Escapism Habit/Pastime	Companionship Maintenance <i>Interaction</i> Formation Enhancement <i>Professional</i> <i>Trend/fashion</i>	Expressive Infor- mation Sharing
Kim et al. (2011)	Information	Entertainment Convenience	Formation <i>Seeking Friends</i> Maintenance <i>Social Support</i>	-
Cheung et al. (2011); Oliveira et al. (2016)	Purposive Value	Entertainment	Maintenance <i>Connectivity</i> Enhancement	Self-Discovery Purposive Value
Rae & Lonborg (2015)	Information	-	Maintenance <i>Friendship</i> Formation <i>Connection</i>	-

The presence of such a broad range of motivational underpinnings of Facebook use highlights the fact that social media services can be used in a multitude of ways. It would therefore seem important to understand why people come to use social media in many ways, with potentially many different outcomes. From a U&G perspective, research might focus on the role that psychosocial characteristics play in determining user motivation, use behavior and, ultimately, use effects.

1.2.2 Mood management through the use of Facebook

While the U&G framework assumes users to be cognizant of their needs, an alternative account of instrumental media use, Mood Management Theory (MMT) (Knobloch-Westerwick,

2011; Zillmann, 1988, 2000), does not assume every media use to result from active, need-oriented and conscious-level thought processes. According to this account, learning processes governed by the principles of operant conditioning might likewise explain the targeted use of media in the service of situational mood regulation (Knobloch-Westerwick, 2011). The model basically assumes that people “*seek out media content they expect to improve their mood*” (op cit., p. 373). Through socialization and individual learning experiences, mood states (stimuli) come to govern situational media use behavior (responses) to achieve mood-ameliorating effects (consequences): Accordingly, throughout development, stimulus-response contingencies get established according to the adaptiveness of different media content for modulating different mood states. Hereby, the adaptiveness of media content is said to vary depending on its excitement potential (arousal modulation), hedonic content (positive/negative) and semantic affinity (e.g. predicted avoidance of content with high affinity to one’s negative state) (Knobloch-Westerwick, 2011). While the basic tenets of the model have repeatedly been supported, there have also been major criticisms and contradictory results, the discussion of which is far beyond the present context (see Knobloch-Westwick, 2011, for an extended discussion of findings and theoretical implications). Suffice to say that often enough, mood management tendencies have been shown to be conditional on factors such as gender, type of (negative) mood state under investigation or even run counter the predicted avoidance of topics with semantic affinity to one’s negative mood state (e.g. preference for TV programs on socially isolated and lonely protagonists in a study of lonely elderly; see Mares & Cantor, 1992). Nonetheless, the account is a helpful adjunct to the U&G framework mentioned above, in that it explicitly is concerned with the prediction of affect-dependent consumption of media content at the level of the situation.

Social media findings directly concerning the MMT are sparse, although there are findings that show acute cognitive and affective effects of viewing one’s own or other users’ SNS profiles (B. Gentile, Twenge, Freeman, & Campbell, 2012; Gonzales & Hancock, 2011; Haferkamp & Krämer, 2011; Toma, 2010; Toma & Hancock, 2013), which could be taken as evidence for the mood management potential of SNSs (e.g. enhancing self-esteem by spending time on one’s own Facebook account page; see Gentile et al., 2012). Recently, Johnson and Knobloch-Westerwick (2014) investigated the effects of a mood induction procedure (positive vs. negative mood induction through bogus performance feedback) on browsing patterns of manipulated SNS user profiles and found evidence for mood management effects, as manifested in different patterns of social comparisons. Compared to the positive mood condition, participants in the negative mood condition engaged in significantly more downward social comparisons, as measured by increased viewing times allotted to user profiles with low career success

and/or low attractiveness. The authors interpreted the findings as evidence for the mood regulation potential of SNSs by enabling users to engage in social comparison processes in the service of mood repair (Johnson & Knobloch-Westerwick, 2014). In another mood-induction study, Toma and Hancock (2013) were able to show that participants whose ego was threatened by negative feedback on a speaking performance showed an extraordinarily strong drive toward browsing their Facebook profile, when given the (theoretical) choice between one of several online activities. The authors interpreted their findings to show the potential of Facebook in aiding people in maintaining and reestablishing perceptions of self-worth.

There are also findings derived from experience sampling studies conducted in field settings, which are generally in line with the MMT, as SNS use including Facebook could be predicted by preceding affective (need) states (Kross et al., 2013; Z. Wang et al., 2012). However, and contrary to predictions derived from the MMT account, self-initiated SNS use had inconsistent effects on subsequent affective/need states in these two studies (see Section III.1.4.3).

1.3 Social network sites use in the lonely

There is now ample evidence, both conceptual and empirical, showing that human beings possess an innate drive toward social connection with others in their attempt to establish a satisfactory and healthy state of being (Baumeister & Leary, 1995; J. T. Cacioppo, Hawkley, et al., 2006; S. Cacioppo, Grippo, London, Goossens, & Cacioppo, 2015; Hawkley & Cacioppo, 2010). The regulation of such social needs has been investigated using different theoretical need conceptualizations, such as the need to belong (Baumeister & Leary, 1995), the need to affiliate (O'Connor & Rosenblood, 1996) or the need for relatedness (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Such studies concerned both social interaction and social media use (Hall, 2016a, 2016b; Kross et al., 2013; Lin, 2016; O'Connor & Rosenblood, 1996; Reich & Vorderer, 2013; K. M. Sheldon, Abad, & Hinsch, 2011; Z. Wang et al., 2012).

Failure at establishing an adequate and expected level of social relationships has been shown to be predictive of physical and mental disorders and to overall mortality (J. T. Cacioppo et al., 2010; J. T. Cacioppo, Hughes, et al., 2006; S. Cacioppo et al., 2015; Hawkley & Cacioppo, 2003; Hawkley, Thisted, & Cacioppo, 2009; Holt-Lunstad et al., 2015; Holt-Lunstad et al., 2010; Petitte et al., 2015; Uchino et al., 1996), highlighting their importance both in the prevention and in the rehabilitation of disease states.

Likewise, (subjective) states of social isolation have been discussed and investigated in relation to the engagement in compensatory activities including media use like television, radio or the Internet (Breunig & Ridder, 2015; Rubenstein & Shaver, 1982a; Rubins, 1964; Schwab, 1997; Seepersad, 2004). From a U&G and media dependency perspective (Rubin & Windahl,

1986; Schweiger, 2007), it is only natural to ask whether certain psychological and/or social factors might predispose individuals toward using specific (non-)media functional alternatives for the fulfillment of social needs. In case of chronic social isolation, i.e. in case of a reduced availability of in-person sources of social need satisfaction, one might predict an elevated importance of specific media alternatives for respective need fulfillment. In this context, social media services like Facebook might represent an exceptionally important functional alternative, given their broad variety of social features (as outlined above). As will be shown, the psychological state of loneliness might be an indicator of both the presence of situationally unmet social needs and the tendency to meet these needs using SNSs like Facebook.

1.3.1 Trait/State loneliness as indicator of unmet social affiliation needs

According to Schwab (1997), loneliness can be defined as “*the disquieting awareness of internal distance between oneself and others and the accompanying desire for connectedness in satisfying, meaningful relationships*” (p.22, translated by the author). Inherent in such a definition is a perceived discrepancy between a person’s desired and actually attained levels of interpersonal connection (Peplau & Perlman, 1982b; Perlman & Peplau, 1982). This perceived discrepancy may promote different sorts of behaviors depending on an individual’s appraisal of coping resources and self-efficacy beliefs (W. H. Jones & Carver, 1991; Revenson, 1981; Rubenstein & Shaver, 1982a). Defining a prototype of the loneliness experience has been difficult, since it represents a complex psychological phenomenon involving affective, cognitive and behavioral components, albeit to varying degrees (Heinrich & Gullone, 2006). Loneliness has been shown to have a peak prevalence rate during the years of adolescence and emerging adulthood (Larson, 1990, 1999; Qualter et al., 2015; Rokach, 2000), making university students a highly attractive focus group in loneliness studies.

Moreover, loneliness should be differentiated according to the employed time dimension of studies, since it can take both chronic (i.e. trait-like) and transient (state-like) forms. Marangoni and Ickes (1989) point to the importance of distinguishing between these different forms, since the transient experience of loneliness may be rather normative and not necessarily related to the chronic experience. This has been shown in a study of college freshmen (Shaver et al., 1985), which found that trait and state loneliness measures whereas highly related to each other in times of social stability (i.e. in the summer before college entry, toward the end of the first term). However, trait-/state-measures of loneliness were only weakly related shortly upon entering college, i.e. directly after a major transition in one’s life context. State loneliness might hence be conceptualized as an acute reaction to a felt discrepancy between momentary and desired levels of social integration and/or emotional intimacy. This

reaction might occur as a response to larger contextual changes, but also might be observable at the fine-grained time-scale of everyday life.

1.3.2 Social network sites as a functional alternative in the lonely

Even among the earliest theoretical accounts of loneliness, media use has been discussed as one of the potential responses to the experience (Rubins, 1964). The advent of the Internet and social media like Facebook has led many researchers to speculate about and empirically substantiate the role that these services might play for the lonely. As higher levels of loneliness have been associated with lower levels of social skills (DiTommaso et al., 2003; Duck et al., 1994; Stokes, 1987) and with a hypervigilance toward social threat cues such as negative social evaluation (J. T. Cacioppo & Hawkley, 2009), the communicative context provided by the Internet might provide major benefits for the lonely. In computer-mediated communication (CMC), there is reduced availability of social communication cues and a certain extent of asynchronicity/controllability of the communication process itself (Walther, 1996). Each of these features might be highly salient for the lonely and the socially inept, since they might help compensate for deficiencies present/felt in real-world settings. Empirical investigations have shown that psychosocial factors and personality characteristics such as self-consciousness and social anxiety are predictive of the perceived relevance of reduced cues and asynchronicity/controllability in CMC (Schouten et al., 2007). Likewise, the importance of these CMC features has been discussed extensively in theories of problematic Internet use, in that the satisfaction of social needs unmet in in-person life might provide the socially inept and the lonely with a superior source of reward, while at the same time setting such individuals at risk for addictive patterns of Internet use in general and social media use in particular (Andreassen, 2015; Caplan, 2003, 2005, 2007; Davis, 2001; Satici & Uysal, 2015). Against this background, a detailed study of how psychosocial factors like loneliness influence user motivations and actual use behaviors concerning social media services like Facebook seems warranted.

The author was able to locate twelve published studies of loneliness in Facebook use, all published since 2010 and most frequently conducted in university student samples (L. R. Baker & Oswald, 2010; Burke, Marlow, & Lento, 2010; Clayton, Osborne, Miller, & Oberle, 2013; Jin, 2013; Lemieux, Lajoie, & Trainor, 2013; Lin, 2016; Lou, Yan, Nickerson, & McMorris, 2012; Ryan & Xenos, 2011; P. Sheldon, 2013; Skues, Williams, & Wise, 2012; Teppers, Luyckx, Klimstra, & Goossens, 2014; Wohn & LaRose, 2014). Three of these studies compared users and non-users and unequivocally found non-users to display higher levels of loneliness, especially in terms of a lack of friends and acquaintances (Lou et al., 2012; Ryan & Xenos, 2011; Teppers et al., 2014). While this evidence could be taken to mean that Facebook helps build social capital (and,

maybe it does so especially for the psychosocially vulnerable) (Ellison et al., 2007; Steinfield et al., 2008), it also could be taken as evidence that socially integrated and active persons simply expand their higher level of social activity to the online realm, and are thus more likely to make use of social Internet services like social network sites (Kraut et al., 2002; Zywicka & Danowski, 2008). This latter perspective (“rich-get-richer hypothesis”) would predict more active and beneficial use of Facebook for the socially integrated, compared to the psychosocially vulnerable and lonely. As will be shown, the current state of evidence does not allow for the (dis)confirmation of any of the two rival hypotheses.

First of all, there is at present conflicting evidence regarding the association between loneliness and the intensity of Facebook use, as some studies have shown insignificant associations (L. R. Baker & Oswald, 2010; Burke et al., 2010; Jin, 2013; Lin, 2016; Teppers et al., 2014; Wohn & LaRose, 2014), while others have shown positive correlations with indicators of overall use duration (Lemieux et al., 2013; Ryan & Xenos, 2011; Skues et al., 2012). Studies investigating the frequency of specific Facebook activities found loneliness to be uncorrelated with content production activities such as status updates or posting photos (Burke et al., 2010; Jin, 2013), whereas it was negatively associated with communication activities such as receiving or writing messages and wall posts (Burke et al., 2010; Jin, 2013; Ryan & Xenos, 2011). Moreover, loneliness has been associated with less reported engagement in adaptive and intimate forms of self-disclosure (Jin, 2013; P. Sheldon, 2013). Loneliness was, however, positively associated with passive activities such as browsing profiles or photos (Burke et al., 2010; Ryan & Xenos, 2011). These findings hence would support the “rich-get-richer hypothesis,” since less lonely people make more active and, potentially, adaptive use of the SNS.

Hence, while the quantitative break down of activity types would imply a rather dysfunctional pattern of activity in the lonely, these findings do not tell us anything about the relative benefits that lonely persons may derive of their online communication activities. It has been shown that coping with loneliness can be associated with both passive and active behavioral strategies (W. H. Jones & Carver, 1991; Rubenstein & Shaver, 1982a; Schwab, 1997). Moreover, lonely persons have been shown to engage in less adaptive forms of self-disclosing behaviors in other online as well as offline interpersonal contexts (Ignatius & Kokkonen, 2007; Leung, 2002). Therefore, while adopting a more passive usage of SNSs like Facebook, lonely persons might nonetheless show an increased amount of social activity as when abstaining completely from SNS usage. In a recent study, Lin (2016) was able to show that higher levels of Facebook communication with online-only acquaintances were associated with higher levels of loneliness, whereas higher levels of communication with good friends were negatively associated with loneliness. Importantly, in their hierarchical regression analyses, these associations held

controlling for offline social interaction quality. Evidence such as this could be taken to imply that lonely individuals strive to compensate for their reduced quality and quantity of social relationships in the offline realm by more actively seeking out new online acquaintances. In line with this, while not unequivocally associated with the total number of Facebook friends (Burke et al., 2010; Jin, 2013; P. Sheldon, 2013; Skues et al., 2012; Wohn & LaRose, 2014), loneliness has been shown to be associated with a network of Facebook friends that contains relatively more online-only (Jin, 2013) and less firmly established friendships (Lemieux et al., 2013). This evidence could be taken to show that lonely persons use Facebook as a means of compensatory friending, as has also been shown for persons suffering from low self-esteem and high levels of public self-consciousness (J.-E. R. Lee, Moore, Park, & Park, 2012). Contrary to this interpretation, however, are findings that show loneliness to be associated with a decreased level of relatedness need satisfaction via Facebook (Lin, 2016) and, although not unanimously, less favorable appraisals of Facebook use (Clayton et al., 2013; Jin, 2013; Lou et al., 2012). On the other hand, there clearly is evidence for a stronger social-compensatory use orientation in the lonely, since loneliness has been shown to be positively associated with higher levels of relationally oriented Facebook use strategies (Clayton et al., 2013; Jin, 2013, but see Lou et al., 2012) and more favorable appraisals of the provided opportunities of self-disclosing personal information (Jin, 2013). Most interestingly in this context, however, is a longitudinal study of (Teppers et al., 2014). These researchers followed a high-school age sample (mean age about 16 years) over a period of five months and investigated both concurrent and longitudinal relationships between different forms of loneliness (family-related vs. peer-related loneliness) and seven different motives potentially underlying Facebook use. At both T1 and T2, analyses of concurrent associations revealed peer-related loneliness to be consistently and positively associated with social skill compensation motives and loneliness alleviation motives. Moreover, family-related loneliness was consistently and positively associated with Facebook use in order to meet new people. In their cross-lagged path analyses of the predictive relations among motives and loneliness, the authors showed that peer-related loneliness at T1 was predictive of relative increases in three motivational domains, i.e. the personal contact motive, the social skills compensation motive and the loneliness alleviation motive. Moreover, whereas T1 motive scores for meeting new people were associated with relative decreases in peer-related loneliness at T2, social skill compensation motive scores at T1 were associated with relative increases (!) of peer-related loneliness at T2. To the knowledge of the author, these findings are the first to show that loneliness is predictively associated with a social-compensatory Facebook use orientation. This use orientation, however, was not adaptive in the long run, as it was associated with increased loneliness. One may speculate that

lonely individuals are driven toward Facebook use for the perceived benefits of CMC that may effectively help tackle their interpersonal deficiencies and even help alleviate negative feelings at a situational level. Moreover, these situational provisions derived from social-compensatory use do not necessarily translate to offline settings or, maybe, never were intended to do so. While social-compensatory use of Facebook may displace time and opportunities for engaging in in-person social interactions, Facebook use for meeting new people may ameliorate adolescents' loneliness as it creates new opportunities for interpersonal contact in offline settings.

A straightforward summary of the reviewed study results is hard to accomplish. While not necessarily related to surface indicators of Facebook use such as overall use duration or the total number of Facebook friends, loneliness seems to be associated with more passive and less socially communicative forms of Facebook use. Nonetheless, there are indicators of social-compensatory use tendencies in the lonely, as reflected in an elevated ratio of online-only friends and elevated subjective appraisals of relationally oriented Facebook use strategies. Moreover, the only identified study of Facebook use motives in the lonely supports the notion of social-compensatory use orientation, since peer-related loneliness has been associated with Facebook use deemed to compensate for a lack of social skills and to alleviate feelings of loneliness. This use orientation, however, was longitudinally associated with an increase in peer-related loneliness. Therefore, the present state of evidence would suggest that lonely people, while stating their Facebook use to be aimed at social compensation, fail to derive social provisions from their use that would generalize to real-world settings. Part of this use orientation, however, seems to be a tendency to engage in mood-regulatory use of the SNS, as reflected in both concurrent and predictive associations between loneliness and the tendency to use Facebook for the sake of loneliness alleviation (Teppers et al., 2014).

1.3.3 Loneliness in social network sites addiction

As is the case for Internet use in general, the last few years have seen a tremendous increase in research concerning the development of excessive patterns of SNS use, commonly discussed under the header of an addiction syndrome (Andreassen, 2015; Kuss & Griffiths, 2011b). Based on the general opening of the addiction concept to include the excessive and maladaptive exertion of certain behaviors such as gambling or online gaming (Mann, Fauth-Bühler, Seiferth, Heinz, & , 2013; Marlatt et al., 1988; Shaffer et al., 2004), the Internet environment is regarded as highly rewarding (Greenfield, 2011). This strong reinforcing potential directly follows from the sheer intensity, portability and unlimited availability of digital content that allows for a diverse range of pleasurable effects to be obtained in a need-specific manner and in a host of everyday contexts (Greenfield, 2011). Addictive behaviors such as online behaviors are dis-

cussed to share many of symptomatic features of substance-related dependencies (Beard & Wolf, 2001; Griffiths, 2005; Shaffer et al., 2004; Tao et al., 2010), including the development of (behavioral) tolerance, a loss of control over the behavior, a cognitive preoccupation with the behavior, and a tendency to instrumentally enact the behavior in the service of mood management.

In general accounts of Internet addiction, as well as in those specifically related to SNS addiction, there is a strong acknowledgement of a social compensation hypothesis, which posits that respective online services might provide especially strong sources of reinforcement for the psychosocially inept and the lonely (Andreassen, 2015; Caplan, 2003, 2005; Davis, 2001). In this context, SNSs like Facebook might represent viable functional alternatives for the fulfillment of psychological needs that are unmet in in-person life (e.g. affiliative needs), as has already been discussed in early account of Internet addiction (Young, 1998). And just as was the case for loneliness (Teppers et al., 2014), SNS addiction has likewise been linked to aberrant use motives, such as stronger tendencies to use an SNS like Facebook for mood regulation, for both social-compensatory and entertainment purposes (for review, see Ryan, Chester, Reece, & Xenos, 2014). Not surprisingly, study results show a link between trait indicators of loneliness and the severity of SNS addiction syndromes (Andreassen, 2015; J. Kim et al., 2009; Spraggins, 2009). This evidence could be taken to suggest that loneliness and SNS addiction might be linked through use behaviors that are driven by aberrant motives such as mood regulation or social compensation.

1.4 State loneliness in the regulation of social affiliation needs

Although the vast majority of U&G-related research is cross-sectional in nature, the predictions derived from this account should also hold at the situational level (Schweiger, 2007). Obviously, when psychological needs come to drive the targeted and gratification-oriented use of mass media (or of non-media functional alternatives), this necessarily occurs at the level of different situations, in different social contexts and under a varying availability of media-/non-media functional alternatives. The lack of consideration of situational media use might miss a key point of the U&G account, namely the user and his situational (non-)media choices, given his situational state of needs. This is critical when thinking about the individual difference perspective that is implicitly inherent in the U&G framework: people do differ in their media use motives and behaviors and this has repeatedly been shown to be retraceable to differences in social, demographic and psychological factors, using cross-sectional designs (Amiel & Sargent, 2004; Moody, 2001; Papacharissi & Rubin, 2000; Rubin et al., 1985; P. Sheldon, 2008a; Weaver III, 2003). Logically, these individual difference variables should also have explanatory power at

the situational level when it comes to explaining individual differences in the situational use of (non-)media functional alternatives for gratifying respective needs.

Therefore, it is unclear up to this point, which form a study of need-related use of functional alternatives in the gratification of social affiliation needs should take. Within cross-sectional designs, one indicator of a person's level of loneliness is assessed and related to his/her motivations for and actually enacted types of Facebook use (or, alternatively, in-person contacts). Building on this information, one can draw conclusions regarding the between-person relationships among psychosocial characteristics and aspects of social media use or interpersonal interaction behaviors. For example, it might be possible to state that lonely people make heavier use of social media services like Facebook (H. Song et al., 2014). Besides the pitfalls in drawing any clear-cut directional conclusions from such cross-sectional data (Morgan & Winship, 2014), one is left with the even more cumbersome task of drawing any inferences concerning the (within-person) processes that actually give rise to such an association. Where does this person-level association come from? Is it that situational feelings of loneliness lead to a subsequent increase in the use of Facebook? If so, is this a process that is unconditional, i.e. present in every person irrespective of his/her individual characteristics? Or does it depend on aspects of the person, situation etc.? Do lonely people weigh up functional alternatives for social need satisfaction in different ways in comparison with the non-lonely, eventually giving more weight to the putative social provisions available via social media? Clearly there needs to be a situational context for this increased use, as it necessarily occurs at the expense of other activities, e.g. social contacts involving in-person interaction. As can be seen, there might be something to gain from a situation-level study of loneliness.

1.4.1 Experience sampling methodology in the study of everyday experiences

A methodological approach amenable to assess both situational contingencies of media use behaviors and social interactions is a rather loose methodological concept known as ambulatory assessment (AA) or experience sampling methodology (ESM) The hallmark feature of these approaches is the quasi-naturalistic nature of data collection (Kubey, Larson, & Csikszentmihalyi, 1996), which is achieved by repeatedly assessing individuals in field settings, over extended periods of time. This approach potentially yields more ecologically valid study results, as data are captured within a broad variety of different situational contexts that are part of an individual participant's everyday life (Csikszentmihalyi & Larson, 1987; Kubey et al., 1996; Larson & Csikszentmihalyi, 1983). Moreover, participant responses concerning the information of interest (e.g. momentary affective states, amount of physical activity) can reasonably be expected to be less influenced by retrospective recall bias (Scollon, Kim-Prieto, &

Diener, 2003). The data collection itself is typically aided by specific technical devices equipped with specific ESM software or, increasingly popular, by using specific software applications available for use on ordinary mobile devices such as smartphones (Trull & Ebner-Priemer, 2013). Moreover, the repeated assessment of data within the same subjects allows for the analysis of (causal) within-subject processes (Bolger & Laurenceau, 2013; Ebner-Priemer & Trull, 2009), e.g. by linking affective states to the quantity of subsequent social interaction (while simultaneously controlling for contextual factors).

1.4.2 State loneliness in the regulation of in-person social interaction

Loneliness studies at the trait level have consistently shown that the psychological experience is indeed associated with more objective aspects of a person's social network, such as having no intimate relationship, smaller social networks or a reduced number of social interactions (W. H. Jones & Hebb, 2003). W. H. Jones (1981) conducted a diary study of quantitative/qualitative aspects of social contacts across several days and, after collapsing the situation-level data to person-averages, investigated the relationships between trait loneliness and social contact indicators. Overall findings indicated that loneliness was not necessarily associated with an overall reduction in the amount of social contacts but with an increased diversity of and reduced intimacy with interaction partners. Note that this study is essentially unable to tell us anything about the situational dynamics of loneliness or the role of quantitative/qualitative aspects of social interactions in situational feelings of loneliness.

Although ESM studies in loneliness research are rather scarce, there is at least some conceptual and empirical work available dealing with the role that situational feelings of loneliness play both in interpersonal and in media use contexts. Using diary-based methods in an ESM study of daily experiences, Larson (1990) showed a link between the mere situational state of being alone and the situational experience of loneliness. The strength of this relation was contingent on age, in that it was strongest among adolescents and diminished somewhat in size with increasing age. The strong link between solitude and the experience of loneliness in the young may be due to normative developmental pressures of identity formation (Larson, 1990), or due to heightened social sensitivity regarding the conformation to cultural expectations. This latter interpretation is consistent with the finding that the link between aloneness and experienced loneliness was especially strong when adolescents reported to be alone at Friday or Saturday evenings, times when it becomes increasingly normative to be together with peers (Larson, 1999). The latter studies treated loneliness as a result of preceding or concurrent situational social context, i.e. an emotional reaction (studied at the situation-level) that results from the insufficient satisfaction of an innate belongingness need (Baumeister & Leary, 1995;

Weiss, 1973). The same logic holds for a diary study published by Reis et al. (2000), which investigated the satisfaction of relatedness needs and aspects of emotional well-being as a function of specific qualitative features of social interactions at the day-level. Likewise, Csikszentmihalyi and Hunter (2003) found that the situational state of being alone was associated with lower levels of subjective happiness.

However, given the putatively innate drive toward social connection, such a purely effect-oriented study approach might be overly one-sided. One could also expect loneliness (as well as other indicators of unmet social needs) to be associated with a desire toward social reconnection, as already implied by the very definition of the phenomenon itself (Schwab, 1997). Loneliness in the dynamic context of everyday life might therefore be regarded as a double-edged sword that signifies the failure of previous attempts at social affiliation need satisfaction, yet at the same time drives an individual toward future efforts to achieve a satisfactory sense of social integration. To the knowledge of the author, not a single study has been published that deals with predictive relationships between situational feelings of loneliness and subsequent social interactions. There are, however, situation-level studies of the links between emotional states and qualitative features of social interactions (Hawkley, Burleson, Berntson, & Cacioppo, 2003; Hawkley, Preacher, & Cacioppo, 2007). In a diary study of undergraduate students, Hawkley and colleagues (2003; 2007) studied the predictive relationships between emotional states and qualitative features of social interactions at the situation level by repeatedly assessing individuals both within and across days (plus some trait measures including loneliness that were assessed only once). Overall findings showed that trait loneliness was associated with more negative affect and a reduced quality of social interactions across the whole study period of one week (Hawkley et al., 2007). Surprisingly, however, it was not generally associated with an overall reduction in social interaction, at least during workdays (Hawkley et al., 2003). Moreover, at the situation-level, the authors found evidence for both concurrent and lagged effects indicative of reciprocity among affective tone (positive, negative) and interaction quality (positive, negative). Therefore, the positive affect resulted from and was predictive of positively valued interactions (even after a lag of 90 minutes), whereas the reverse was true for negative affect and negatively valued interactions (Hawkley et al., 2007). Although the strength of some of these predictive relationships varied across individuals, it was not contingent on a person's level of trait loneliness. As an example, trait loneliness did not moderate the strength of predictive relations between negative interaction quality and subsequent negative affect (Hawkley et al., 2007), what might be expected given the reported hypervigilance toward social threats (J. T. Cacioppo & Hawkley, 2009). Note that this study did not assess loneliness at the situational level, hence missing some of the key points made above

concerning the study of affiliation need regulation at the situation-level. Nonetheless it sheds some light on the many possibilities of modeling within-person processes in the regulation and perception of social events encountered in in-person life.

Another conceptual approach, indirectly related to the study of situational loneliness, stems from the so-called social affiliation model (O'Connor & Rosenblood, 1996). Within this model, people are believed to differ in their need for affiliation, which they strive to satiate by electively engaging in social contexts that match their (internal) optimal range of affiliative states. This model assumes a person's need for affiliation to be rather stable across time. Moreover, in keeping with the analogy of caloric intake in case of hunger, the satiation of this need is believed to happen in a homeostatic manner. Hence, everyday fluctuations in the sought out social or solitary contexts are assumed to reflect—at least to a certain degree - an individual's striving for social homeostasis (O'Connor & Rosenblood, 1996). While this model predicts future transitions in social contexts (social contact vs. solitude) in case of non-desired momentary social states, it also predicts strong continuities in case of being in a desired momentary social state. For example, when momentarily being in a non-desired state of solitude (partly conferrable to a lonely state), an individual is predicted to electively seek-out social contact in the near future. Contrary to this, when being in an elected state of solitude, the model does not assume the individual to electively change this state of being in the near future. Two studies examined and generally confirmed the regulatory dynamics in social interactions at the situation level (Hall, 2016a; O'Connor & Rosenblood, 1996). What this model and these studies did not target, however, is the significance of emotional states in this regulatory process. It may well be that situational feelings of loneliness might play a role in the regulation of social interactions, indicating an affiliative state below an individual's optimal range and hence driving behavior in a way to establish a sense of social reconnection. Other points missed by these studies are (a) the consideration of (media) alternatives in the satisfaction of affiliative needs and (b) and the investigation of inter-individual differences in the situational regulation of affiliative needs.

1.4.3 State loneliness in the regulation of social network site use

The author was able to locate only two ESM studies of the links between social need states and SNS use (Kross et al., 2013; Z. Wang et al., 2012), of which only one study adopted an individual difference perspective (Z. Wang et al., 2012). To begin with, this study found evidence for a need-driven use of social media, in that a broad variety of need states (cognitive, emotional, social, and habitual) was predictive of social media use. Interestingly, person-level characteristics such as the perceived level of social support moderated the strength of the associa-

tion between need states and the subsequent use of social media. Compared to persons with higher levels of social support, those reporting lower levels of perceived social support engaged in more instrumental use of social media services, as their situational use of social media was more tightly linked to preceding situational need states. These conditional relations were present across different categories of need states, which could be taken to mean that social media represent a more important functional alternative for gratifying a broad variety of different psychological needs in those with psychosocial problems. Unfortunately, Z. Wang et al. (2012) did not investigate the possibility of conditional effects of social media use upon respective need gratification, the size of which may likewise depend on psychosocial factors like social support strength. They did, however, assess for main effects of social media use upon need gratification. Interestingly, they found social media use to be unrelated to the gratification of social needs (but positively related to the gratification of cognitive and emotional needs). In another study of situational use of the SNS Facebook, Kross et al. (2013) found partly divergent results. They were generally able to replicate the finding of Wang et al (2012) concerning the need-based prediction of situational Facebook use, as situational feelings of loneliness were predictive of subsequent use of Facebook. Contrary to Wang et al. (2012), however, they found that Facebook use was predictive of a subsequent *decrease in positive affect*, a finding that is inconsistent with the gratification of (emotional) needs. Moreover, Kross et al. (2013) investigated the possibility of conditional effects of Facebook use by including individual difference variables such as loneliness, depression, gender as potential moderators. However, across the range of moderating variables considered, the negative effect of Facebook use on affect was unconditional. Unfortunately, Kross et al. (2013) did not report on the analysis of conditional effects in the prediction of Facebook use. As they found situational feelings of loneliness to be predictive of subsequent Facebook use, it would have been intriguing to find psychosocial traits to moderate the strength of this predictive relationship. Therefore, at present, there is only limited evidence concerning the role of individual difference variables in explaining the situational use of social media services like Facebook. As outlined above, such candidate variables could encompass indicators of social insecurity/anxiety and loneliness, amongst others. The present study seeks to clarify the role of these variables in explaining the use of Facebook at the situational level.

2. Research Questions and Hypotheses

Taking things together, there currently is a lack of studies conducted at the situation level that investigate the role of psychological states such as loneliness in the everyday dynamics of both social interaction and SNS use. Not a single study has tried to establish a predictive role of situational feelings of loneliness (putatively indicative of unmet social affiliation needs) for the subsequent engagement in social interaction. Only one study investigated and established such a role for situational feelings of loneliness in the prediction of subsequent Facebook use. Moreover, there is a complete lack of knowledge concerning inter-individual differences in such putative predictive relationships. This study aims to address these research gaps and will address the following research questions:

Research question 1: In taking the perspective of the U&G account and the MMT, it is asked whether there exist predictive relations between situational affective states and the subsequent use of the social media service Facebook. In line with previous research, it is assumed that situational social need states, as indicated by feelings of loneliness, are predictive of subsequent social media use including Facebook (Kross et al., 2013). Moreover, it is assumed that person-level indicators of loneliness will be associated with the amount of Facebook use, although the direction of this relation is somewhat unclear (see Section III.1.3.2). In line with the U&G account (e.g. Rubin & Windahl, 1986, Schweiger, 2007), the perceived availability and adaptiveness of functional (non-)media alternatives is believed to vary depending on characteristics of the person. Therefore, it is assumed that the strength of situational contingencies between state loneliness and social media use will vary across individuals. This variability, in turn, is hypothesized to be relatable to individual differences in psychosocial adaptation. As trait loneliness has been shown to be associated with aberrant Facebook use motives (Teppers et al., 2014), it is hypothesized that it will explain inter-individual differences in the situational contingencies of Facebook use. Other aspects of psychosocial adaptation might likewise be important in this respect and will hence be investigated in an exploratory manner. Therefore, the following hypotheses are posited:

Hypothesis 1a: Situational feelings of loneliness will be predictive of elevated levels of subsequent Facebook use

Hypothesis 1b: Person-level indicators of loneliness are associated with the amount of Facebook use

Hypothesis 1c: The strength of situational contingencies between loneliness and Facebook use vary across persons and can be explained by their levels of trait loneliness

Hypothesis 1d: Other person-level traits will help explain differences in the situational contingencies between loneliness and Facebook use

Research question 2: As situational social need states might likewise be predictive of subsequent engagement in (real-life) social interaction, it is assumed to find such predictive relations at the situational level. As already theorized by Schwab (1997), the feeling of loneliness can be expected to be associated with the urge at social (re-)connection (Baumeister & Leary, 1995; J. T. Cacioppo, Hawkley, et al., 2006). As prior ESM research mainly focused on the effects of social interaction on affective wellbeing (Hawkley et al., 2007), there is currently a lack of corresponding research concerning the affective regulation of (subsequent) social contacts. In line with the social affiliation model (Hall, 2016a; O'Connor & Rosenblood, 1996), it is assumed that both prior social contact and momentary need states are predictive of subsequent engagement in social contacts. Momentary (social) need states, as indicated by situational feelings of loneliness, are assumed to reflect a suboptimal satisfaction of affiliative needs at the situation level and to drive an individual toward subsequent social reconnection. Moreover, it is hypothesized that the strength of these predictive relationships differ across individuals and that individual differences might account for this. As trait loneliness has been shown to be associated with aberrations in social interaction (Ignatius & Kokkonen, 2007; W. H. Jones, 1981; W. H. Jones et al., 1982), it might be associated with such individual differences in the situational regulation of affiliative needs. Other aspects of psychosocial adaptation might likewise be important in this respect and will be included as an exploratory part of these analyses. Therefore, the following research hypotheses are posited:

Hypothesis 2a: Situational feelings of loneliness will be predictive of elevated levels of subsequent in-person social contacts

Hypothesis 2b: Person-level indicators of loneliness are negatively associated with the amount of in-person social contacts

Hypothesis 2c: The strength of situational contingencies between loneliness and social contacts varies across persons and can be explained by their levels of trait loneliness

Hypothesis 2d: Other person-level traits will help explain differences in the situational contingencies between loneliness and social contacts

For replication purposes, the present study will also investigate the associations between loneliness, indicators of psychosocial adjustment, and Internet use behaviors including Facebook. It is assumed that loneliness will be associated with a lower level of psychosocial functioning and increased levels of mental health problems to (see Sections I.1.1 and I.1.2). Moreover, it is expected to find associations between trait loneliness and quantitative indicators of Internet use. As the current state of evidence concerning this matter is somewhat mixed, no directional hypotheses are posited (see Sections II.1.4.2 and III.1.3.2). Moreover, it is expected to find consistent positive associations between trait loneliness and indicators of Internet addiction, as has been shown previously (Andreassen, 2015; Caplan, 2003; J. Kim et al., 2009).

3. Methods

3.1 Sample

This study made use of a convenience sampling strategy employed within a local university context. The final sample, predominantly comprised of undergraduate students at the Psychology Department of the University of Regensburg, encompassed 65 participants (50 females, 15 males) with a mean age of about 21 years (see Table III.3 for more details on demographic information). Local Psychology students' attendance in the study was rewarded by means of course credit depending on their degree of schedule compliance. Additionally, protocol compliance was encouraged by means upon entering a lot of monetary prizes upon achieving a compliance rate of at least 80% of answered questionnaires. During the experience sampling period of two weeks, participants were asked to fill-in questionnaires at fixed intervals up to 7 times per day, resulting in up to 98 measurements per person. Across all participants, 6,005 valid data points were collected at the situational level, representing a compliance rate of 94.27%. For the present study, these data were reduced to those data points that were part of the fixed interval schedule and that contained all information aspects required for the analyses (i.e. 3,341 data points, see Section III.3.4.2.1 for details). Data collection was conducted in cooperation with two graduate students.

Table III.3

Sociodemographic information of the study sample

	M (SD)	
Age	20.74 (3.26)	
		N (%)
Gender	female	50 (76.9%)
	male	15 (23.1%)
Marital status	married	2 (3.1%)
	unmarried/divorced	63 (96.9%)
Partner status	in relationship	29 (44.6%)
	single	36 (55.4%)
Household arrangement	alone	18 (27.7%)
	at parents'	8 (12.3%)
	with spouse	9 (13.8%)
	shared flat	28 (43.1%)
	other	2 (3%)
Residential area	metropolitan (above 100,000 inhabitants)	47 (72.3%)
	urban (20,000 to 100,000 inhabitants)	9 (13.8%)
	small town (2,000 to 20,000 inhabitants)	2 (3.1%)
	rural (less than 2,000 inhabitants)	7 (10.8%)

3.2 Instruments

The study encompassed both laboratory-based assessments of trait-like measures and ESM assessments of situational aspects that were undertaken in field settings. In considering this, the following descriptions will be divided into two parts each devoted to one of these different assessment protocols.

3.2.1 Laboratory-based assessments

In a laboratory of the University of Regensburg Psychology department, four local working stations (one desktop computer, three laptops) were equipped with software required for the digital format questionnaire assessments (i.e. web browsers, the most recent versions of the JAVA runtime environment).

The questionnaires themselves were given as web surveys, hosted on a web server of the University of Regensburg using the freely available online-survey application Limesurvey™ (LimeSurvey Project Team & Schmitz, 2012; Version 1.92+). The implementation of the application on web space provided by the university was performed in cooperation with employees of the university's computing center. The survey layout "Skeletonquest_192" was uploaded and adapted for use in the current study. All questionnaires and scales were adapted to the digitized format of presentation by making use of the different preprogrammed question types provided with the software. The survey layout and question settings were adapted to fit to different types of displays and screen resolutions. Confidentiality of recorded data and anonymity of the participant was ensured by means of pseudonymization. Two different questionnaire versions were created. The first questionnaire was filled-in by all participants before the actual start of the ESM study period and assessed demographic, psychosocial and Internet use information (see Section III.3.2.1.1). The second questionnaire, filled-in directly following a subject's ESM study period, assessed participant experiences with the ESM study protocol and an appraisal of his/her general wellbeing (see Section III.3.2.1.2).

3.2.1.1 Questionnaire instruments – first appointment

During the first lab visit, subjects filled in a catalogue of questionnaire items assessing demographic information (age, gender, area of residence, achieved degree, partner status, household arrangement). These questions were followed by a set of questions compiled by the author, assessing aspects of a subject's Internet use behaviors (types of Internet access used, types of Internet activities performed, favorite types of Internet activity, weekly amount of Internet use). Following this, subjects were asked for different motives underlying their use of the Internet, using a scale developed by Ridder and colleagues (Breunig & Ridder, 2015; Ridder & Engel, 2001, 2005). Additionally, a *short version of the Internet Addiction Test* (sIAT), a scale

originally developed by Young (1998), was given. The short version used encompassed 12 items and was adapted to German language by Pawlikowski and colleagues (Pawlikowski, 2011; Pawlikowski et al., 2013). Higher scores are thought to reflect an increased severity of the Internet addiction syndrome.

These Internet-centered questions were followed by a *short version of Carver's coping inventory* (briefCOPE) (Carver, 1997; Carver et al., 1989), which assesses behavioral strategies for dealing with general stressors of everyday life. This short version of the scale was adapted to German language by Knoll and colleagues (Knoll et al., 2005) and encompasses 28 items. The scale was designed to encompass 14 subscales, each representing a different dimension of coping with stress. As the subscales could not be substantiated empirically, the scale was dropped from further analysis.

This was followed by a German language version of the Rosenberg Self-Esteem Scale (RSES) (M. Rosenberg, 1965; von Collani & Herzberg, 2003a, 2003b). The scale is comprised of 10 items answered on a 4-point Likert scale (ranging from 1-“Doesn't apply at all” to 4-“Applies completely”) and assesses the degree of positive self-evaluations across different life domains, hence reflecting an indicator of global self-esteem. Higher scale scores indicate heightened levels of self-esteem.

After this, subjects answered a German language version of the Satisfaction with Life Scale (SWLS, Glaeser, Grande, Braehler & Roth, 2011) originally developed by Diener, Emmons, Larsen, and Griffin (1985). The scale comprises 5 items answered on a 7-point Likert scale (from “I completely disagree” to “I completely agree”) and asks subjects for a general appraisal of their life satisfaction. This general assessment was complemented by the depression scale of the patient health questionnaire (PHQ-9) developed by Spitzer and colleagues (Kroenke & Spitzer, 2002; Kroenke et al., 2001; Kroenke et al., 2010; Löwe et al., 2002). The scale is widely used in measuring the presence and severity of symptoms of major depression according to the DSM-IV, and it has established reliability and validity (Gräfe et al., 2004; Kroenke & Spitzer, 2002; Kroenke et al., 2001; Kroenke et al., 2010; Löwe et al., 2002). The scale consists of nine items related to the symptom criteria, which are to be rated on a 4-point Likert scale according to the past two weeks (“never,” “several days,” “more than half the days,” “nearly every day”). Items are to be rated according to the past two weeks. Higher scores are indicative of the presence of more depression symptoms.

Loneliness was assessed using the multidimensional Loneliness Scale (MLS) developed by Schwab (1997). The scale consists of 37 items, comprising three subscales related to different aspects of loneliness: *social loneliness* (i.e. a lack of friends and acquaintances sharing mutual interests; 15 items), *emotional loneliness* (lack of strong emotional ties with family, friends or a

significant other; 12 items) and the *incapability of being alone* (distress and problems with being alone; 10 items). For the present purposes, subscale scores were collapsed to form one global indicator of a person's level of distress resulting from loneliness (MLS scores will also be referred to as "trait loneliness" scores). Higher scale scores are indicative of heightened distress resulting from loneliness.

Subsequently, a short version of the Insecurity Questionnaire (U-Bogen 24) developed by Ulrich de Muynck and Ulrich (1978, 1994) was delivered. The short version of the scale was developed by Albani et al. (2006), consists of 24 items and is rated on a 6-point Likert scale (ranging from "does not apply at all" to "applies completely"). The scale encompasses four subscales (6 items each) assessing different aspects of social insecurity and social anxiety like a lack of assertiveness, the (in)ability to put demands on others, the presence of social contact anxiety and a subscale assessing the fear of failure and critique. Subscale scores were calculated and collapsed to form a global indicator of social insecurity, with higher scores indicating elevated levels of social insecurity.

Following the assessment of the outlined set of psychosocial health indicators was a final set of questions related to subjects' use of Facebook. These questions were an ad hoc collection of items, partly derived from the Media Technology Usage and Attitudes Scale (MTUAS) developed by Rosen, Whaling, Carrier, Cheever, and Rokkum (2013). This scale captures a broad variety of multimedia uses and includes questions related to the frequency of Facebook activities (e.g. "Click 'Like' to a posting, photo, etc."; "Browse profiles and photos") and the quantity and qualitative structure of a person's network of Facebook friends (e.g. "How many of your Facebook friends do you know in person?"). The nine items related to Facebook activities and four questions related to the quality/quantity of Facebook friends were translated to German language by the author and discussed with collaborating students for consistency. Likewise, the response format of both the activity scale (10-point Likert scale ranging from "never" to "all the time") and the Facebook friends scale (9-point Likert scale ranging from "0" to "751 or more") were adapted to German language. These items were mixed with ad hoc items to assess the following: general frequency of Facebook use across contexts and devices (four items), the frequency of specific Facebook activities (seven items), structure and quantity of a subject's network of Facebook friends (four items), handling of broken-up relationships (up to four items) and friendships via Facebook (six items). These two latter sets of questions sought to determine the extent to which broken-up social relationships of in-person life were maintained in Facebook by staying friends and keeping in touch. For the present study, only the following items were considered for further analysis: the items related to general Facebook activity, the number of Facebook friends and an index of mere online friendships. This

index was formed as an index of the ratio of the number of Facebook friends known in-person divided by the total number of Facebook friends. As, contrary to the MTUAS, the number of Facebook friends was assessed as an absolute number (and not by Likert scale)⁶, this variable had to be transformed to the ordinal Likert scale categories of the MTUAS. Complementing the questions concerning Facebook activities was a German language adaptation of the Bergen Facebook Addiction Scale (BFAS), a six item scale developed by Andreassen et al. (2012). The instrument is thought to capture each of the six core domains of addiction syndromes (i.e. salience, mood modification, tolerance, withdrawal, conflict, and relapse), as discussed by Griffiths (2005). Higher scale scores hereby reflect stronger addiction tendencies toward the social medium.

3.2.1.2 Questionnaire instruments – second appointment

During the second lab visit, subjects filled in a second questionnaire, which consisted of a repeated assessment of life satisfaction using the SWLS (Diener et al., 1985; Glaesmer et al., 2011). Additionally, a set of 27 ad hoc questions were presented. These questions pertained to subjects' experiences regarding the ESM protocol on weekdays and weekends (eight items each; e.g. *"I felt annoyed by the assessments."*), evaluations of the technical implementation of the ESM assessments (six items; e.g. *"From a technical point of view, I think that the employed method is inappropriate"*) and an appraisal of reactive cognitions/feelings due to the employed study protocol and situational assessments (five items; e.g. *"The investigation made me think about my Internet consumption"*). Responses to each of these questions were recorded using a 6-point Likert scale (ranging from *"does not apply at all"* to *"applies completely"*).

3.2.2 Field-based assessments

In between the two lab appointments, subjects had to comply to an ESM study protocol of two weeks' duration and were prompted to repeatedly rate their momentary affective states, preceding social contacts, and their previous Facebook use (as described below in further detail). In order to conduct the field-based assessments, a total of twelve Palm Zire devices were used⁷. The personal digital assistants (PDA) were purchased from Short Tronics, INC (www.palmdr.com). The freely available and specialized ESM software *"Experience Sampling Program"* (ESP, Version 4.0) by Barrett and Feldman Barrett (2005) was installed on each of the PDA devices. The software was set to take control over the devices during data acquisition (enabling the *"Take Over Machine"* setting), which allowed for the single-purpose use of the PDA devices in the service of the experience sampling study. ESP itself had to be integrated

⁶ Participants could log in to their Facebook account in order to provide the precise number.

⁷ Of these twelve devices, one got lost during the first wave of assessments. Another device had a display malfunction, hence reducing the maximal number of participants per assessment wave to ten.

into Mozilla Firefox (Version 1.0.7), as described in the user's manual (Barrett & Feldman Barrett, 2005), in order to set up the experience sampling protocol, transfer it to the Palm devices using the *"HotSync"* function and download recorded data to the central study database located on a desktop computer in the laboratory room.

The questionnaire was programmed to be adaptive (using the *'%NEXT'*-command for conditional branching) and allowed participants to select among three different questionnaire versions depending on time of day (*"morning assessment," "daytime assessment," "nighttime assessment"*). This feature also allowed for restarting the questionnaire in case of erroneous responses. The three different questionnaire versions differed by the numbers of questions prompted and will be described in the following.

The *"morning assessment,"* which was to be conducted shortly upon awakening, contained three questions:

- *"How do you feel right now?" ("very good" - "very bad")*
- *"How worried are you at the moment?" ("not at all" - "very much")*
- *"How lonely do you feel at the moment?" ("not at all" - "very much")*

These questions were presented as slider questions. This means that subject responses were collected using visual analogue scales, whose endpoints were labeled as described. Subjects moved a slider button along the scales using the display pens of the Palm Zire devices and confirmed their inputs by clicking an "OK" button. Besides the labeled endpoints, the visual analogue scales contained some reference lines but were otherwise unlabeled. Recorded responses to these questions ranged from 1 to 100. Following the procedure of Kross et al. (2013), the question for affective wellbeing always was presented first, while presentation order of those concerning worries and feelings of loneliness was randomized.

The *"daytime assessment"* contained the three questions of the morning assessment plus four additional questions. Two questions each were devoted to the amount of Facebook use, another two to the amount of direct social contacts since the last assessment the subject had performed. Participants were instructed to document their Facebook use in terms of frequency and duration of visiting the site of the networking service. Direct social contacts were to be assessed in terms of both in-person social interactions and telephone calls. The first set of these questions were slider questions asking the subject for a subjective appraisal of the amount of time spent on Facebook or spent in interpersonal contact (*"none" – "very much"*):

- *"How much time did you spend on Facebook since the last assessment?"*
- *"How much direct social contact did you have since the last assessment?"*

The order of these two questions was randomized. They were complemented by two additional ones asking for an estimate of the amount of time (in minutes) spent on Facebook or in direct social contacts:

- *“Quantified in minutes, how much time did you spend on Facebook since the last assessment?”*
- *“Quantified in minutes, how much direct social contact did you have since the last assessment?”*

Participants could enter their responses using a numeric keypad on the PDA screens.

The **“nighttime assessment”** contained all questions of the daytime assessments plus four additional ones. These were devoted to an appraisal of the quality of the preceding day’s interpersonal interactions and were presented as slider questions (*“not at all”* - *“very much”*):

- *“To what degree have the interactions been governed by emotional intimacy?”*
- *“To what degree did the interactions provide you with a sense of being part of a community (of friends, family etc.)?”*
- *“How satisfied are you with today’s direct social contacts?”*
- *“How stressed have you been during today’s direct social contacts?”*

3.3 Procedure

The study period lasted from October 2014 to May 2015 and participant recruitment was mainly restricted to the lecture periods of both the winter and summer term. This was done to ensure a comparable structure of everyday obligations of student life across participants. Participants were contacted through advertisements posted on a local bulletin board at the University of Regensburg’s Psychology Department, through word-of-mouth advertising in courses, and from two collaborating students’ pool of acquaintances. Inclusion criteria were set to include only those participants that had a Facebook account and that were regular, active users of the site.

After scheduling the first appointment, participants were invited to a first laboratory session in groups of up to four persons. During this lab session, participants had to fill-in a first questionnaire assessing a host of demographic, Internet- and Facebook-use-related information and several psychosocial trait measures, as outlined above (see Section III.3.2.1.1). Upon completion, subjects were introduced to handling the PDA devices and the different questionnaires versions. Additionally, an individual measurement scheme was scheduled for each participant to ideally fit into his/her everyday life. This schedule was arranged to capture a daily baseline measurement shortly upon awakening (*“morning assessment”*). After this morning assessment, participants were scheduled to undertake five questionnaire assess-

ments of their feeling states, social contacts and Facebook use (*'daytime assessment'*) at regular time intervals of 2 hours, beginning with an individually arranged time of day. After these assessments, subjects were instructed to collect one additional assessment upon going to sleep, also containing questions related to the perceived quality of the day's preceding social interactions (*'nighttime assessment'*). After introducing subjects to the devices, explaining the measurement protocol and clarifying any open questions, subjects were equipped with technical devices (a Palm Zire, a device case and a D/C charging cable), seen off by the investigators and instructed to start their daily assessments beginning with the following day. Toward the end of the two weeks of the ESM study period, participants were approached and a final lab session was scheduled for returning devices and filling-in short post questionnaires containing the SWLS and a questionnaire compiled by the author assessing subject experiences with the research protocol (see Section III.3.2.1.2).

Although subjects were instructed to self-reliantly adhere to the arranged assessment sched-

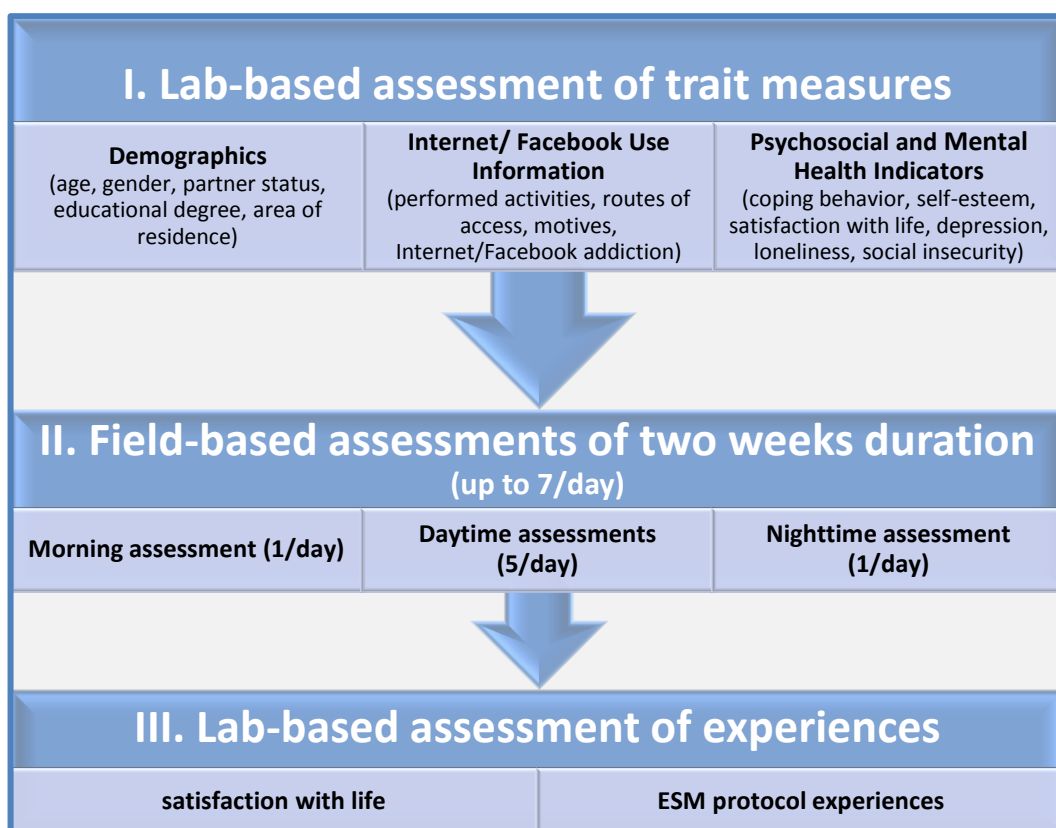


Figure III.2
Flow chart of the adopted assessment schedule

ule during the ESM period, they were technically aided by SMS reminders of pending assessments. This was achieved using the Android app *"Aapi SMS Scheduler,"* which allowed for the implementation of individually tailored messaging schedules. For this purpose, a study cell phone (Samsung Galaxy "Young"; GT-S6310N) was purchased and run with a contract involving

an SMS flat rate (mobile phone provider: simplytel)⁸. The timing of SMS reminders and every-day assessments was held constant across days within each participant (i.e. same schedule for weekdays and weekends). Following minor difficulties of subjects in handling the programmed ESM questionnaires in case of typing errors, some minor changes in questionnaire programming were undertaken to allow subjects to correct the entered information for any errors made. The flow chart presented in Figure III.2 is meant to recap and visualize the employed procedures in the sequence of their implementation.

After downloading a participant's recorded data from the PDA device to the central study database located on a desktop computer in the laboratory room, data cleansing was performed. As all participant responses were stored to a single .txt data files with the information of every single assessment stored in the long format (with each single question stored in a single row), these data had to be restructured to the wide format for every single assessment (such that all answers to the questions of the "morning assessment" were arranged to a single row and so on). This was done by importing the data to Microsoft Excel, where they were additionally screened for erroneous responses. Responses were judged as erroneous when the following criteria were met: (a) the response was made in an unreasonably short time interval following the last assessment (less than 15 minutes), (b) was obviously no attempt at correcting input errors and (c) contained duration estimates concerning either Facebook use or social contacts (in minutes), that were at least twice as high than the actual time period passed since the last conducted assessment. For these reasons, a total of 192 questionnaire responses were deleted from the data set, yielding a total of 6005 valid data points.

3.4 Statistical Analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, Version 23) and Statistical Analysis Software (SAS, University Edition 2.3, 9.04.01M3P06242015). If not otherwise stated, all inferential tests were two-sided, using the standard criterion of statistical significance ($\alpha = 0.05$).

3.4.1 Descriptive and correlational analyses

Descriptive statistics for the scale-based trait measures were calculated as means and standard deviations, assuming metric scale level (Carifio & Perla, 2008; Norman, 2010). Additionally, internal consistencies of the employed scales measures were calculated as Cronbach's alpha.

⁸ During a month (involving two complete assessment waves), up to 1960 reminder SMS' had be sent (2waves * 10participants * 98assessments = 1960 reminder SMS). The sending schedules were written and saved as .csv files using Microsoft Excel 2010. Technical advice and supporting information was kindly provided by Christian Blum (M.A) of the University of Regensburg's Department of Education Science.

The intercorrelations among scale measures and Internet use indicators were calculated using Bravais-Pearson correlation coefficients. All these analyses were conducted using SPSS.

3.4.2 *Multilevel analysis of situational Facebook use/social contacts*

In order to test the predictions regarding situational Facebook use and social interactions, multilevel models were fitted to the ESM data using SAS PROC MIXED (Littell, Stroup, Milliken, Wolfinger, & Schabenberger, 2006). Moreover, an intercorrelation analysis was conducted that respected the nested structure of the data hierarchy inherent to ESM studies. Following the rationale outlined in Snijders and Bosker (2012), associations of such data can be decomposed into two unrelated components, i.e. a within-person and a between-person correlation. These different correlations were calculated using the “*Within And Between Groups Analysis*” SAS script published by O’Connor (2004)⁹.

3.4.2.1 Data reduction against the background of the research model

As one of the main hypotheses pertained to the prediction of situational Facebook use/social contacts from preceding psychological states and behaviors, the obtained ESM data had to be rearranged and reduced (see Hypothesis 1a in the lower panel of Figure III.3).

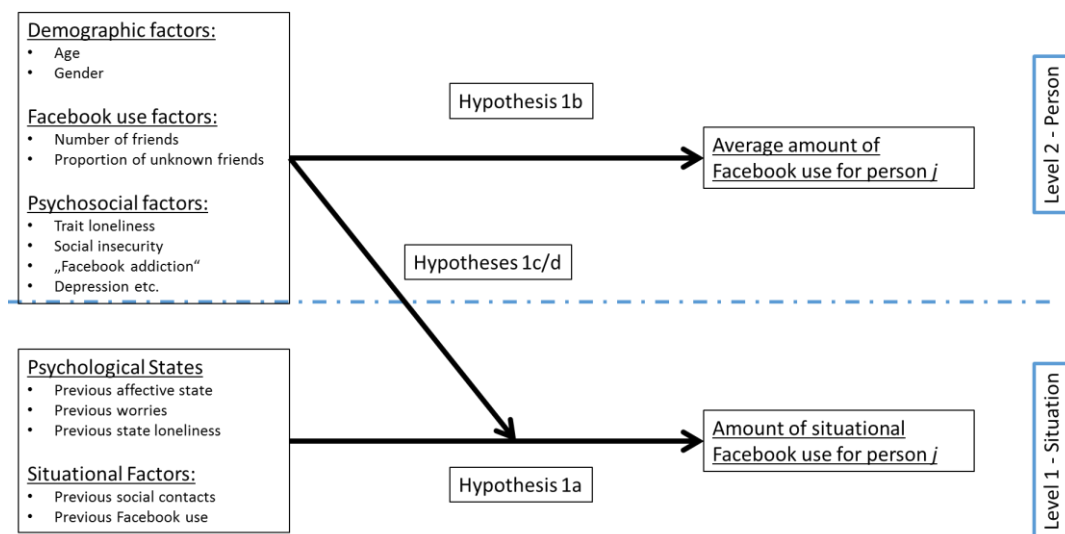


Figure III.3

Research model for the prediction of situation-level and person-level Facebook use and interpersonal differences and situation-level contingencies

This was necessary since not all required data were available for every single assessment point. As shown below, only beginning from the second daytime assessment onward, all required situation-level information was available (see Figure III.4 below). Moreover, since the

⁹ As can be found under the following web link: <https://people.ok.ubc.ca/briocconn/levels/levels.html> (date:09/23/2016)

nighttime assessments of each day were self-initiated by the participants and not part of the arranged fixed-interval schedule, all data points of nighttime assessments were dropped for all participants. Employing these criteria reduced available data points across subjects from 6005 to 3341.

Optimally, when adhering to the employed fixed interval schedule, a criterion measure of interest (e.g. Facebook use at daytime assessment 4 for participant 12 at day 2) could be predicted from the preceding assessment arranged to be conducted two hours earlier (i.e. predictors obtained at daytime assessment 3 for participant 12 at day 2). As it may have been impractical for participants to conduct every single assessment of the employed schedule, however, not in every single case was it possible to keep this fixed interval-prediction over a time period of 2 hours. Therefore, within every single day of assessments, data from preceding assessments containing all relevant predictor information could stem from earlier daytime assessments (e.g. data obtained at daytime assessment 2 for participant 12 at day 2 was allowed to predict Facebook use at daytime assessment 4 for participant 12 at day 2 when the participant did not provide valid information at timepoint 3). However, this loosening of the fixed-interval prediction schedule was only allowed within days, not for data points obtained at different days. This procedure replicated the data analytic plan of Kross et al. (2013) and has been shown to have little influence on model results.

3.4.2.2 Description of model development

A multilevel analytic framework was chosen because it is able to account for the nested data structures inherent to experience sampling studies (Bolger & Laurenceau, 2013; Heck, Thomas, & Tabata, 2014; Nezlek, 2012; Schwartz & Stone, 2007; Snijders & Bosker, 2012) and can be used for modeling within-subject causal processes, treating the person as his/her own control (Bolger & Laurenceau, 2013). As subjects were assessed several times a day for a study period of two weeks, individual assessments are “nested” within individuals. Accounting for this nested data structure is accomplished by partitioning the variance of a criterion variable (e.g. situational Facebook use) of interest into both so-called level-1 and level-2 portions. Level-1 refers to the lowest level of the data hierarchy, i.e. the situational level. As Facebook use can be expected to vary from situation to situation, a substantial portion of variability in the data can be expected to be attributable to this situational level. However, one can also expect the amount of (average) Facebook use to vary from person to person, meaning that the person level may likewise contribute to the overall variability in the data. These two sources of variability can be quantified and expressed as deviations in relation to the overall (‘grand’) mean of Facebook use, yielding the following equations:

$$Y_{ij} = \beta_{oj} + \varepsilon_{ij}$$

with

$$\beta_{oj} = \gamma_{00} + u_{oj}$$

which, when substituted into the above formula, gives the single equation

$$Y_{ij} = \gamma_{00} + u_{oj} + \varepsilon_{ij}$$

where Y_{ij} refers to the i th assessment of Facebook use for the j th participant, respectively. The intercept term β_{oj} represents the average Facebook use of person j and ε_{ij} denotes the (random) level-1 error of estimating Facebook use in situation i for person j (i.e. deviation of situational assessment i from the person intercept β_{oj}). The term β_{oj} can be further decomposed into two components, i.e. a fixed part representing the overall mean of Facebook use (across persons and situations) and a random part u_{oj} . The random level-2 error term u_{oj} hereby reflects variability in average Facebook use between different individuals j . As outlined by Heck et al. (2014), the proportion of variance explained by the grouping/nesting structure relative to the total variance [estimated as $u_{oj}/(u_{oj} + \varepsilon_{ij})$] would give an estimate for the relative homogeneity of persons' Facebook use: the higher this proportion (also known as the intraclass correlation, ICC) is, the more will variations in Facebook use be attributable to person-level factors instead of situation-level factors. Modeling and potentially reducing these variances at different levels of the data hierarchy lies at the core of multilevel analyses and represents one of the major advantages over standard ordinary least squares regression analysis (Snijders & Bosker, 2012).

Starting off from the “null model” without predictor variables outlined above (**Step 1 - Random Intercept Model**), multilevel models for the prediction of the situational amount of Facebook use were developed following the general model building strategies and recommendations outlined by Heck et al. (2014). In other words, in the next step of model development, situation-level predictors were fed into the model of situational Facebook use in order to account for situational/level-1 variability (**Step 2 – Level 1 Random Intercept Model**). The first set of included predictors were related to time and situational context, i.e. a dummy-coded variable for separating between assessments taken on a weekend/workday, a dummy-coded variable separating time of day based on a median-split of all assessed timepoints (before/after 3.15 p.m.) and a count variable concerning the i th situational assessment of a person. The second set of predictors were those situation-level measures that temporally preceded (and hence were potential causal antecedents of) the obtained criterion measures. These measures included the three indicators of psychological state (i.e. situational affect, worry, loneliness)

and the estimates of Facebook use and social contacts from the next earlier assessment. As these measures represented situation-level estimates that each pertained to activities performed between the respective and the preceding assessment, only selected predictors were deemed appropriate for these (causal-process) models. Hence, only predictors that temporarily preceded the time periods for which Facebook use amount was assessed were included as predictor variables. For example, the amount of Facebook use in a given time period (T_{1-2})¹⁰ was explained using indicators of psychological state assessed at T_1 and estimates of Facebook use and social contacts for the time period T_{0-1} (see Figure III.4 for explanation). For each respective day, only criterion measures data obtained from the second daytime assessment onward were hence used for these analyses, as only then all relevant information concerning predictor and criterion measures was available.

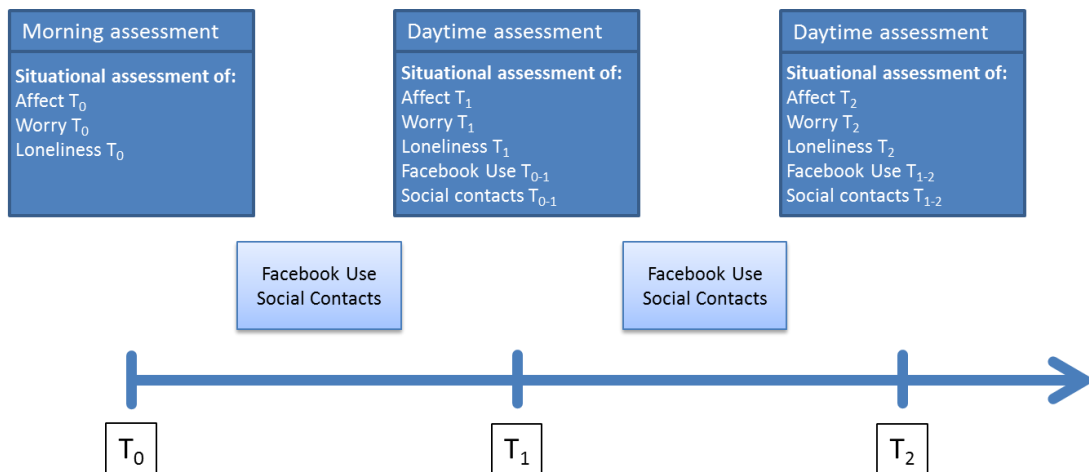


Figure III.4
 Concept scheme of the employed assessment protocol, exemplifying the prediction of Facebook during T_{1-2} from information obtained at T_1

A model containing the mentioned level-1 predictor variables at this stage of model development would yield the following equation:

$$Y_{ij} = \gamma_{00} + u_{oj} + \sum_{h=1}^p \gamma_{h0} * X_{hij} + \epsilon_{ij}$$

Note that within-person regression coefficients are expressed as γ_{h0} , indicating that the within-person influence of the h situation-level factors X_h on situational Facebook use is treated as *fixed* (i.e. the strength of relationships does not vary across persons j ; $\beta_{hj} = \gamma_{h0}$).

¹⁰ Which was assessed at T_2 .

In the next step of model development (**Step 3 – Level 2 Random Intercept Model**), person-level predictors were entered into the model to account for random intercept variance. The first set of included predictors pertained to demographic traits, i.e. gender and age. The second set encompassed both psychosocial trait measures (trait loneliness, Facebook addiction, self-esteem, social insecurity, depression) and indicators of subjects' set of Facebook friends (number of Facebook friends, relative proportion of Facebook friends not known in-person). Following the nomenclature of (Heck et al., 2014; Snijders & Bosker, 2012), the model containing both the (fixed) level-1 and the (fixed) level-2 predictor variables would yield the following equation:

$$Y_{ij} = \gamma_{00} + u_{oj} + \sum_{h=1}^p \gamma_{h0} * X_{hij} + \sum_{k=1}^q \gamma_{0k} * Z_{kj} + \varepsilon_{ij}$$

As can be seen, also the between-person regression coefficients are expressed as γ_{0k} , indicating that the influence of each of the k person level factors Z_{kj} on subjects' average amount of Facebook use is treated as *fixed*.

In the fourth step of model development, the previously fixed effects at the situation-level were allowed to vary randomly across subjects (**Step 4 – Random Intercept, Random Slopes Model**). For each of the h level-1 predictor variables X_h , this can be achieved by adding a random parameter at the person level (u_{hj}), hence treating the previously fixed regression parameter as randomly varying (across level-2 units):

$$\beta_{hj} = \gamma_{h0} + u_{hj}$$

Substituting this expression into the model yields the extended formula

$$Y_{ij} = \gamma_{00} + u_{oj} + \sum_{h=1}^p \gamma_{h0} * X_{hij} + \sum_{k=1}^q \gamma_{0k} * Z_{kj} + \sum_{h=1}^p u_{hj} * X_{hij} + \varepsilon_{ij}$$

As can be seen from this equation, the introduction of random slope variance introduces the interaction terms ' $u_{hj} * X_{hij}$ ' into the model. This interaction term is considered a random effect, signifying that for some individuals j , a situation-level predictor variable X_h has larger/smaller effects on the criterion variable of situational Facebook use. This variability can be modeled as a function of person-level factors in a subsequent model building step, involving so-called "cross-level interaction terms." In the current analysis, the presence of random slopes was first evaluated for the "situational loneliness" predictor, but also for all other retained level-1 parameters concerning type or time of day, psychological state or preceding

behaviors. This was done in a step-by-step manner and only significant random slopes were retained in the model, as recommended by experts in the field (Heck et al., 2014; Snijders & Bosker, 2012).

In the last step of model development, eventually identified random slope variance in situational loneliness effects on subsequent Facebook use was accounted for by entering interaction terms between person-level characteristics and situational loneliness (**Step 5 – Cross-Level Interaction Model**). This is accomplished by extending the model equation for the randomly varying (loneliness) slope

$$\beta_{hj} = \gamma_{h0} + u_{hj}$$

by the inclusion of interaction terms of the form ' $\gamma_{hk} * Z_{kj}$ ', yielding the general form of the random slope model

$$\beta_{hj} = \gamma_{h0} + \sum_{k=1}^q \gamma_{hk} * Z_{kj} + u_{hj}$$

Note that this model of ' β_{hj} ', when inspected in this isolated form, is mainly concerned with the reduction of the between-person (level-2) error term ' u_{hj} ', i.e. the random slope variance. However, when substituting this extended equation into the level-1 model of situational Facebook use, one can see that the strength of effects of situational loneliness (one of the X_h variables) on subsequent Facebook use now has become contingent on person-level characteristics Z_k , as can be seen from the interaction term ' $\gamma_{hk} * Z_{kj} * X_{hij}$ ', respectively:

$$Y_{ij} = \gamma_{00} + u_{oj} + \sum_{h=1}^p \gamma_{h0} * X_{hij} + \sum_{k=1}^q \gamma_{0k} * Z_{kj} + \sum_{k=1}^q \sum_{h=1}^p \gamma_{hk} * Z_{kj} * X_{hij} + \sum_{h=1}^p u_{hj} * X_{hij} + \varepsilon_{ij}$$

As this was explicitly hypothesized, such cross-level interactions were first tested for trait loneliness. Other cross-level interactions were also tested in an exploratory manner. After finishing these model building step, retained cross-level interactions were probed using the so-called "pick-a-point" approach, which assesses the effect of a moderator variable on a criterion variable (e.g. the size of the loneliness regression slope in Facebook use) at the mean \pm one standard deviation values of the respective moderator (Bauer & Curran, 2005; Hayes, 2013). For resultant differential values of ' β_{hj} ', separate regression lines were plotted in order to visualize the relationship between situational loneliness and subsequent Facebook use. As suggested by Aguinis, Gottfredson, and Culpepper (2013), all identified cross-level interactions were as-

sessed and interpreted simultaneously (i.e. controlling for the influence of other cross-level interaction effects).

3.4.2.3 Variable selection during model development

The same general model building procedure was employed both for the prediction of (1) situational Facebook use and (2) for situational social contacts. Some of the variables entered at different stages of the model building process were deemed obligatory/necessary, whereas others were entered as potential covariates that were only kept in the model when significantly associated with the criterion measures of interest. Table III.4 gives an overview of the variables considered at different stages of model development.

Table III.4

Overview of predictor variables entered at the different steps of model development, subdivided into those entered obligatorily and those entered optionally based on model results

Model Step	obligatory predictors	optional covariates
Step 1	-	-
Step 2	<ul style="list-style-type: none"> time of day workday/weekend <i>i</i>th assessment loneliness T_{i-1} 	<ul style="list-style-type: none"> affect T_{i-1} worry T_{i-1} Facebook use $T_{i-1-i-2}$ social contact $T_{i-1-i-2}$ interactions between Level 1 predictors
Step 3	<ul style="list-style-type: none"> gender age trait loneliness 	<ul style="list-style-type: none"> Facebook addiction Social insecurity Depression Self-esteem Nb. of Facebook friends proportion of unmet Facebook friends
Step 4	loneliness T_{i-1} slope	possible level-1 variable slopes: <ul style="list-style-type: none"> day /time of day psychological states behavioral predictors
Step 5	<p>obligatory interaction test: trait loneliness*loneliness T_{i-1}</p> <p>optional tests only for established random slopes of situational loneliness:</p> <ul style="list-style-type: none"> social insecurity depression gender Facebook addiction ... 	

For model building Step 2, the time-related variables (time of day, type of day, *i*th assessment of participant *j*) were deemed necessary covariates for the specification of situational context. Moreover, situational loneliness at T_{i-1} was entered as a hypothesized predictor of subsequent

Facebook use/social contacts. All other situation-level variables were entered in an exploratory manner and retained only when significantly associated with criterion measures. This was done in order to achieve a balance between a parsimonious model with adequate fit and the necessity of covariate control in order to test for the robustness of potential loneliness effects.

For model building step 3, core demographic variables (gender, age) were entered as obligatory covariates. Additionally, as hypothesized, trait loneliness (MLS score) was entered into the model. Additional person-level variables were entered in an exploratory manner and retained in the model in case of significant associations (see Table III.4).

In model building step 4, the presence of random slope variance was obligatorily tested for situational loneliness. Moreover, other included level-1 variables (related to day/time of day and preceding psychological states and behaviors) were also allowed to have random slope variance. In order to avoid convergence problems, the presence of random slopes was checked in a successive manner and insignificant random effects were removed (Snijders & Bosker, 2012).

In model building step 5, only cross-level interactions of relevance for the explanation of random slope variance in situational loneliness effects were included. Because of the research hypothesis that trait loneliness would moderate the influence of state loneliness on subsequent Facebook use, the corresponding cross-level interaction term was obligatorily included in the models. All other cross-level interactions were tested in an exploratory manner and only retained in case of statistical significance.

3.4.2.4 Technical specifications, employed procedures and effect sizes

Model development and estimation was based both on the recommendations of statistics experts in the field and on practical guidelines offered by ESM researchers (Bolger & Laurenceau, 2013; Heck et al., 2014; Schwartz & Stone, 2007; Snijders & Bosker, 2012). In SAS, models were estimated using the (Full Information) Maximum Likelihood (ML) procedure, as it is suited for testing “nested” models differing in the number of included fixed effects (Heck et al., 2014; Snijders & Bosker, 2012). Only for models differing in the number of random effects (final models of step 3 vs. step 4), the Restricted Maximum Likelihood (REML) estimation procedure was employed, as it performs superior to the ML method in this context (see Snijders & Bosker, 2012, p.89f). Final model selection was based on deviance testing using differences in the -2 log likelihoods between successively estimated models as a test statistic. These difference values follow a χ^2 -distribution, with degrees of freedom equal to the number of effect parameters that the nested models differ in. For models differing only in the fixed effects part, deviance testing was based on -2 log likelihood values produced by ML estimation, whereas in

models differing in their random parts, deviance testing was based on values produced by the REML method (following the rationale of Snijders & Bosker, 2012; see p.97f).

Degrees of freedoms for the inferential tests of fixed effects were calculated using the Kenward-Roger approximation, as implemented in SAS PROC MIXED (using “ddfm=KR” in the MODEL statement). For the random effects, an unstructured covariance matrix was specified (specifying “type=UNSTRUCTURED” in the RANDOM statement). Because of the repeated measures design with varying time-lags between individual assessments, one could not expect the level-1 error terms to be uncorrelated (Bolger & Laurenceau, 2013). To account for the presumed autocorrelation of (level-1) error terms, SAS PROC MIXED offers several helpful options in the REPEATED statement that allow for explicitly modeling an autoregressive error structure (Bolger & Laurenceau, 2013; Littell et al., 2006; Schwartz & Stone, 2007; Snijders & Bosker, 2012). In the present context, since there were varying time lags between assessments, a covariance structure [the spatial power function “type=SP(POW) (‘timelag’)”] was chosen that was suitable for modeling interdependencies among error terms as a function of the precise time lag between any two assessments (Schwartz & Stone, 2007). Assuming that the correlation between the error terms of two assessments differing by 1 time unit (e.g. 1 hour) is equal to ρ , the size of ρ will decrease exponentially as a function of the time distance between two assessments when using this covariance structure specification¹¹. For these purposes, a new variable (conttime) was created, which assessed the time passed (in hours) since a participant’s first assessment. This variable was included in the spatial power function (Bolger & Laurenceau, 2013; Littell et al., 2006; Schwartz & Stone, 2007).

Following the recommendations of experts in the field (Bolger & Laurenceau, 2013), the level-1 predictors of psychological states were decomposed into their within- and between-person parts. To begin with, raw variables were grand mean centered ($\check{x}_{hij} = x_{hij} - \bar{x}_h$). After that, these grand-mean centered variables were decomposed into two components representing (a) the between-subject means aspect of a respective predictor variable ($\check{x}_{h.j}$) and (2) a situational, within-subject deviation from these means aspect ($\check{x}_{hij} - \check{x}_{h.j}$). This resulted in two new variables (e.g. for state loneliness) that were entered during model building Step 2 so as to elucidate the (level-1) specificity of situational predictors in variance explanation.

As discussed in detail by LaHuis, Hartman, Hakoyama, and Clark (2014) and Snijders and Bosker (2012), there are many different types of effect size measures to choose among when

¹¹ As an example, for a value of $\rho=.8$, the error correlation for a 1-hour lag between assessments will be equal to $\rho^1=.8$, whereas for a 2-hour lag it will be $\rho^2=.64$, and so on. This type of spatial power function is an extension of the more frequently employed first order autoregressive (AR(1)) covariance structure, which assumes time lags between neighboring assessments to be equidistant (Bolger & Laurenceau, 2013; Schwartz & Stone, 2007). For details, see the SAS handbook for PROC MIXED (Littell et al., 2006).

conducting a multilevel analysis. The most frequently employed ones—similar to ordinary least squares regression models—are those that focus on the amount of explained variance in the criterion measures of interest (LaHuis et al., 2014). But due to the multilevel structure, there are several variance components, at different levels of the data hierarchy, that each might be interesting to explain. For example, in a two-level model with one random slope, there are three variance components (level-1 residual variance, level-2 random intercept variance, level-2 random slope variance). The presence of different variance components is complicated by the fact that the inclusion of predictor variables at one level of the data hierarchy (e.g. level 1) might influence variance components at several levels (Snijders & Bosker, 2012)¹². There are R^2 measures available which seek to quantify the amount of variance explained at a specific level of the data hierarchy, whereas other measures account for the total amount of explained variance collapsing across level-specific variance components. For the present study, it was decided to quantify both level-specific reductions in variance components and overall reductions in criterion measures variance (for models excluding random slope components) by employing three different R^2 -type measures. These will be coined following the rationale of LaHuis et al. (2014)

In order to quantify the *explained variance at the situational level* (level 1), the reduction of variance of a full/nested model relative to the null model (the Step 1 Random Intercept Model) will be quantified as:

$$R_1^2(\text{approx.}) = \frac{(\sigma_{null}^2 - \sigma_{full}^2)}{\sigma_{null}^2}$$

where the term σ^2 denotes the variance of the level-1 residuals e_{ij} .

An analogous measure was employed for the quantification of *explained variance at the person level* (level 2):

$$R_2^2(\text{approx.}) = \frac{(\tau_{null}^2 - \tau_{full}^2)}{\tau_{null}^2}$$

where the term τ^2 denotes the variance of the level-2 residuals u_{oj} .

A third measure of *explained total variance* was computed, which did not differentiate between level-specific variance reductions:

$$R^2(\text{total}) = 1 - \frac{(\sigma_{full}^2 + \tau_{full}^2)}{(\sigma_{null}^2 + \tau_{null}^2)}$$

¹² For example, the inclusion of situational loneliness as a predictor of subsequent Facebook use at level 1 might change the amount of variance both for level-1 residual as well as level-2 random intercept variances.

In addition to these R^2 effect size measures related to the main outcome variables Y_{ij} , for models with a random slope component (Model Steps 4 and 5), explained variance of random slopes due to the inclusion of cross-level interaction terms was quantified using a measure analogous to the R^2 (approx.) measure outlined above:

$$R_{slope}^2(\text{approx.}) = \frac{(\tau_{slope_{null}}^2 - \tau_{slope_{full}}^2)}{\tau_{slope_{null}}^2}$$

where τ_{slope}^2 denotes the variance of level-2 slope residuals u_{hj} . The term $\tau_{slope_{null}}^2$ hereby denotes the variance estimate obtained at Step 4 of the model building process, while $\tau_{slope_{full}}^2$ denotes the variance estimate obtained at Step 5 of the model building process and after the inclusion of cross-level interaction terms.

4. Results

4.1 Descriptive statistics

Descriptive statistics of the employed scale measures, their corresponding internal consistencies (Cronbach's alpha) and the potential ranges of scale scores are given in Table III.5. As can be seen, participants made use of a broad range of possible scale scores, with mean scale scores falling well in-between the ceiling and bottom values of the different psychometric scales. Moreover, all considered scales had acceptable internal consistencies that each exceeded values of .700.

Participants indicated to have a mean number of 408 Facebook friends, with substantial variability across subjects ranging from 44 to 1,003 friends. Moreover, they indicated that only a small proportion of about 10% of their Facebook friends were people they had never met in-person. This ratio, however, ranged from 0% up to 60%. An inspection of the data revealed that higher ratios of "unknown friends" was not necessarily associated with elevated absolute numbers of Facebook friends: of the four subjects indicating the highest ratios of Facebook friends unmet in-person (range between .50 and .60), three indicated below-average numbers of Facebook friends (with numbers ranging between 101–359). On the other side, the four subjects indicating the highest numbers of Facebook friends (range: 738–1003) indicated pretty low levels of "unknown friends" (range between .00 and .11). Private-purpose Internet use in terms of hours per week varied substantially across participants, with a mean of about 22.6 hours.

Table III.5

Descriptive statistics of employed scales measures, Facebook and Internet use measures

Instrument	M	S.E.	Min	Max	SD	Cronbach Alpha	Scale Range
MLS	72.26	2.18	48	131	17.55	.913	37–185
U-Bogen 24	42.05	2.09	11	94	16.88	.899	0–120
BFAS	11.62	.47	6	24	3.81	.791	6–30
sIAT	23.34	.75	12	40	6.03	.837	12–60
RSES	30.02	.39	23	36	3.16	.873	10–40
PHQ-9	5.12	.45	0	16	3.60	.761	0–27
SWLS – T1	27.14	.57	15	35	4.60	.802	5–35
SWLS – T2	27.34	.54	10	34	4.39	.812	5–35
Nb. FB friends	408.26	23.11	44	1003	186.35	-	-
% unknown FB friends	.11	.02	.00	.60	.16	-	-
FB use frequency	21.45	.88	6	36	7.09	.822	4–40
Internet use (h/w)	22.57	1.75	1	80	14.10	-	-

4.2 Correlational analyses of trait-level indicators

In order to test hypotheses concerning the predicted associations between (trait) loneliness and (a) addictive Internet/Facebook use tendencies, (b) quantitative aspects of Internet/ Facebook use, and (c) quantitative/ qualitative features of Facebook friend networks, a set of correlational analyses including all relevant variables were conducted. These also included all other scale-based measures of psychosocial adaptation in order to assess the specificity of eventually identified loneliness effects.

The results of these analyses can be found in the intercorrelations table presented below (see Table III.6). As can be seen, loneliness (as measured by the MLS) was essentially unrelated to Internet/ Facebook use intensity (p values $\geq .236$) or the size and composition of a person's network of Facebook friends (p values $\geq .336$). On the other hand, loneliness showed significantly positive association with both general Internet addiction and Facebook addiction tendencies, which were in the small-to-moderate range. An inspection of Table III.6 reveals that this pattern of association was the same for all other scale measures of psychosocial adaptation and mental health (PHQ-9, U-Bogen 24, RSES). Hence, achieving scores indicative of elevated psychosocial/mental health problems was consistently associated with elevated scores in the two Internet addiction scale measures. This corresponds well to the quite consistent pattern of interrelations among psychosocial health indicator variables ranging in the moderate-to-strong range (with the notable exception of weak loneliness-depression relation, $r = .215$, $p = .085$).

Another observation pertains to the missing association between Facebook use intensity and general Internet use quantity ($r = .199$, $p = .112$). Likewise, Facebook use intensity was essentially unrelated both the total number of Facebook friends ($r = .096$, $p = .448$) and the proportion of unknown friends ($r = -.056$, $p = .658$).

The two addiction scales showed a differential pattern of intercorrelations with activity-related measures. Whereas the Facebook addiction scale was positively associated with Facebook use intensity ($r = .286$, $p = .021$) while unrelated to general Internet use intensity ($r = .063$, $p = .619$), the Internet addiction scale showed the reverse pattern with no association with Facebook activity ($r = .179$, $p = .155$) and positive associations with general Internet activity ($r = .247$, $p = .047$).

Table III.6

Intercorrelations among scale measures, Facebook and Internet use measures

	1	2	3	4	5	6	7	8	9	10	11	12
1. MEF	1	,662 ^{***}	,259 [*]	,397 ^{**}	-,524 ^{***}	.215	-,363 ^{**}	-,369 ^{**}	.100	.149	.121	.128
2. U-Bogen 24	,662 ^{***}	1	,372 ^{**}	,428 ^{***}	-,640 ^{***}	,426 ^{***}	-,434 ^{***}	-,359 ^{**}	.081	.171	.022	.069
3. BFAS	,259 [*]	,372 ^{**}	1	,585 ^{***}	-,240	,264 [*]	-,117	-,092	.129	,286 [*]	.135	.063
4. sIAT	,397 ^{**}	,428 ^{***}	,585 ^{***}	1	-,345 ^{**}	,438 ^{***}	-,099	-,245 [*]	.022	.179	.088	.247 [*]
5. RSES	-,524 ^{***}	-,640 ^{***}	-,240	-,345 ^{**}	1	-,529 ^{***}	,622 ^{***}	,436 ^{***}	-,013	-,073	-,101	-,010
6. PHQ-9	.215	,426 ^{***}	,264 [*]	,438 ^{***}	-,529 ^{***}	1	-,271 [*]	-,278 [*]	-,087	.005	.088	.154
7. SWLS_PRE	-,363 ^{**}	-,434 ^{***}	-,117	-,099	,622 ^{***}	-,271 [*]	1	,391 ^{**}	-,049	-,021	-,025	-,053
8. SWLS_POS	-,369 ^{**}	-,359 ^{**}	-,092	-,245 [*]	,436 ^{***}	-,278 [*]	,391 ^{**}	1	.057	.148	.054	-,043
9. % unknown FB friends	.100	.081	.129	.022	-,013	-,087	-,049	.057	1	-,056	.065	.138
10. FB Activity	.149	.171	,286 [*]	.179	-,073	.005	-,021	.148	-,056	1	.096	.199
11. Number of FB friends	.121	.022	.135	.088	-,101	.088	-,025	.054	.065	.096	1	.071
12. Internet use (h/w)	.128	.069	.063	.247 [*]	-,010	.154	-,053	-,043	.138	.199	.071	1

Annotations.

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed);

4.3 Multilevel analysis of situational Facebook use

4.3.1 Variable overview and intercorrelations

For convenience purposes, the following table (Table III.7) provides the reader with an overview of the variables derived from the ESM study as they were used during the multilevel analyses.

Table III.7

Overview of variables derived from the ESM study and interpretational aids

Name	Description	T	min	max	high scores indicate
FB	FB use during interval (i-1)-i	i	1	100	↑ Facebook use
CON	Soc. con. during interval (i-1)-i	i	1	100	↑ social contacts
p_FB	FB use during interval (i-2)-(i-1)	i-1	1	100	↑ Facebook use
p_CON	Soc. con. during interval (i-2)-(i-1)	i-1	1	100	↑ social contacts
p_lone	Loneliness after interval (i-2)-(i-1)	i-1	1	100	↑ loneliness
p_aff	Affective state after interval (i-2)-(i-1)	i-1	1	100	↑ negative feelings
p_wor	Worry after interval (i-2)-(i-1)	i-1	1	100	↑ worry
dh	time of day	ts	0	1	0 - before; 1 - after 3.15 p.m.
we	workday/weekend	ts	0	1	0 - workday; 1 - weekend
tp	timepoint (nth assessment)	dp	1	61	later timepoint

Annotations.

ts – information derived from time stamping of ESM data by the ESP software, dp – as derived from data preparation; only assessment points containing all relevant information were kept for analysis; T – timepoint of report; i, i-1 – data obtained at timepoint i or the next previous timepoint (i-1)

As a starting point for the multilevel (regression) models, an intercorrelation analysis of variables assessed during the ESM study period was conducted. The results of these analyses are displayed in Table III.8. Correlations below the diagonal represent between-person association of variables, whereas those above the diagonal represent within-person associations between variables (i.e. those at the situation level). The prefix “p_” connotes variables that were assessed prior to the criterion measures of interest, i.e. Facebook use (FB) and social contacts (‘CON’). As can be seen from the table, the differentiation between p_FB and FB or p_CON and CON is redundant at the person level, as these variables are almost identical when collapsed/averaged within a person¹³, hence resulting in almost perfect correlations. This state of affairs is completely different, however, when looking at the situation level (above the diagonal).

The pattern of intercorrelations at the person level (below the diagonal) showed that there were no consistent associations between psychological states and neither the amount of Facebook use nor the amount of social contacts (all $ps' \geq .25$). Moreover, there were no significant

¹³ Since within each day almost every value of “FB” corresponds to the value of “p_FB” of the next assessment.

associations between Facebook use and social contacts (all $ps' \geq .38$). There were, however, strong positive associations among psychological state indicators (all $ps' \leq .001$).

The pattern of intercorrelations at the situation level was very different from that at the person level, revealing that there were significant, albeit weak, positive associations between psychological states and concurrent Facebook use (p_{FB} : all $ps' \leq .013$) and subsequent Facebook use (FB: all $ps' \leq .06$). For social contacts, there were weak-to-moderate and negative associations between psychological states and concurrent (p_{CON} : all $ps' \leq .001$), as well as subsequent social contacts (CON: all $ps' \leq .001$). Interestingly, there were differential associations between Facebook use and social contact indicators. Engaging in one activity was negatively associated with engaging in the other both concurrently (FB-CON, $p_{FB-p_{CON}}$, all $ps' \leq .001$) and subsequently (p_{FB-CON} , p_{CON-FB} , all $ps' \leq .002$). Moreover, there were positive, small-to-moderate cross-situational relations within activity categories (p_{FB-FB} , $p_{CON-CON}$: all $ps' \leq .001$).

Table III.8

Within-person (above diagonal) and between-person (below diagonal) intercorrelations among study variables concerning situational psychological states and concurrent/subsequent Facebook use and social contacts

	FB	CON	p_{FB}	p_{CON}	p_{lone}	p_{aff}	p_{wor}
FB	-	-.192***	.175***	-.056**	.088***	.071***	.033
CON	.065	-	-.096***	.386***	-.241***	-.162***	-.111***
p_{FB}	.979***	.066	-	-.177***	.127***	.059***	.044*
p_{CON}	.109	.959***	.106	-	-.350***	-.207***	-.155***
p_{lone}	.108	-.038	.076	-.089	-	.361***	.273***
p_{aff}	-.130	-.082	-.144	-.060	.576***	-	.460***
p_{wor}	.091	.053	.091	.045	.721***	.621***	-

Annotations.

*** Correlation significant at $p < .001$ (two-tailed); ** Correlation significant at $p < .01$ (two-tailed); * Correlation significant at $p < .05$ (two-tailed); dfs for t-tests at the person level: 63, dfs for t-tests at the situation level: 3275

4.3.2 Model development

Starting off with the “Random Intercept Model” (Step 1), variance in Facebook use could be attributed to both the situation-level (σ^2) and the person-level (τ^2), with the ICC indicating that about 31% of total variance in Facebook use was attributable to person-level factors. For this model, the autoregressive covariance structure caused convergence problems during model Step 4, after rendering the preceding Facebook use (p_{FB}) slope as random. The inclusion of “ p_{FB} ” at model Step 2 (i.e. as fixed effect) rendered the estimate for the correlation among error terms (ρ) insignificant ($\rho_{null} = .444$, $p \leq .001$; $\rho_{step2} = -.185$, $p = .051$). Therefore, it seemed that the lagged control of preceding Facebook use led to residual errors that were uncorrelat-

ed across time. For these reasons, it was chosen to drop the autoregressive error structure and rerun the model development. Model information criteria, as displayed in Table III.9, indicated that the inclusion of variables at the situation level (Step 2) and the person level (Step 3) led to significantly improved model fit, as indicated by decreases in the absolute values of the -2 log Likelihoods and derived information criteria. Moreover, modeling the slopes of loneliness and preceding Facebook use on the subsequent amount of Facebook use as random also led to improved model fit. Likewise, the modeling of random loneliness slope variance by the inclusion of cross-level interaction terms (Step 5) likewise improved model fit. This increase in model fit, indicated by the information criteria, was corroborated by deviance testing, which yielded a statistically significant improvement in model fit throughout model building steps (all $p_s' \leq .002$). Therefore, the model fitted during building Step 5 was chosen as the final model and will be presented in detail in the following section.

Table III.9

Model information table including a display of information criteria, deviance test results and estimated variance components for every model building step including fixed slopes

		Step 1	Step 2	Step 3	Step 4	Step 5
Estimation Method	ML REML	28870.6	28690.7	28671.3	28600.5	28582.4
AIC		28876.6	28710.7	28701.3	28640.5	28630.4
AICC		28876.6	28710.7	28701.4	28640.8	28630.7
BIC		28883.1	28732.4	28733.9	28684	28682.5
Δ -deviance			179.90	19.40	72	18.1
df			7	5	5	4
p-Value		-	.0000	.0016	.0000	.0000
τ^2		142.49	91.99	66.99		68.58
σ^2		311.48	297.29	297.27		294.55
ICC		.314	.236	.184		.189

Annotations.

ML – (Full Information) Maximum Likelihood -2 log likelihood; REML – Restricted Maximum Likelihood -2 log likelihood; AIC – Akaike Information Criterion; AICC – small sample size correction for AIC; BIC – Bayesian Information Criterion (all AIC/AICC/BIC values refer to ML estimates); all information criteria can be interpreted in the metric of “smaller is better”

in order to obtain estimates for explained variance at the situation and person level for model Step 5, the model (including random slopes) was rerun with the interaction terms but the random slopes excluded. As suggested by Snijders and Bosker (2012), this represents a reasonable estimate.

4.3.3 Model results

A full display of model results throughout the model building process can be found in Table III.10. As can be seen from the final model (Step 5), among the included predictors at the situation level, previous feelings of loneliness ($p_lone_within: .0878$, $p = .0006$) were positively associated with subsequent Facebook use. Moreover, the amount of previous Facebook use

interacted with time of day (p_{FB*dh} : .1064, $p = .0006$) to positively influence subsequent Facebook use: before 3.15 (p.m.), preceding Facebook use was less strongly associated with subsequent use ($p_{FB_{dh=0}}$: .0938, $p = .0084$) as compared to situations later in the afternoon/evening ($p_{FB_{dh=1}}$: .2002, $p < .0001$). Moreover, there was a significant and negative effect of assessment occasion, with timepoints later in the ESM study protocol being associated with reductions in reported Facebook use (tp : -.0974, $p < .0001$).

Controlling for the situation-level variables, it could be shown that neither gender nor age were significantly predictive of subjects' average Facebook use (all $ps' > .59$). However, results for the main effects of trait loneliness (MLS: .17, $p = .0368$) and Facebook addiction (BFAS: 1.1702, $p = .0004$) showed positive and statistically significant predictive relations with subjects' average levels of Facebook use. Contrary to this, social insecurity (U-Bogen 24: -.1623, $p = .0742$) showed a negative, yet only marginally significant association with average Facebook use levels. During model Step 4, both the "loneliness-Facebook use" and the "previous-current Facebook use" slopes were shown to vary significantly across participants, yielding evidence for random slopes variances.

Results for the cross-level interaction between person-level variables and situational loneliness feelings revealed several statistically significant interaction effects. It could be shown that a one unit increase in trait loneliness was associated with a .004 increase in the "loneliness-Facebook use" slope at the situation level ($p_{lone_within*MLS}$: .0040, $p = .0248$). Furthermore, higher Facebook addiction scores had a similar effect, in that a one unit increase in BFAS scores was associated with a .017 increase in the "loneliness-Facebook use" slope at the situation level ($p_{lone_within*BFAS}$: .0175, $p = .0061$). Contrary to this, albeit only marginally significant, a one unit increase in social insecurity was associated with a .003 decrease in the "loneliness-Facebook use" slope ($p_{lone_within*U_Bogen\ 24}$: -.0035, $p = .0560$). Above that, the size of the "loneliness-Facebook use" slope was shown to be contingent on gender ($p_{lone_within*Gender}$: -.1375, $p = .0245$), meaning that the effect of situational loneliness on subsequent Facebook use was significantly stronger for women ($p_{lone_within_{women}}$: .08775, $p = .0006$) as compared to men ($p_{lone_within_{men}}$: -.04977, $p = .3632$).

Table III.10

Model summary table with a display of the estimated unstandardized regression coefficients (fixed effects) and variance components (random effects)

Parameters	Step 1	Step 2	Step 3	Step 4	Step 5
<i>regression coefficients (fixed effects)</i>					
intercept	16.94 (1.51)***	16.47 (1.48)***	16.44 (1.48)***	16.49 (1.46)***	16.60 (1.45)***
tp		-.09 (.02)***	-.09 (.02)***	-.10 (.02)***	-.10 (.02)***
we		-.23 (.66)	-.22 (.66)	-.32 (.66)	-.39 (.66)
dh		-.21 (.82)	-.21 (.82)	-.18 (.81)	-.26 (.81)
p_lone_within		.06 (.02)***	.06 (.02)***	.06 (.03)*	.09 (.02)***
p_FB		.12 (.03)***	.12 (.03)***	.10 (.04)**	.09 (.04)**
dh*p_FB		.10 (.03)***	.10 (.03)***	.10 (.03)***	.11 (.03)***
p_lone_between		.11 (.11)	.11 (.10)	.12 (.10)	.11 (.09)
gender			.14 (2.76)	.60 (2.74)	-.31 (2.72)
age			-.25 (.37)	-.21 (.36)	-.19 (.36)
trait loneliness (MLS)			.15 (.08)#	.14 (.08)#	.17 (.08)*
trait social insecurity (U-Bogen 24)			-.17 (.09)#	-.13 (.09)	-.16 (.09)#
trait Facebook addiction (BFAS)			1.25 (.31)***	1.03 (.31)**	1.17 (.03)***
p_lone_within*Gender					-.138 (.059)*
p_lone_within*MLS					.004 (.002)*
p_lone_within*U-Bogen 24					-.003 (.002)#
p_lone_within*BFAS					.017 (.006)**
<i>variance components (random effects)</i>					
Residual (σ^2)	311.48 (7.70)***	297.29 (7.35)***	297.27 (7.35)***	283.92 (7.15)***	284.01 (7.14)***
Intercept (τ_{00}^2)	142.49 (26.11)***	91.99 (17.71)***	66.99 (13.13)***	63.217 (14.27)***	62.13 (13.93)***
Slope _{p_lone} (τ_{11}^2)				.018 (.007)**	.008(.005)#
Slope _{p_FB} (τ_{22}^2)				.025 (.008)***	.026 (.008)***
Covariance (τ_{01})				.371 (.242)	.265 (.185)
Covariance (τ_{02})				-.161 (.238)	-.153 (.237)
Covariance (τ_{12})				-.008 (.005)	-.008 (.005)#
<i>nb of parameters</i>	3	10	15	20	24

Annotations.

*** significant at $p < .001$ (two-tailed); ** significant at $p < .01$ (two-tailed); * significant at $p < .05$ (two-tailed); # significant at $p < .10$ (two-tailed), standard errors are given in parentheses

Due to this gender difference in situational loneliness slopes, subsequent interaction probing was conducted stratifying for gender. Therefore, interaction plots for the psychosocial trait measures (MLS, BFAS, U-Bogen 24) will be displayed for men and women. Interaction probing was conducted using group-mean centered level-1 predictor scores ($p_lone_within = 0$ means that a person is at his/her average level of situational loneliness) and grand-mean centered level-2 predictor scores (e.g. $MLS = 0$ means that a person is on the grand mean of trait loneliness levels). Separate regression lines were plotted for different values of the level-2 moderator variables (i.e. grand-mean values ± 1 SD), keeping all other moderator variables at their grand-mean value.

4.3.3.1 Moderating effects of trait loneliness

As can be seen from Figure III.5, for female subjects (left panel) high levels of trait loneliness (mean value + 1 SD) led to an increase in situational loneliness effects on subsequent Facebook use. At low levels of trait loneliness (mean value - 1 SD), however, the effect of situational loneliness on subsequent Facebook use approached zero (female- $p_lone_within_{MLS_min1SD}$: .0180, $p = .6230$). For men (right panel), however, situational loneliness slopes were insignificant at the probed values of trait loneliness, although there was a trend for negative situational effects of loneliness on subsequent Facebook use at low levels of trait loneliness (male- $p_lone_within_{MLS_min1SD}$: -.1195, $p = .0667$).

These trait loneliness-contingent effects on the situation-level “loneliness-Facebook use” slope are clearly in line with research Hypothesis 1c.

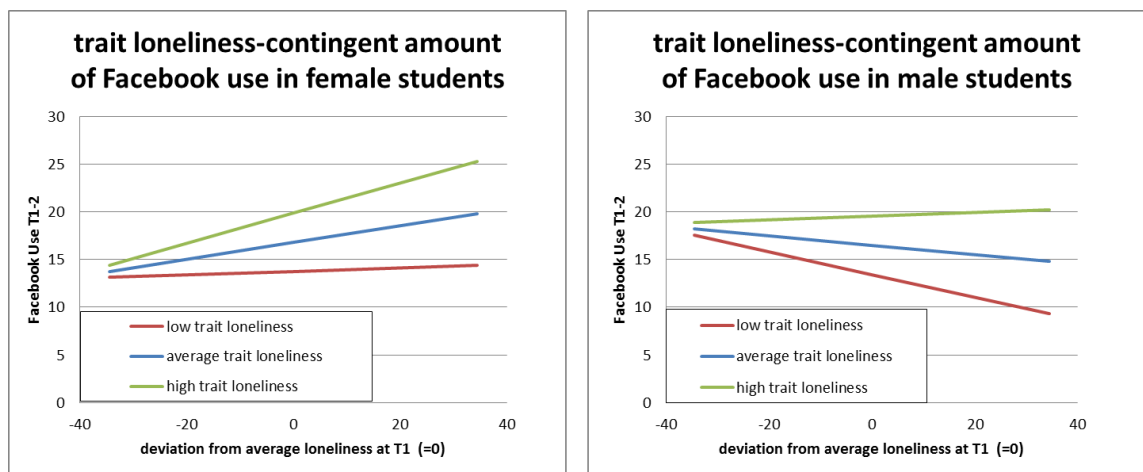


Figure III.5
Moderating effects of trait loneliness on situation-level “loneliness-Facebook use” slopes by participant gender

4.3.3.2 Moderating effects of Facebook addiction

Figure III.6 shows how different values on a trait measure of Facebook addiction exert (positive) influence on the strength of the situation-level “loneliness-Facebook use” slope. For female subjects (left panel), high levels of Facebook addiction led to an increase in situational loneliness effects on subsequent Facebook use (female-p_lone_within_{BFAS_plus1SD}: .1543, $p < .0001$). Similar to trait loneliness results, at low levels of Facebook addiction, the situational loneliness slope approached zero and was insignificant (female-p_lone_within_{BFAS_min1SD}: .0212, $p = .5395$). For male subjects (right panel), lower levels of Facebook addiction were associated with a (more) negative association between situational feelings of loneliness and the amount of subsequent Facebook use (male-p_lone_within_{BFAS_min1SD}: -.1163, $p = .0540$). In male subjects with higher levels of Facebook addiction, situational loneliness was essentially unrelated to subsequent Facebook use (male-p_lone_within_{BFAS_plus1SD}: .01678, $p = .7766$).

Taken together, these findings show that Facebook addiction tendencies play a role in determining the extent to which situational loneliness governs subsequent Facebook use.

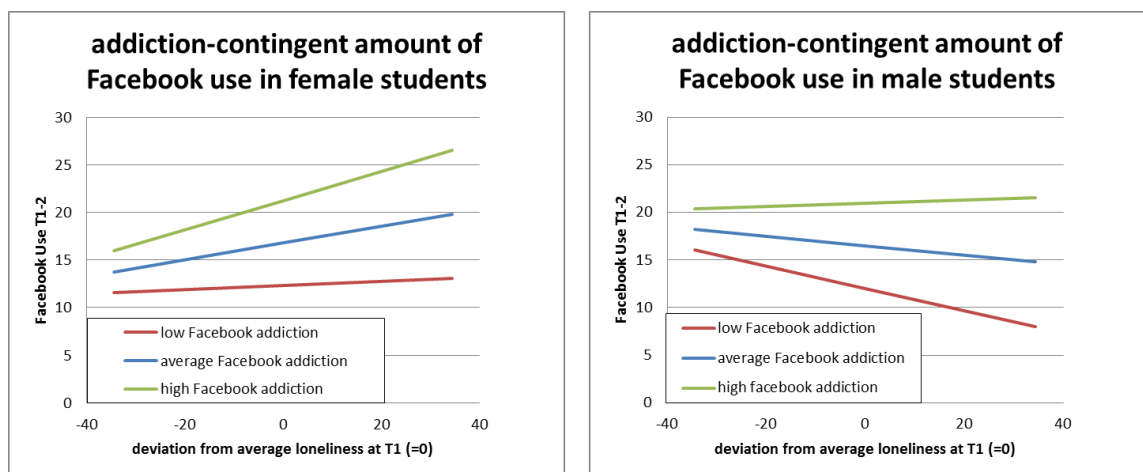


Figure III.6
Moderating effects of trait Facebook addiction on situation-level “loneliness-Facebook use” slopes by participant gender

4.3.3.3 Moderating effects of social insecurity

Although the cross-level interaction effect was only marginally significant, conditional effects of situational loneliness on subsequent Facebook use for different levels of social insecurity (as assessed by the U-Bogen 24) will be displayed. As shown in Figure III.7, the conditional effects of social insecurity were opposite in direction to those of both trait loneliness and Facebook addiction tendencies. For females (left panel), low levels of social insecurity were associated with higher values for the situation-level “loneliness-Facebook use” slope (female-

$p_{\text{lone_within}}_{U\text{-Bogen_min}1SD}$: .1461, $p = .0007$). Contrary to this, the slope was negligible at higher levels of social insecurity (female- $p_{\text{lone_within}}_{U\text{-Bogen_plus}1SD}$: .0294, $p = .4134$). For male subjects, the “loneliness-Facebook use” slope approached zero at lower levels of social insecurity (male- $p_{\text{lone_within}}_{U\text{-Bogen_min}1SD}$:.0086, $p = .8832$). Contrary to this, it was slightly negative at high levels of social insecurity, although this effect did not reach statistical significance (male- $p_{\text{lone_within}}_{U\text{-Bogen_plus}1SD}$: -.1081, $p = .1041$).

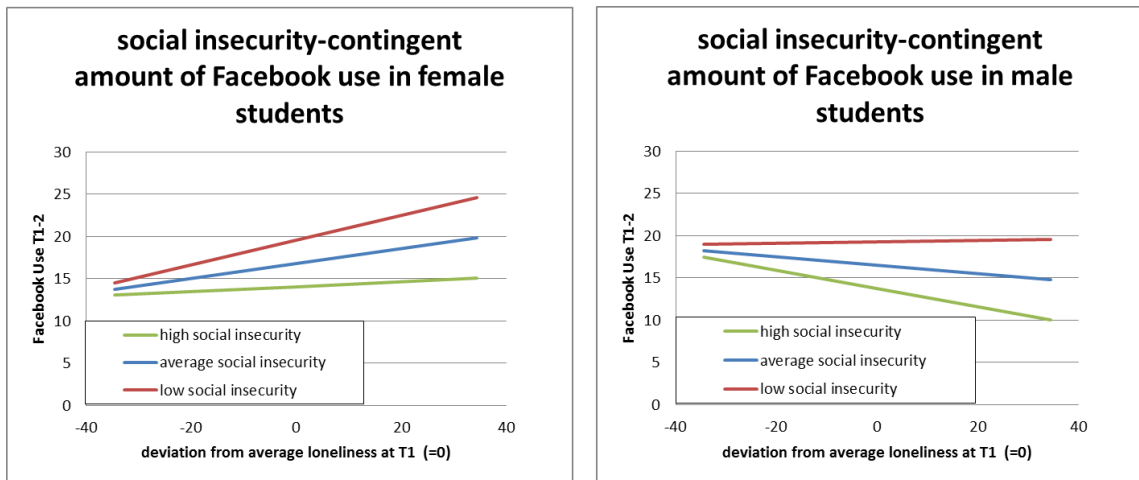


Figure III.7

Moderating effects of trait social insecurity on situation-level “loneliness-Facebook use” slopes by participant gender

4.3.4 Effect sizes

As can be seen from the summary table of effect size measures (Table III.11), the final model explained a total of 21.1% of the variance in Facebook use differences across the two levels of the data hierarchy. At the situational level, the included predictor variables accounted for a total of 7.3% of variability in situational Facebook use scores. Moreover, more than 50% of between-person variability in mean Facebook use levels could be accounted for in the final model. As can be seen from the model table, by far the largest part of explained variance at both levels of the data hierarchy could be accounted for at Step 2 of the model development, i.e. by the inclusion of situation-level variables. Within this model building step, not only was 6.5% of level-1 variance accounted for, but so was a total of 35.5% of between-person variance in average Facebook use. Moreover, the inclusion of the four cross-level interaction terms accounted for a total of 55.8% of between-person variance in “loneliness-Facebook use” slopes and rendered the variance parameter estimate marginally insignificant ($p = .0504$). The inclusion of trait loneliness as the only cross-level moderator of situational loneliness effects accounted for a total of 14.6% of the slope variance.

While this display of effect size measures is devoted to the final fitted model, it lacks precise information concerning the effects specifically attributable to the included state/trait loneliness parameters. When rerunning these analyses with only these parameters¹⁴, only 3.5% of the total variance in Facebook use differences could be accounted for. At level-1 of the data hierarchy, only 0.3% of variance in situational Facebook use was attributable to state loneliness, whereas at level-2 of the data hierarchy, 4.5% of between-person variability in average Facebook use was accounted for by trait loneliness. Moreover, the cross-level interaction term including trait loneliness accounted for 10.8% of between-person variability in state loneliness slopes.

Table III.11

Local and global estimates of explained variance at the two levels of the multilevel model and the random “loneliness-Facebook use” slope

Measure of explained variance	Step 1	Step 2	Step 3	Step 4	Step 5
$R_1^2(\text{approx.})$	0	0,065	0,065	-	0,073
$R_2^2(\text{approx.})$	0	0,355	0,530	-	0,519
$R^2(\text{total})$	0	0,154	0,209	-	0,211
$R_{\text{slope}_{p_lone}}^2(\text{approx.})$				0	0,558

4.4 Multilevel analysis of situational social contacts

4.4.1 Model development

An analogous multilevel model was developed for the prediction of social contacts at the situational level. This model differed from the model of situational Facebook use to the extent that the included autoregressive covariance structure did not cause any convergence problems and hence was kept throughout the model building process.

Beginning with the Random Intercept Model (Step 1), the ICC value indicated that a substantial amount of variability in social contacts could be attributed to the situation (σ^2) as well as the person level (τ^2). This analysis indicated that a smaller portion of about 11.3% of overall variability in social contacts was attributable to between-person differences in average social contact.

Throughout model development, there was slight disagreement across information criteria as to which model to choose as best-fitting one (see Table III.12). While AIC/AICC values indicated a continuous improvement of model fit until Step 4 of model development, BIC values favored the model of Step 2 as the most parsimonious. However, the results of deviance test-

¹⁴ i.e.: p_lone_within, p_lone_between, MLS, the interaction term MLS*p_lone_within

ing suggested that beyond the inclusion of situation-level predictors (Step 2), the inclusion of person-level predictors (Step 3), and the inclusion of random slopes (Step 4) led to significantly improved model fit. Contrary to this, random slope variance in situational loneliness effects on subsequent social contacts could not be modeled as a function of person-level characteristics, since the inclusion of cross-level interaction terms (Step 5) did not lead to improved model fit¹⁵. Therefore, the Random Intercept Random Slope Model (Step 4) was chosen as the final model, which will be presented in the following section.

Table III.12

Model information table including a display of information criteria, deviance test results and estimated variance components for every model building step including fixed slopes

		Step 1	Step 2	Step 3	Step 4	Step 5
Estimation Method	ML	32635.1	32365.2	32349.8	32313.9	32305.3
	REML			32399.1	32360.9	
AIC		32643.1	32395.2	32387.8	32369.9	32373.3
AICC		32643.1	32395.4	32388.1	32370.4	32374
BIC		32651.8	32427.8	32429.1	32430.8	32447.2
Δ -deviance			269.90	15.40	38.20	8.60
df			11	4	9	6
p-Value		-	.0000	.0039	.0000	.1974
τ^2		145.02	69.534	50.7619		51.6365
σ^2		1136.71	918.43	918.45		914.92
ICC		.113	.070	.052		.053

Annotations.

ML – (Full Information) Maximum Likelihood -2 log likelihood; REML – Restricted Maximum Likelihood -2 log likelihood; AIC – Akaike Information Criterion; AICC – small sample size correction for AIC; BIC – Bayesian Information Criterion (all AIC/AICC/BIC values refer to ML estimates); all information criteria can be interpreted in the metric of “smaller is better”

in order to obtain estimates for explained variance at the situation and person level for model Step 5, the model (actually including random slopes) was rerun with the interaction terms but the random slopes excluded. As suggested by Snijders and Bosker (2012), this represents a reasonable estimate.

4.4.2 Model results

A full display of model results throughout the model building process can be found in Table III.13. As can be seen from the final model (Step 4), there were complex interactions among the included predictors at the situation level, complicating a straightforward interpretation of (fixed) effects. First, there was a significant effect of the amount of previous social contacts on the amount of subsequent social contacts and the size of this effect was conditional on type of day (p_{CON*we} : .1528, $p < .0001$). On workdays, this effect was smaller ($p_{CON_{workday}}$: .2502, $p < .0001$) that the two days of the weekend ($p_{CON_{weekend}}$: .4030, $p < .0001$). This indicates that

¹⁵ The displayed fit statistics concerning model Step 5 were derived from a model containing 6 cross-level interaction terms (concerning all included level-2 variables). None of these fixed effects did even approach significance, whether tested in combination or in isolation (data not shown).

social contacts showed a stronger continuity across situational assessments during weekends than on workdays. Among the psychological state predictors, previous affective state had a negative effect on subsequent social contacts ($p_{\text{aff_within}}$: $-.1186$, $p = .0011$), indicating that higher levels of negative affect were associated with a subsequent decrease in social contacts. Situational loneliness showed a highly complex association with subsequent amount of social contacts, in that it had a quadratic effect ($p_{\text{lone_within}}*p_{\text{lone_within}}$: $.0029$, $p = .0323$) that also was contingent on the amount of previous social contacts ($p_{\text{CON}}*p_{\text{lone_within}}$: $-.00282$, $p = .0035$). Figure III.8 is a visualized representation of this quadratic effect of situational feelings of loneliness on subsequent social contacts, as conditioned by the amount of previous social contacts (probed at minimum, intermediate and maximum levels of the variable p_{CON}). As can be seen, state loneliness was associated with both decreases (at low-to-moderate levels of loneliness) and increases (at high levels of loneliness) in subsequent social contacts. Moreover, the ranges of loneliness-associated decreases and increases in subsequent social contacts differed depending on the amount of preceding social contacts: in situations of zero preceding social contact, loneliness-associated decreases in subsequent social contacts were smaller and a transition to loneliness-associated increases in subsequent social contacts occurred “earlier” (i.e. at lower levels of loneliness), as compared to intermediate or very high levels of preceding social contact (compare the orange lines to both the blue and red ones). As can also be seen, the steeper “loneliness-subsequent social contact” slope in situations of no/little preceding social contacts led to assimilation of subsequent contact levels at higher levels of loneliness.

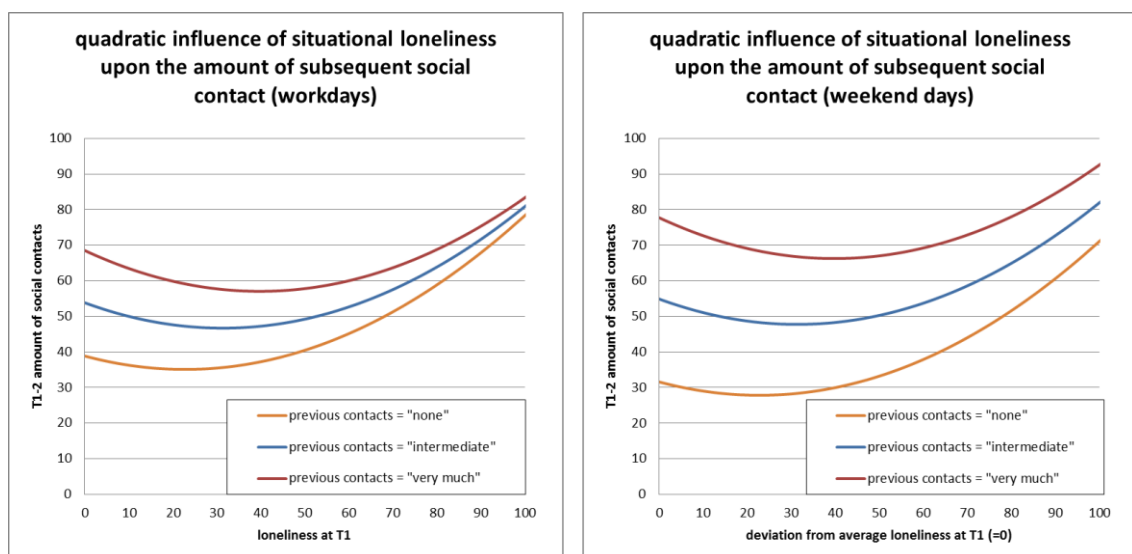


Figure III.8
Quadratic influence of situational loneliness on subsequent social contacts, as conditioned by preceding social contacts

Controlling for the situation-level effects, neither gender nor age were associated with average levels of social contact (all $ps' > .19$). Likewise, the average level of loneliness feelings was unrelated to the average amount of social contact ($p_{\text{lone_between}}$: .1232, $p = .3503$). Contrary to this, average affective state levels were significantly predictive of average social contacts ($p_{\text{aff_between}}$: -.3369, $p = .0153$), but only after including the PHQ-9 as a person-level indicator of depressive symptoms (compare $p_{\text{aff_between}}$ coefficients between Step 2 and Step 3). The PHQ-9 itself showed a positive, albeit marginally significant effect on social contact levels (PHQ-9: .7282, $p = .0563$). Trait loneliness had a significant negative effect on reported levels of average social contact (MLS: -.2255, $p = .0019$).

Table III.13

Model summary table with a display of the estimated unstandardized regression coefficients (fixed effects) and variance components (random effects)

Parameters	Step 1	Step 2	Step 3	Step 4
<i>regression coefficients (fixed effects)</i>				
intercept	57.83 (1.68)***	41.67 (1.95)***	42.60 (2.00)***	43.49 (2.13)***
tp		-.01 (.04)	-.02 (.04)	-.02 (.04)
we		-9.05 (2.27)***	-9.03 (2.27)***	-6.38 (2.62)*
dh		-1.25 (1.13)	-1.20 (1.13)	-1.21 (1.33)
$p_{\text{lone_within}}$		-.14 (.07)*	-.14 (.07)*	-.14 (.07)#
p_{CON}		.27 (.02)***	.26 (.02)***	.25 (.02)***
$p_{\text{aff_within}}$		-.11 (.04)**	-.11 (.04)**	-.12 (.04)**
$p_{\text{lone_within}}^*$			.003 (.0012)*	.003 (.0014)*
$p_{\text{lone_within}}$		.003 (.0012)*	.003 (.0012)*	.003 (.0014)*
$p_{\text{CON}}^*p_{\text{lone_within}}$		-.003 (.0009)**	-.003 (.0009)**	-.003 (.0010)**
p_{CON}^*we		.19 (.03)***	.19 (.03)***	.15 (.04)***
$p_{\text{lone_between}}$		.02 (.13)	.16 (.12)	.12 (.13)
$p_{\text{aff_between}}$		-.10 (.12)	-.34 (.13)**	-.34 (.13)**
gender			-3.63 (2.97)	-4.18 (3.18)
age			-.35 (.35)	-.22 (.37)
trait loneliness (MLS)			-.21 (.06)**	-.23 (.07)**
depression (PHQ-9)			.69 (.35)#	.73 (.37)#
<i>variance components (random effects)</i>				
Residual (σ^2)	1136.71 (32.1)***	918.43 (22.83)***	918.45 (22.83)***	881.88 (22.66)***
Intercept (τ_{00}^2)	145.02 (31.99)***	69.53 (16.35)***	50.76 (12.87)***	76.93 (24.33)***
Rho (SP(POW))	.643 (.014)***	.217 (.064)***	.217 (.064)***	.230 (.065)***
Slope $_{p_{\text{lone}}}$ (τ_{11}^2)				.058 (.0226)**
Slope $_{dh}$ (τ_{22}^2)				32.968 (19.878)*
Slope $_{we}$ (τ_{33}^2)				73.549 (32.402)*
Covariance (τ_{01})				.318 (.538)
Covariance (τ_{02})				-21.515 (17.416)
Covariance (τ_{03})				-21.686 (20.500)
Covariance (τ_{12})				-.034 (.493)
Covariance (τ_{13})				.703 (.610)
Covariance (τ_{23})				-4.193 (16.661)
<i>nb of parameters</i>	4	15	19	28

Annotations.

*** significant at $p < .001$ (two-tailed); ** significant at $p < .01$ (two-tailed); * significant at $p < .05$ (two-tailed); # significant at $p < .10$ (two-tailed), standard errors are given in parentheses

During model Step 4, “loneliness - social contact,” “type of day - social contact” and “time of day - social contact” slopes were shown to vary significantly across participants, yielding evidence for random slopes variances (see Table III.13). None of the parameter estimates concerning covariance between random effects yielded significant results.

The cross-level interaction model (Step 5), not detailed herein, showed that the trait*state loneliness interaction was insignificant in explaining random slope variance (MLS*p_lone_within: .00303, p = .2498). Likewise, no cross-level interaction between one of the other level-2 covariates and state loneliness could explain random slope variance (data not shown).

4.4.3 Effect sizes

As can be seen from the summary table of effect size measures (Table III.14), the final model explained a total of 24.4% of the variance in social contacts across the two levels of the data hierarchy. At the situational level, the included predictor variables accounted for a total of 19.2% of variability in situational Facebook use scores. At the person level, almost two-thirds (i.e. 64.4%) of between-person variability in social contact amount could be accounted for in the final model. As in the previous models of Facebook use, by far the largest part of explained variance at both levels of the data hierarchy could be accounted for at Step 2 of the model development, i.e. by the inclusion of situation-level variables. Within this model building step, not only was 19.2% of level-1 variance accounted for, but so were a total of 52.1% of between-person variance in social contacts.

In order to quantify the size of effects specifically attributable to the included loneliness parameters, a Step 3 model was run that included only the state/trait indicators of loneliness (i.e.: p_lone_within, p_lone_within*p_lone_within, p_lone_between, MLS). This reduced model showed that the loneliness parameters accounted for a total of 6.8% of variance in social contact levels across the data hierarchy. At the situation level, 6.2% of variability in situational social contacts could be accounted for, while a total of 11.6% of variability in mean social contact levels could be accounted for at the person level.

Table III.14
Local and global estimates of explained variance at the two levels of the multilevel model

Measure of explained variance	Step 1	Step 2	Step 3	Step 4
R_1^2 (approx.)	0	0,192	0,192	-
R_2^2 (approx.)	0	0,521	0,650	-
R^2 (total)	0	0,229	0,244	-
$R_{slope_{p_lone}}^2$ (approx.)				0

5. Discussion

The aims of the present study were multifold in nature. For the sake of replication, the associations between a trait indicator of loneliness and aspects of psychosocial adaptation were investigated. As hypothesized, correlations with constructs such as self-esteem, social insecurity and satisfaction with life were in the expected direction and moderate to strong in size. However, one notable exception is the insignificant, albeit positive, association between loneliness and depression, which warrants further explanation. Additionally, this study sought to establish links between trait loneliness and aspects of general Internet use (duration of weekly use) and Facebook use (general activity, number of friends, ratio of online-only friends). However, no such links could be established and the obtained correlations, albeit positive in sign, were of only small magnitude. Contrary to this and confirming the predictions made, associations between loneliness and Internet addiction including Facebook addiction were positive and small to moderate in size. Taking these results together, the intended replication analyses were only partly successful in establishing the proposed loneliness links.

One of the main research questions of this study, however, pertained to the investigation of situational Facebook use and the hypothesized role for state loneliness in driving such use (see Section III.4.3). In the final multilevel model, all major research hypotheses could be confirmed at least partly: first, there was a gender-dependent effect of state loneliness on subsequent Facebook use, revealing positive and significant effects in females ($p_{\text{loneliness_within_women}}: .08775, p = .0006$) and negative but insignificant effects in males ($p_{\text{loneliness_within_men}}: -.04977, p = .3632$)¹⁶. This gender-disparate effect was unsuspected, hence Hypothesis 1a concerning the effects of situational feelings of loneliness (Kross et al., 2013) could only partly be confirmed. Beyond this, the included indicator of trait loneliness was positively associated with a person's average amount of Facebook use (MLS: .17, $p = .0368$), lending support for research Hypothesis 1b. Third, and importantly, the situational contingencies between state loneliness and the subsequent amount of Facebook use varied across persons. As hypothesized, a person's level of trait loneliness was able to explain part of this variability in state loneliness slopes ($p_{\text{loneliness_within*MLS}}: .0040, p = .0248$). Interaction probing revealed that state loneliness was a stronger predictor of subsequent Facebook use in participants with higher levels of trait loneliness (see Figure III.5). These results were in line with predictions from Hypothesis 1c. Additionally, other cross-level interactions were identified: Compared to participants with

¹⁶ Note that the sizes of these effects are expressed with the values of other cross-level moderators (trait loneliness, social insecurity and Facebook addiction) fixed at their grand-mean values. However, these gender differences remained virtually unchanged when excluding the other cross-level moderators from the model ($p_{\text{loneliness_within_women}}: .08606, p = .0024$; $p_{\text{loneliness_within_men}}: -.04622, p = .4262$).

lower levels of Facebook addiction symptoms, situational loneliness feelings were a stronger predictor of subsequent Facebook use in those with higher symptom levels ($p_{\text{lone_within*BFAS}}: .0175, p = .0061$). Albeit marginally significant, social insecurity likewise proved to be a moderator of the size of situational contingencies. Compared to participants with lower levels of social insecurity, those with higher levels showed a reduced tendency to use Facebook when in lonely states ($p_{\text{lone_within*U_Bogen 24}}: -.0035, p = .0560$). These findings hence support the (exploratory) Hypothesis 1d.

A second main aim was the investigation of the hypothesized role of state feelings of loneliness in the regulation of social contact behaviors, as observed in the situational context of everyday life. The complex findings concerning the predictive effects of state loneliness on subsequent amount of social contacts were generally in line with predictions (Hypothesis 2a), albeit they proved to be more complex than anticipated and warrant further explication. Beyond this, there was a significant negative association between trait levels of loneliness and the average amount of social contacts during the ESM study period (MLS: $-.2255, p = .0019$). This clearly supports Hypothesis 2b. Contrary to this, although the size of situational contingencies between state loneliness and subsequent social contacts varied across participants, neither levels of trait loneliness (Hypothesis 2c) nor other person-level traits (Hypothesis 2d) could significantly account for this variability. Therefore, both these latter hypotheses must be rejected based on the present study results.

For the sake of clarity, the following discussion will be divided into four major sections. The first part will deal with results obtained in the replication analyses concerning loneliness associations with psychosocial adaptation and Internet/SNS use behaviors (Section III.5.1). The second and third part of the discussion will be concerned with the results of the multilevel models developed for Facebook use (Section III.5.2) and social contact behaviors (see Section III.5.3). The last part of this chapter will focus on major methodological weaknesses of the conducted study and highlight potential avenues for future ESM research in media use contexts (Section III.5.4).

5.1 Trait loneliness, psychosocial adaptation and Internet use

5.1.1 Trait loneliness and psychosocial adaptation

In line with previously reported results (see Chapter II) and general findings in the empirical literature (Heinrich & Gullone, 2006; Schwab, 1997), trait loneliness was found to be associated with other indicators of psychosocial maladaptation such as elevated levels social insecurity, lower levels of self-esteem and lower levels of satisfaction with life (absolute values of r between $.363$ and $.662$). This lends additional support to the notion that loneliness is not just

an indicator of social relationship problems, but a rather global indicator of psychosocial maladjustment and reduced emotional well-being (see also Section II.5.1). The insignificant association between loneliness and depression, however, contrasts with previous empirical work (J. T. Cacioppo et al., 2010; J. T. Cacioppo, Hughes, et al., 2006; Heinrich & Gullone, 2006; Schwab, 1997) and is hard to reconcile. Available normative data for the German general population reveal that depression scores were comparatively high in the present sample. With a PHQ-9 mean score of 5.12 (3.60), the present sample scores almost 3 points above the mean of the respective age norm (mean score for 14-24 years: 2.3, SD: 3.3, see Kocalevent, Hinz, & Brähler, 2013). Floor effects in depression hence would not seem to be a potential explanation for the insignificant association. Moreover, the PHQ-9 has already been shown to correlate with other measures of trait loneliness (Weeks, Michela, Peplau, & Bragg, 1980), such as the UCLA Loneliness Scale (Mazurek, 2014; D. W. Russell, 1996) or the loneliness scale developed by de Jong-Gierveld and van Tilburg (1999, see chapter II). The current study employed a multidimensional loneliness scale shown to possess a three-factorial structure (Schwab, 1997), with subscales concerning different aspects of loneliness (social loneliness, emotional loneliness, the inability to be alone). Although originally not intended for this purpose, the current study collapsed the three subscales to form a unidimensional indicator of trait loneliness with high levels of internal consistency (Cronbach's alpha: .913). This could change the interpretation of scale scores, since loneliness is currently defined by the perceived lack of sufficient and meaningful social or emotional bonds (de Jong-Gierveld & van Tilburg, 1999; DiTommaso & Spinner, 1997; D. Russell et al., 1984; D. W. Russell, 1996; Weiss, 1973, 1974), and not by a lack of ability to handle situations of solitude. While this putatively changed meaning of the loneliness indicator might seem a possible explanation for the insignificant association with depression, it does not apply in the present context. When correlating the subscale scores of the MLS with depression scores derived from the PHQ-9 in an exploratory analysis, associations between depression and social loneliness ($r = .118$, $p = .349$) and emotional loneliness ($r = .169$, $p = .179$) subscales were insignificant. Contrary to this, however, depression was significantly and positively associated with subscale scores for the inability to be alone ($r = .253$, $p = .042$). This pattern of results still runs counter both the established links between more conventional indicators of loneliness and depression. However, it also runs counter findings obtained for the loneliness scale by Schwab (1997) itself. For example Schwab and Barkmann (1999) were able to show consistent negative associations between all three subscales and indicators of general wellbeing as well as general mental health in a sample of university students, which were moderate to strong in size. A potential explanation for the inconsistent link found in this study may be the relative instability of emotional well-being during the transition to university, which has

repeatedly been associated with negative emotional well-being (Alfeld-Liro & Sigelman, 1998; Cooke, Bewick, Barkham, Bradley, & Audin, 2006; Shaver et al., 1985). As a large part of participants was comprised of freshmen during their first academic year, reported depressive symptoms (prompted with regards to the two weeks prior to assessment) may have reflected the current hassles of the transition process to a stronger degree. This could have obscured/weakened otherwise consistent links between trait loneliness and depression.

5.1.2 Trait loneliness associations with Internet and Facebook use

Surprisingly, trait loneliness was found to be unrelated to all indicators of quantitative/qualitative features of Internet use. In terms of quality of Facebook use, it was neither related to the total number of Facebook friends (as a putative indicator for the degree of active social use) nor to the relative ratio of online-only friends (as a putative indicator for the degree of compensatory online friending). While the present null findings concerning total number of Facebook friends replicate those previously reported (Burke et al., 2010; Jin, 2013; P. Sheldon, 2013; Skues et al., 2012, but see Wohn et al., 2014), the null findings concerning the ratio of online-only friends runs counter the present state of empirical evidence (Jin, 2013; Lemieux et al., 2013). However, a closer inspection of available data shows that the most likely reason for this lies in the relatively low power of the present study. Both previously reported associations between trait measures of loneliness and a relative increase in the ratio of unknown/loose Facebook friends were small in magnitude (with absolute values of $r = .13$ reported by Lemieux et al. and $r = .14$ reported by Jin). This perfectly resembles the present findings both in direction and size of effect ($r = .100$), which show a slight association between higher levels of loneliness and an increased ratio of online-only Facebook friends.

In terms of Internet usage quantity, trait loneliness was neither related to overall nor content-specific (i.e. Facebook) use intensity, based on the reported results of bivariate correlational analyses. This finding adds further to a rather inconsistent picture of results regarding both Facebook (L. R. Baker & Oswald, 2010; Burke et al., 2010; Jin, 2013; Lemieux et al., 2013; Lin, 2016; Ryan & Xenos, 2011; Skues et al., 2012; Teppers et al., 2014) and general (i.e. content-independent) Internet use intensity (Davis et al., 2002; Engelberg & Sjoberg, 2004; Gross et al., 2002; Kraut et al., 1998; Matsuba, 2006; Moody, 2001; Morahan-Martin & Schumacher, 2003; Yoder et al., 2005; see also the results reported in chapter II). The perhaps most convincing evidence in this respect was derived from a study conducted in cooperation with Facebook, as reported by Burke et al. (2010) at the 2010 CHI conference in Atlanta. Based on server log data, objective indicators of total time spent on the site (averaged to hours per day) were found to be unrelated to participants' levels of trait loneliness. Whereas the present study

employed an ad hoc scale measure of Facebook activity (Cronbach's alpha: .822), the results are still in line with those derived from more objective indicators. As reported by Burke et al. (2010), however, the correlation of self-reported overall use with objective log data, albeit significant, was only moderate in size ($r = .45$), underlining the potential inaccuracy of self-reported estimates concerning Internet use (Junco, 2013; Scharkow, 2016). One possible solution to this may be the repeated and situated assessment of Internet use across a diverse range of contexts, as conducted within ESM studies (Moreno et al., 2012). The ESM method has been discussed to reduce recall and estimation biases inherent in the one-time assessment of information concerning psychological variables of interest (Scollon et al., 2003). In fact, when investigating the link between trait loneliness and (average) use levels of Facebook based on experience sampling data (Hypothesis 1b), divergent results were obtained. In the present multilevel analysis approach, trait loneliness was significantly associated with an elevated amount of Facebook use. This finding could be taken to indicate the higher importance of SNSs like Facebook in the lonely, since they might represent an environment offering social provisions that are unavailable in in-person life. In line with this interpretation, the present study found trait loneliness to be significantly associated with lower levels of social contacts (Hypothesis 2b). This pattern of results would be suggestive of a true behavioral manifestation of the discussed preference for online social contacts in the lonely (Caplan, 2003) or could be taken as a behavioral manifestation of social-compensatory use orientation (Teppers et al., 2014). However, this study did neither assess for Facebook-specific use motives nor specific types of Facebook activities as part of the ESM study protocol, thereby rendering this interpretation speculative. Future studies should try to assess different types of Facebook activities and both their relation to underlying Facebook use motives and indicators of psychosocial adaptation.

Another thing that should be kept in mind when interpreting the reported links between loneliness and person-averages of Facebook use and social contact behaviors is the fact that the considered ESM data points did not encompass all major parts of students' everyday life. Due to the employed data reduction procedure (see Section III.3.4.2.1), specific time periods (early mornings, late evenings) were completely dropped from the analyses to ensure data points that were as equidistant in time as possible, while containing all relevant information for analyzing predictions made at the situation level. This clearly reduces the generalizability of results, since person-level indicators of both Facebook use and social contacts were not entirely representative of participants' everyday life. Future work might try to investigate the validity of ESM-based estimates of Internet activity, by comparing their associations with both server

logs and the one-time self-reports. Based on the present results, it would seem that the choice of different assessment methods can yield quite different results in studies of loneliness.

5.1.3 Trait loneliness and Internet addiction

In line with previously reported findings, higher levels of trait loneliness were consistently associated with both indicators of generalized (content-independent) Internet addiction and Facebook addiction (Andreassen, 2015; J. Kim et al., 2009; Kuss et al., 2014). This pattern of findings also supports major predictions of the cognitive-behavioral model of Internet addiction (Caplan, 2003; Davis, 2001), which posits that it is the social features of the Internet environment that provide the lonely and socially inept with major social gratifications, making the technology “*the individual’s lifeline to the outer world*” (Davis, 2001, p. 193). Moreover, the present findings also show a strong overlap between Facebook addiction and generalized Internet addiction, as reflected in the strong association between respective trait indicators ($r = .585, p < .001$). This replicates previous findings from an international study reported by Montag et al. (2015) and highlights the importance of the social dimension in Internet addiction.

5.2 The role of state loneliness in Facebook use

The present study results concerning the role of state loneliness in driving situational use of Facebook clearly are in line with predictions. Not only was state loneliness a significant predictor of subsequent amount of Facebook use (generally confirming research Hypothesis 1a), but the size of its effects varied across persons and was shown to be conditional on levels of trait loneliness (confirming Hypothesis 1c), gender, trait social insecurity and Facebook addiction symptoms (confirming Hypothesis 1d).

The finding of loneliness-contingent Facebook use replicates findings reported by Kross et al. (2013) and implies that participants’ situational use of Facebook occurred, at least to some extent, in a manner that was responsive to their social need states. This interpretation is fully in line with findings derived from the ESM study of social media use conducted by (Z. Wang et al., 2012), who found social needs to be one among several needs predictive of social media use (besides emotional, habitual and cognitive needs). These findings also replicate cross-sectional findings by K. M. Sheldon et al. (2011), who were able to show that both in the case of satisfied and in the case of dissatisfied relatedness needs, people were driven toward increased use of Facebook. Furthermore, the positive association between dissatisfied relatedness needs and increased Facebook use was largely mediated by the tendency to cope with loneliness using Facebook. These findings imply that Facebook can indeed be used as a means of dealing with feelings of loneliness. This interpretation is also in line with the reported posi-

tive association between daily Facebook use time and the motivation to use Facebook in order to decrease feelings of loneliness (Teppers et al., 2014). In terms of effect sizes, however, these results should be qualified, since the presently reported effects of state loneliness on subsequent Facebook use are very small, making up for only 0.3% of the situation-level variance of Facebook use in the reported multilevel model (see Section III.4.3.4). Previously reported bivariate associations between Facebook use and indicators of loneliness/dissatisfied relatedness needs have also been of small effect size, at best (Sheldon et al., 2011: r values between .13 and .17; Teppers et al., 2014: r values between .02 and .21). In terms of practical significance, then, Facebook use at the situation level would appear to be largely unresponsive to social need states. However, it may well be that this responsiveness is contingent on situational factors unconsidered within the scope of the present study. For example, it could happen that periodic Facebook use was impossible due to situational constraints in participants' everyday life, such as course attendance, social activities or working hours. In such circumstances, one cannot expect to find any predictive associations between state loneliness and Facebook use. This problem of unconsidered situation specifiers might explain for the relatively low portion of only 7.3% explained variance at the situation-level in the final model (see Section III.4.3.4). Future studies should consider a more fine-grained specification of context information as an important background against which to assess the predictive role of psychological states in the use of social media.

5.2.1 Trait loneliness effects on state loneliness slopes

The nature of the moderating effect of trait loneliness on the situational contingencies between state loneliness and subsequent Facebook use implied that Facebook might be an important functional alternative in the regulation of social need states for the (trait) lonely. With increasing levels of trait loneliness, state loneliness became a stronger driver of subsequent Facebook use (see Section III.4.3.3.1), replicating the findings reported by Z. Wang et al. (2012). These authors showed a moderating effect of social support on the strength of associations between social need states and subsequent social media use. In those reporting lower levels of social support, social need states were more tightly linked to an increase in the amount of social media use (Z. Wang et al., 2012).

The present study results are also in line with predictions derived from the U&G framework and the MMT, in that individual differences in psychosocial adaptation do indeed exert influence on the ways that social media services like Facebook come to be used. It would seem then, that Facebook is a more important functional alternative for social need gratification in lonely people, as signified by stronger links between situational feelings of loneliness and the

amount of subsequent Facebook use. This pattern of findings is clearly in line with the assumption of an active audience that makes use of media options in targeted, need-responsive ways (Katz et al., 1973; Palmgreen, 1984). While modest in effect size (14.6% of explained variance in state loneliness slopes), trait loneliness played the role hypothesized and the obtained findings add to a rather small, but consistent body of empirical studies conducted at the situation level and within everyday settings, as reviewed above. This is also noteworthy from a methodological point of view, since the available studies (including the present one) differed widely in their ESM protocols adopted. While Kross et al. (2013) adopted a variable interval assessment schedule, assessing individuals at varying points of time, the present study and that of Z. Wang et al. (2012) employed fixed interval schedules. While the former schedule is commonly referred to as true “experience sampling” and is believed to yield a more representative and less expectancy-biased sampling of daily experience (Scollon et al., 2003), the latter approach clearly aids in the repeated and duration-based estimation of endorsed activities such as media use behaviors. As the present study also asked for estimates of time periods engaged in social interaction or Facebook browsing, this type of schedule was deemed more appropriate for the present purposes.

The present ESM study data also lend additional credence to a growing literature on the role of psychosocial deficiencies in the use and abuse of Internet services and suggest that lonely people might indeed strive to compensate for a paucity of social ties experienced in the in-person world by an elective and targeted use of media alternatives. This interpretation of findings is fully in line with the reasoning adopted by proponents of the cognitive-behavioral model of Internet addiction (Caplan, 2003; Davis, 2001) and highlights the fact that media stimuli might possess differential reinforcement value depending on person-level characteristics. Perfectly in line with this line of thinking is the ESM study finding of Shadur, Hussong, and Haroon (2015), who were able to show that greater fluctuations in daily negative affect were predictive of subsequent psychoactive substance use in a sample of adolescents. Moreover, and in line with the role of social support/trait loneliness in SNS use discussed above, levels of peer social support acted as effect moderator in these predictive relationships. Those adolescents who reported lower levels of social support engaged in this type of “self-medication” to a somewhat stronger degree. The striking similarity of results across different types of addictive stimuli (psychoactive substances, social media environments) is noteworthy and may be of relevance for the discussion of syndrome models of behavioral addictions (see Section III.5.2.3 below).

Other factors at the person-level that had a moderating effect on state loneliness slopes were gender, Facebook addiction and social insecurity. Although not explicitly hypothesized, these identified effects will be discussed in the following subsections.

5.2.2 Gender effects on state loneliness slopes

Results derived from the present sample revealed that state loneliness was a stronger driver of Facebook use in women ($p_{\text{lone_within*Gender}}: -.1375, p = .0245$). Probing of this interaction (with all level-2 scale measures centered at their grand-mean value) revealed that state loneliness slopes were positive and significant for female participants ($p_{\text{lone_within}_{\text{women}}}: .08775, p = .0006$), while they were slightly negative, yet insignificant for males ($p_{\text{lone_within}_{\text{men}}}: -.04977, p = .3632$). This could be taken to mean that women's situational use of Facebook appears in a manner more responsive to social need states.

While young adult women and men have been shown to employ their social support networks to comparable degrees when trying to cope with feelings of loneliness, women have also been shown to be more accepting and reflective regarding their loneliness experience (Rokach, 2001). Such differences in coping orientation might well translate to aberrant uses of social media services at the situation level. Moreover, there might also be subtle differences in the experience and meaning of loneliness depending on gender. First of all, there is evidence showing that women are more willing to openly express feelings of loneliness, which could be attributed to the process of gender socialization (Borys & Perlman, 1985). Such normative gender roles could explain an increased willingness of women to use social media as an active form of loneliness coping. Moreover, whereas men judge loneliness with respect to density-related qualities of their social network (cohesiveness and interconnectedness among sets of friends), women seem to judge loneliness with regard to the dyadic quality of interpersonal relationships (Stokes & Levin, 1986). As women also report to use Internet services, including Facebook, more for relationship maintenance and interpersonal communication (Mazman & Usluel, 2011; Muscanell & Guadagno, 2012; P. Sheldon, 2009; Weiser, 2000), the nature of their loneliness experience (potentially resulting from a lack of dyadic intimacy in a given situation) might be targeted more readily by Facebook and its' manifold opportunities to contact, browse or otherwise interact with (dyadic) friend profiles. In line with such a view, there are also indications for a greater vulnerability of women for engaging in excessive and under-controlled patterns of social media use (Andreassen et al., 2012; Cam & Isbulan, 2012; Thompson & Loughed, 2012; Turel & Serenko, 2012, but see: Müller et al., 2016; Pelling & White, 2009; Wu, Cheung, Ku, & Hung, 2013), commonly referred to by such terms as "Facebook addiction" (Ryan et al., 2014) or "social network site addiction" (Andreassen, 2015).

Hence it may be the better fit with the social provisions offered and those needed that drives women to use SNSs like Facebook in a social-need-responsive manner, eventually resulting in an increased risk for developing maladaptive usage patterns. Contrary to this interpretation, however, K. M. Sheldon et al. (2011) were unable to find moderating effects of gender on the strength of associations between unsatisfied relatedness needs and the amount of Facebook use. Nonetheless, the study of gender differences in social media use including Facebook has yielded some interesting results and clearly warrants further study.

It should be stated clearly, however, that the present findings should be taken as preliminary, since men were underrepresented in this study ($n = 15$). Hence, the reported findings await further replication in larger scale studies with more balanced gender ratios.

5.2.3 Facebook addiction effects on state loneliness slopes

Another interesting finding that emerged from this study is that addictive Facebook use tendencies were associated with a higher level of total Facebook use (BFAS: 1.1702, $p = .0004$), fully in line with present research on excessive and addictive forms of SNS use (Andreassen, 2015; Ryan et al., 2014). Moreover, higher addiction levels contributed to Facebook use that was more responsive to situational social needs, as indicated by state feelings of loneliness ($p_{\text{lone_within}} \cdot \text{BFAS}$: .0175, $p = .0061$, see also Section III.4.3.3.2). This finding could also be taken to mean that persons displaying higher levels of Facebook addiction engage in mood regulatory service use to a stronger degree. This interpretation fits well into the addiction science parlance, since mood regulation is regarded a core characteristic shared by the different expressions of the behavioral syndrome (T. B. Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Griffiths, 2005; Shaffer et al., 2004), also reflected in the official diagnostic criteria for gambling disorder (American Psychiatric Association, 2013).

In line with this consideration, there is convincing evidence available to suggest that addictive Facebook use can be linked to an underlying mood alteration motivation, as reviewed in detail by Ryan et al. (2014). Above that, there is also evidence to suggest that general deficits in the regulation of emotions are associated with SNS addiction. Using an ex post facto design, Hormes et al. (2014) were able to show that high levels of SNS addiction were associated with several emotion regulation deficits, such as a limited access to effective regulation strategies and less goal-directed/more impulse-driven behavioral styles when in negative affective states. This emerging field of study certainly deserves further consideration in future studies of addictive media use.

It might be then that the attempt at regulating negative mood states might be a commonality of central importance in the consummatory behaviors underlying different expressions of

the addiction syndrome. As already noted by Shaffer et al. (2004) in a conceptual discussion of the addiction syndrome, the assumption of shared vulnerabilities at the biopsychosocial level (e.g. emotion regulation deficits) is of great heuristic value, yet does not help anything in explaining the specific addictive pattern of object interaction endorsed by a respective individual. This certainly is a process hard to model, although heuristically it could be traced in a person's individual reinforcement history of object interactions against the background of his or her biopsychosocial characteristics. The various ways of negative mood alteration, i.e. experiencing negative reinforcement through engaging in specific behaviors such as alcohol use (Shadur et al., 2015) or social media use (the present study), might serve an example for such a heuristic. To the knowledge of the author, this study is the first to show a role for addictive Facebook use tendencies in the explanation of mood regulatory social media service use at the situation level.

Nonetheless, the present study and its limited time frame does not allow for definite answers regarding the role of addictive tendencies in this mood regulatory Facebook use. The study of such within-person processes against the background of an addiction conceptualization certainly affords more intensive and longitudinal study designs and awaits further investigations.

5.2.4 Social insecurity effects on state loneliness slopes

The present study revealed results with respect to social insecurity that are only partly consistent with the present state of empirical evidence. While only marginally significant, social insecurity was negatively associated with overall levels of Facebook use (U-Bogen 24: $-.1623$, $p = .0742$). Moreover, it moderated state loneliness slopes at a marginally significant level ($p_{\text{lone_within*U_Bogen 24}}: -.0035$, $p = .0560$). Probing of this interaction revealed that at higher levels of social insecurity, state loneliness was less strongly associated with subsequent amount of Facebook use.

This finding conflicts with social-compensatory accounts of Internet use and findings showing a stronger preference for online social communication in the socially anxious and insecure (Caplan, 2003, 2005, 2007; Pierce, 2009; Weidman et al., 2012). Studies actually investigating use behaviors, however, found different indicators of social anxiety such as shyness or “unwillingness to communicate” to be inconsistently, yet positively related to the overall use levels of Facebook (Shaw, Timpano, Tran, & Joormann, 2015; P. Sheldon, 2008a, 2013), contradicting the negative associations found in the present study. Moreover, since social anxiety and shyness have been linked to psychosocial deficits in the form of social isolation and loneliness (Asendorpf, 2000; Teo, Lerrigo, & Rogers, 2013), social-compensatory Facebook use motives

such as the alleviation of loneliness (through virtual *companionship*) have also been confirmed in relation to social anxiety in cross-sectional designs (P. Sheldon, 2008a). However, the present study showed effects of social insecurity that were opposite in direction, i.e. a reduced use of Facebook when in a lonely state. While the discrepant findings may be due to different conceptual and analytic designs, there is also some reason to believe that social anxiety might not necessarily translate to increased SNS use in lonely states. For example, in a rating study of Facebook profiles, Weidman and Levinson (2015) were able to show that profiles of people high in social anxiety could be recognized by objective features such as a low number of Facebook friends (not confirmed within the present study, see Table III.6), relationship status as single and a reduced amount of self-disclosure, such as an absence of status updates. This finding would suggest that part of a person's social anxiety is transferred to his/her Facebook account, potentially making the SNS an uncomfortable online environment when in a lonely state. As social anxiety has been reported to be associated with more passive uses of SNSs like Facebook (Shaw et al., 2015; P. Sheldon, 2008a), the social-compensatory use of web applications in the socially anxious might be restricted to those environments that guarantee for a greater degree of anonymity and escape from deficiencies felt in the in-person world.

5.2.5 *Situational uses and effects of Facebook use – open issues*

Clearly, the present study has revealed some interesting results that leave room for many different interpretations. Therefore, it would seem that this study has revealed more open issues than it could answer. Due to methodological and practical constraints, several aspects have remained untouched in the empirical analyses conducted, which should be mentioned nonetheless. First, the present study does not tell anything about the actual need-responsive uses endorsed when in lonely states. While it is interesting that Facebook is used in lonely states, it would be even more interesting to know exactly what it is used for in these circumstances. Loneliness has been associated with a broad range of divergent uses and use motivations concerning Facebook. Based on the presently available empirical findings, loneliness seems to be associated with more passive activities such as profile browsing, although lonely adolescents also reported to use it for rather active purposes such as social skills compensation, loneliness alleviation or for meeting new people (Teppers et al., 2014). Hence, the already mentioned lack of situational context information is complemented by a corresponding lack of precise information concerning the contents of Facebook use. Consequently, while interpreting the superficially observable pattern of loneliness-contingent Facebook use as a social-compensatory effort, future studies clearly need to identify when and in what form such social-compensatory use actually occurs.

Doing so might at the same time help shed light on another aspect that was completely unconsidered within the present study, i.e. the study of the actual effects resulting from the need-responsive use of Facebook. Interestingly, presently available studies at the situation level would imply that social media use including Facebook would not necessarily result in a relief of dysphoric mood states (Kross et al., 2013; Z. Wang et al., 2012). Whereas Kross et al. (2013) found Facebook use to lead to decrements in positive affect, Z. Wang et al. (2012) found that social media use, while gratifying emotional and cognitive needs, did not lead to a satisfaction of habitual and social needs. The study of psychological effects of social media use at the level of the situation is at its infancy and clearly warrants further study. The reviewed findings imply that it may not be mandatory for situational needs to be gratified within the same situational context in order to act as (cross-situational) drivers of social media use. An important conceptual question in this respect is the degree to which obtained gratifications at the situation level play a role in the long-term regulation of Facebook use behaviors. When negative situational emotional effects do not provide feedback on expectancies and motivations regarding Facebook use and actual use behaviors, this would pose significant problems for the U&G account of media attendance (Palmgreen, 1984). If Facebook is inept at relieving state feelings of loneliness, why should one use it when in lonely state? Could it be that it is effective only in specific situations (e.g. in the evening, when a lonely student is lacking the mandatory social transactions inherent in structured university life)? Could it be that these situation-specific positive effects nonetheless contribute to favorable overall appraisals of the SNS and cross-situationally relevant, action-guiding expectancies? Questions to these answers are far beyond the possibilities of the presently employed design, yet clearly should be regarded as central so as to arrive at a truly informed account of social-compensatory Facebook use.

5.3 The role of state loneliness in situational social contacts

The findings concerning situational social contacts implied that state feelings of loneliness indeed played a role in the regulation of subsequent social contact behaviors, generally confirming the posited research Hypotheses 2a and 2b. Nonetheless, findings concerning the situation level were far more complex than anticipated and should be discussed in more detail. First, state loneliness had a quadratic effect on subsequent contact behaviors ($p_{\text{lone_within}^*p_{\text{lone_within}}}$: .0029, $p = .0323$), with the nonlinear effect being convex in nature. Findings implied that both at low and at high levels of state loneliness would subsequent levels of social contact be higher (compared to moderate levels of state loneliness). Moreover, the size of loneliness effects was also contingent on the amount of preceding social contacts ($p_{\text{CON}^*p_{\text{lone_within}}}$: -.00282, $p = .0035$), which by themselves had positive effects

on subsequent social contacts depending on type of day ($p_{\text{CON}_{\text{workday}}}$: .2502; $p_{\text{CON}_{\text{weekend}}}$: .4030; both p 's < .0001). Probing of these conditional quadratic effects of loneliness revealed that differences in subsequent social contact, as conditioned by differences in the amount of previous social contact, tended to dissipate at higher levels of state loneliness (see Figure III.8). This means, when a subject stated to feel not lonely at all after high amounts of social interaction, this was associated with higher levels of subsequent social interaction (compared to a subject stating no loneliness after a period of zero social contact). On the other side, as subjects reported higher levels of loneliness, those who had zero social contacts in the preceding time period showed an earlier and steeper increase in subsequent social interaction (orange lines) and the difference in subsequent social contact levels dissipated, at least for workdays (left panel of Figure III.8).

These findings are generally in line with the social affiliation model (Hall, 2016a; O'Connor & Rosenblood, 1996), which predicts high continuity in social contexts (social contact vs. solitude) in case of being in desired momentary social states. When participants did not feel lonely at all after having zero social contacts, they would subsequently engage in only low levels of social contact. When they did not feel lonely after having very high levels of social contact, they would continue to engage in this high level of social contact behaviors. Therefore, the absence of state loneliness after different forms of social encounters could be taken to indicate the feeling of being in an elected social context. However, the experience of state loneliness would seem to be of differential motivational significance depending on the level of preceding social contacts. After having zero social contacts, state feelings of loneliness would appear to be a rather straightforward driver toward social reconnection, as signified by the early and steep increases in subsequent social contact levels in such circumstances (orange lines in Figure III.8). In this context, loneliness would seem to be a rather straightforward indicator of being in a non-desired context of solitude. In conditions of high levels of preceding social contacts, however, state loneliness would seem to be associated with rather ambivalent behavioral consequences depending on the intensity of the experience. At low-to-moderate intensity, state loneliness would seem to lead to some reductions in subsequent social contact behaviors (see the red lines in Figure III.8). In terms of the social affiliation model, then, while still signifying a misfit between desired and experienced social context, feelings of loneliness might also lead to some decreases in subsequent social contact behaviors. This interpretation would suggest that in case of “feeling lonely in a crowd” (i.e. after having high levels of social contact), people are driven away from continued social engagement. Alternatively, this finding could be interpreted to mean that state feelings of loneliness might also encompass some anticipatory appraisal of subsequently (un)available social provisions. At high levels of state loneliness,

however, the motivational drive toward social reconnection would seem to prevail ratings of state loneliness, given their association with increases in subsequent social contact behaviors (red lines in Figure III.8).

To the knowledge of the author, this is the first study to show a role for (aversive) feeling states in the regulation of quantitative aspects of subsequent social contact behaviors at the level of situations encountered in everyday life. The findings are largely in line with theoretical conceptualizations of loneliness and suggest that it signifies unmet social needs and indeed drives people toward social reconnection and the eventual attainment of the opted-for social provisions (Schwab, 1997; Weiss, 1973). Nonetheless, this study also provided evidence for some ambivalent meanings of state loneliness, as the experience has also been associated with decreases in subsequent social contact behaviors, potentially indicative of “feeling lonely in the crowd.” Future studies should try to identify the specific contexts giving rise to such experiences and whether factors of the person may explain for this. As neither trait loneliness nor other trait indicators considered within the present research could account for the significant inter-individual variance in state loneliness slopes (disconfirming hypotheses 2c and 2d), it remains to be seen whether there exist between-person differences in the interpersonal regulation of social affiliation needs through in-person social contact behaviors. The study of specific social contexts and person factors relevant in the adaptive regulation of social interactions might help to identify specific aspects of student life that could be tackled to aid psychosocial adaptation to the university context.

5.4 Methodological and conceptual limitations

In this section, the present research findings will be qualified against the background of several methodological and conceptual limitations. Potential remedies and open issues for further studies will also be highlighted in this context.

One of the most obvious limitations pertains to the employed study sample, mainly comprised of Psychology freshmen in their first academic year after study entry. Moreover, as the present sample is a convenience sample of questionable representativeness, the findings of this study need to be taken as preliminary and need to be replicated in other samples of university students. This is especially true for the low number of male participants that could be recruited during this investigation. Hence, future studies should try to replicate the current findings in larger, gender-balanced populations beyond the university student population in order to check for the robustness of the presently reported effects of state loneliness.

In terms of power, the sample size N of 65 participants was comparable to that of other ESM studies of social media use (Kross et al., 2013; Z. Wang et al., 2012), with an average

number of sampled situations (per subject) n above 50. While these numbers compare fairly to those of other published studies, it should be stated clearly that no formal a priori estimation of required sample sizes at the different levels of the data hierarchy were performed, as suggested by experts in the field (Heck et al., 2014; Snijders & Bosker, 2012). Despite the lack of a priori estimation of required sample sizes at different levels of the data hierarchy, the study findings imply that there was sufficient power in the multilevel analyses conducted in order to detect even small effects. This is especially true for the small effects found for state loneliness in predicting subsequent Facebook use (explaining only 0.3% of situation-level variance). As already discussed above, it is at present unclear what size of effect in the explanation of social web application use can be expected at the situation level. While cross-sectional studies have already implied that it is cumbersome to predict media use behaviors from psychological characteristics (LaRose & Eastin, 2004; LaRose, Mastro, et al., 2001), with explained variance in media use seldom exceeding 5–10%, the author was unable to find comparative information for social media use at the situation level. It is clear that different situations allow for social media use to highly varying degrees. This naturally limits the predictability of such use from psychological states, since contextual constraints will at times prohibit use irrespective of individual need states. Conversely, situational factors might at times promote media use irrespective of psychological states. This may even occur during in-person social interaction, when one is hinted at some interesting status update of a friend's profile or when automated notifications of the social media service prompt a visit to the site. Hence, establishing a predictive role of psychological states in subsequent Facebook use, indicative of need-responsive uses of the service, would seem to require a more fine-grained and situated account of the potential context of use. While the present study has not much to offer in this respect, it nonetheless provides evidence in support of this notion: while the amount of preceding Facebook use generally was positively associated with the amount of subsequent Facebook use, it could be shown that the strength of this association was contingent on time of day (p_{FB*dh} : .1064, $p = .0006$). Before 3.15 (p.m.), preceding Facebook use was less strongly associated with subsequent use ($p_{FB_{dh=0}}$: .0938, $p = .0084$) than in situations later in the afternoon/evening ($p_{FB_{dh=1}}$: .2002, $p < .0001$). This clearly shows that the consideration of contextual information helps in determining the situational contingencies of media use behaviors. Although neither time of day nor type of day (workday vs. weekend) proved to moderate state loneliness slopes, future studies should attempt at collecting more fine-grained contextual information in order to arrive at more conclusive findings concerning specific types of situations in which social need responsive Facebook use occurs. Such a study should also try to incorporate measures of the enacted

Facebook uses at the situation level in order to clarify what forms the situational use of Facebook might take depending on psychological states.

Several factors led to the decision to not incorporate additional measures of situational context and precise Facebook uses, which should be mentioned and discussed in some detail. First, as the employed ESM protocol was intense in nature both in terms of duration (two weeks of study period) and intensity (up to seven assessments per day), there was a need to restrict data collection to a certain degree to ensure high levels of protocol compliance (which was excellent: 94.27%). Given the high compliance rate achieved, one might nonetheless try to include a larger amount of questions in the individual assessment questionnaires in future studies. A second limitation that hindered the inclusion of too many questions was the use of rather outdated Palm PDA devices, which did not provide the ease of handling necessary for more comprehensive questionnaire assessments. This problem could be tackled by the employment of more up to date procedures both in terms of ESM software and technical devices. There are several freeware and commercial ESM software solutions available for use on mobile devices such as smartphones (Conner, 2015, May). Ideally, an ESM software solution should be chosen to be usable on participants' private mobile phones, since this would be both an economical and unobtrusive solution. However, the different available software solutions differ in their applicability on different operating systems, hence eventually affording additional costs for equipment acquisition such as compatible smartphones. Equipping some participants with study phones might introduce some bias, as they might continue to use their own mobile phone during the ESM period and hence experience more subject burden. Another possible solution could be the use of online survey applications like Limesurvey™ (LimeSurvey Project Team & Schmitz, 2012) hosted on a web server. However, such a solution would require continuous Internet access and mobile phone reception, potentially introducing bias into the data due to systematic non-availability of contextual media use information in certain subjects. The presently employed solution guaranteed for a comparable amount of subject burden and ensured the operability of questionnaires irrespective of location and time. Nonetheless, future studies should attempt to employ more convenient procedures of data acquisition in order to allow for a more fine-grained inquiry of information, while at the same time ensuring a high compliance rate. As this is an active field of development, feasible and affordable solutions for scientific purposes can be expected to be available soon.

Another aspect worth mentioning is the use of scale-based measures both of psychological traits (loneliness, social insecurity, Facebook addiction etc.) and of states (Facebook use, social contacts, state loneliness/affect/worry). There is some reason to believe that subjective estimates of Internet use behaviors are quite inaccurate and do not necessarily correspond well to

objective use data obtained from server logs or other forms of monitoring software (Burke et al., 2010; Junco, 2013; Scharnow, 2016). As already discussed above, the present study sought to address this inaccuracy by the adoption of a fixed interval ESM protocol. This was thought to reduce recall biases and to aid in interval-based duration estimates for both Facebook use and social contact behaviors (see Bolger & Laurenceau, 2013, chapter 2, for a general discussion on ESM designs). Nonetheless, one can expect these assessments to contain a certain amount of measurement error, e.g. estimation error resulting from varying delays between Facebook use episodes and questionnaire recordings. As suggested for ordinary (1-level) path and regression modeling, a possible remedy to the problem of measurement error can be found in structural equation modeling (Kline, 2015). This model-based approach explicitly tries to estimate the correlative associations among dependent and independent variables based on latent variables (derived from a prespecified measurement model based on observed indicator variables) and thereby tries to correct the construct of interest from error inherent in its measurement (Kline, 2015). In the multilevel analytic context, comparable procedures are available and known as “*multilevel structural equation modeling*” (du Toit & Toit, 2008; Kline, 2015; Muthén, 1997). The present study abstained from these statistical procedures as they afford multiple observed indicator variables for each (latent) construct. This requirement was not met by the present study as it assessed psychological states with single questionnaire items. To the knowledge of the author, there is at present no established scale measure available to assess state loneliness at the situation level. There are, however, short versions of established scales with acceptable psychometric quality when used as trait indicators. For example, Hughes, Waite, Hawkey, and Cacioppo (2004) developed a three item loneliness scale derived from the UCLA loneliness scale and were able to demonstrate satisfactory levels of internal consistency and concurrent and discriminant validity. Adopting such ultra-short scale measures to the situation level in order to assess psychological states might be a fruitful research endeavor for the future (see Brähler et al., 2013, for a compendium of short and ultra-short scale measures in German language). When established, such data could be subjected to multilevel structural equation modeling procedures.

A conceptual limitation that should not be overlooked in the presently adopted research design pertains to the interpretation of causality in non-experimentally manipulated psychological states. As this study adopted the logic in the field, “*using the person as his or her own control*” (Bolger & Laurenceau, 2013, p. 71), within-subject variations in state feelings of loneliness were conceptually treated as the manipulated independent variable, while effects on subsequent Facebook use were treated as the resultant dependent variable. The implied causality in this conceptual arrangement runs risk of being invalid when the employed time lag

analysis fails to capture relevant effects resulting from the temporal order of events (see Bolger & Laurenceau, 2013, chapter 5 for a more thorough discussion of this topic). For example, this study did not consider the temporal order of assessments within each day. This assumes that a loneliness-induced Facebook use will not influence the loneliness–Facebook connection later that day (i.e. there is no “saturation” of the loneliness-induced Facebook use within as well as across days). Given the untested nature of this assumption, the implied causality of the present findings should be treated with some caution.

Likewise, as the study period of two weeks was of rather short duration, another conceptual limitation should be noted. In other words, the sampled media use episodes of the ESM period should be regarded only as a snapshot of participants’ media use behaviors and their contingencies. Therefore, the obtained between-person differences in within-subject processes (i.e. trait-loneliness contingent differences in state loneliness slopes) should be regarded as correlational in nature. While there is both empirical (Teppers et al., 2014) and conceptual (Caplan, 2003) reason to believe that psychosocial traits like loneliness are causally related to media use motives and behaviors, a causal interpretation of the present findings would seem to be justified. Nonetheless, actually proving how traits are influential in systematically changing the situational contingencies between psychological states and behaviors over longer periods of time would be very interesting. One could hypothesize that relative changes in trait levels of loneliness might be influential in changing situational contingencies between state loneliness and Facebook use. For example, a trait lonely university freshman might show rather strong tendencies to use Facebook when in lonely states. As s/he manages the transition to the university context successfully and engages in highly satisfying social relationships, his/her levels of trait loneliness might decrease. It would be interesting to see whether this relative decrease in trait loneliness would be associated with concomitant changes in the contingencies between state loneliness and Facebook use. From a U&G point of view, as a person gains access to additional functional alternatives for respective (social) need satisfaction, there might also be a change in his/her (media use) behaviors aimed at satisfying these needs. Studying such longer-term processes hence might provide valuable information concerning some of the key concepts of media use accounts, but are likewise of interest from a psychosocial point of view.

IV. Social compensatory Internet use in the lonely: a summary and general discussion of findings

1. Morphine-ingesting rats and Facebook junkies – where is the link?

In a series of animal studies conducted by Bruce Alexander and his colleagues during the late 1970s, the role of social context in the regulation of addictive behaviors could be demonstrated (Alexander, Beyerstein, Hadaway, & Coombs, 1981; Alexander, Coombs, & Hadaway, 1978; Hadaway, Alexander, Coombs, & Beyerstein, 1979). These researchers started off with the hypothesis that psychoactive drug self-administration in research animals might be an artifact of the employed experimental protocol, which frequently involves animal testing to be conducted in social isolation. In order to test this hypothesis, they built a large rat cage (8.8 m²) meant for group housing that also allowed for climbing, playing, nesting, mating and other natural behaviors of these mammals (Alexander et al., 1981). In their studies, they compared the effects of isolation-rearing versus colony-rearing on preferences for different doses of vehicle-dissolved morphine hydrochloride (vs. sucrose-flavored water), as assessed by oral self-administration. A general finding of their studies was that colony-reared rats would show a much weaker tendency to consume oral morphine, even in conditions of former isolation-rearing and repeated morphine exposure (Alexander et al., 1981). In discussing these results, Alexander himself did not believe this elevated consumption in isolated rats would occur due to a heightened reinforcement value of the drugs due to isolation-induced vulnerability, such as *“that morphine may reinforce isolated rats by relieving stress resulting from social and sensory isolation”* (Alexander et al., 1981, p. 574). During that time, the researchers favored a protective account of the role of social inclusion and species-appropriate living conditions that would diminish the reinforcement value of morphine, such as *“that colony rats avoid opiates because opiate consumption interferes with the performance of complex, species-specific behaviors [...] and that species-specific behaviors are self reinforcing”* (p. 574). Decades later and after years of historical and anthropological studies, in discussing parallels between the historically documented massive increase in addiction rates in Native American populations and findings from the “rat park” experiments, Alexander comes to a clearer point of view: *“[...] in both cases, the drug only becomes irresistible when the opportunity for normal social existence is destroyed”* (Alexander, 2010).

While such a strong sociocultural account of addictive behavior might be overly simplistic given the many identified bio-psycho-social factors involved in the etiology of addictive disorders (Griffiths, 2005; Marlatt et al., 1988; Meyer & Quenzer, 2013; Shaffer et al., 2004;

Thombs, 1999), these animal findings nonetheless are of heuristic value in highlighting the fact that (addictive) stimuli like psychoactive substances might differ in their reinforcement value depending on factors of the social context experienced by a respective individual. Although not unequivocally, comparable animal findings have been obtained using other experimental procedures or psychoactive substances (Neisewander, Peartree, & Pentkowski, 2012). These behavioral observations are complemented by neurobiological evidence elucidating the connection between social exclusion and drug-seeking behaviors at the brain level (Heilig, Epstein, Nader, & Shaham, 2016; Neisewander et al., 2012).

Against this background, the studies presented herein could be taken to expand the scientific focus to potentially addictive Internet use behaviors and their relation to states of social isolation and loneliness. While the adoption of an addiction perspective might seem odd in studies of Internet use, even decades ago, addiction scientists felt at ease with a broad definition of addictive behaviors, conceptualizing “*addictive behavior as a repetitive habit pattern that increases the risk of disease and/or associated personal and social problems*” (Marlatt et al., 1988, p. 224). A discussion of this broad conceptualization has recently been re-invoked by proponents of syndrome/component models of addiction (Griffiths, 2005; Shaffer et al., 2004) and culminated in a re-conceptualization of the addiction disorders section of the DSM-5 (American Psychiatric Association, 2013) to include gambling disorder as the first officially acknowledged form of behavioral addictions. Acknowledging phenomenological (Grant et al., 2010; Griffiths, 2005; K. P. Rosenberg & Feder, 2014) and neurobiological (Burkett & Young, 2012; L. Clark et al., 2013; Hone-Blanchet & Fecteau, 2014; Leeman & Potenza, 2013; Olsen, 2011) commonalities in the different expressions of addictive behaviors is but one task, however. The other one, way harder to accomplish, involves explaining how the different behavioral manifestations of the addiction syndrome evolve (Shaffer et al., 2004). This certainly is a process hard to model, although heuristically it could be traced in a person’s individual reinforcement history of object interactions against the background of his or her biopsychosocial characteristics. The various and negatively reinforcing ways of alleviating a person’s feeling of loneliness might serve an example in this respect. One way to do so might be the establishment and use of virtual social contacts by means of the Internet. Likewise, successfully dampening the aversive feelings by means of alcohol (see Åkerlind & Hörnquist, 1992, for a thorough discussion) or distracting from them by means of entertainment media consumption might induce sought-after effects that each in its own right might trigger a vicious cycle of addiction, as such use shifts from occasional to habitual or even uncontrollable. In this context, a compensatory account of addiction was proposed and described as follows: “*Central [...] is the notion that addiction can best be understood as learned adaptive or functional behavior in the*

context of personal and environmental factors - i.e. that drug use or other addictive activity is motivated by the individual's attempt to adapt to stress (including stress associated with the consequences of drug use) rather than by simple exposure to addictive substances" (Marlatt et al., 1988, p. 226). This negative reinforcement account of addiction basically is in line with current theoretical conceptualizations of Internet addiction such as the cognitive-behavioral model proposed by Davis (2001). However, as noted by Kardefelt-Winther (2014a), the study of different forms of Internet addiction is currently lacking a consideration of the amenability and dynamic nature of deemed risk factors/ stressors, often treating the Internet - just like psychoactive substances - as a stimulus environment providing reinforcement in highly fine-tuned, reliable and user driven ways, making it potentially addictive (Greenfield, 2011). Contrasting this rather deterministic and linear account of Internet addiction risks ('engagement increases risk'—just as in psychoactive substances), Kardefelt-Winther (2014a) recently suggested an alternate framework for the evaluation of compensatory Internet use. According to his view, considering how psychosocial factors come to influence the reasons and motives underlying a person's Internet use might open up a coping-oriented view of (compensatory) Internet use (Kardefelt-Winther, 2014a). In considering what people are lacking and how they eventually trying to cope with this lack, valuable insight into the dynamics of addicted Internet use could be gained.

Based on this reasoning, the present studies sought to investigate the contingencies between psychosocial factors of the person and his/her Internet use behaviors. Starting off from the U&G account, media use was regarded to follow from active and need-oriented choice processes that led to behaviors aimed at respective psychological need satisfaction (Katz et al., 1973; Schenk, 2007; Schweiger, 2007). Against this background, several testable hypotheses were posited: as loneliness is believed to result from a (perceived) lack of social provisions (Peplau & Perlman, 1982b; Perlman & Peplau, 1982; Schwab, 1997; Weiss, 1973), it was assumed that Internet services with the potential to satisfy social needs would represent a more important functional alternative for respective need fulfillment in the lonely. In order to test this assumption, a study of situational Facebook use was conducted (see Chapter III). Using state feelings of loneliness as an indicator of unmet social needs at the situation level, state loneliness was hypothesized to increase the subsequent use of the social network site. Moreover, the importance of this social need regulation mechanism was hypothesized to be of greater importance for those with a lack of satisfying social relationships, i.e. the trait lonely. Therefore, it was expected to find larger state loneliness-induced increases in subsequent Facebook use in those with high levels of trait loneliness. Another, yet related set of predictions pertained to the motivational underpinnings of Internet use (see Chapter II). In line with available

empirical evidence, it was posited that loneliness would be associated with social-compensatory Internet use motives, e.g. the tendency to use it in order to alleviate feelings of loneliness, to obtain emotional support or to express ones true self more freely (Brand, Laier, et al., 2014; Caplan, 2003; Hollenbaugh & Ferris, 2014; Matsuba, 2006; Morahan-Martin & Schumacher, 2003; Teppers et al., 2014). Based on the cognitive-behavioral model of Internet addiction (Caplan, 2003; Davis, 2001), which puts large conceptual emphasis on psychosocial deficits believed to be the core of Internet addiction, it was expected to find that social-compensatory Internet use motives would be associated with higher levels of Internet addiction. Given the reduced availability of in-person sources for the satisfaction of social needs in the lonely, a stronger motivation for social-compensatory Internet use may indicate the degree to which the Internet is perceived as the one-and-only functional alternative in the satisfaction of such needs. Given this, it was expected to find some usage-contingent effects of loneliness on Internet use orientations: only when the Internet is used for social purposes (i.e. as a means of satisfying social needs unmet in in-person life), lonely people will report social-compensatory use motives, which in turn might increase their risk to get hooked to the Internet. This conceptualization can be taken to reflect some of the propositions outlined in the account of compensatory Internet use by Kardefelt-Winther (2014a).

2. The quest for social-compensatory Internet use in the lonely

The research questions and derived hypotheses were investigated in two studies conducted within university student populations. The focus on these populations can be justified for several reasons: university student populations have been shown to suffer from social contact problems quite frequently (Hahne, 1999) and the experience of loneliness in this age group has been shown to be a quite common phenomenon (Qualter et al., 2015; Rokach, 2000; Schöb, 2001). Moreover, the age group of adolescents and young adults has been shown to be highly equipped with mobile Internet-ready devices and to use the Internet for a variety of different purposes including the alleviation of loneliness (Breunig & Ridder, 2015). Given this, university students appeared to represent a suitable population to look for answers to the research questions posited.

2.1 Moderating effects of social web application use on Internet addiction risk (Study 1)

The first study was cross-sectional in nature and encompassed an online survey that was delivered to a convenience sample of university students from German-speaking countries. Student representatives of various fields of study were contacted and asked to forward an appeal to contribution containing the web link of the survey to their fellow students. The employed re-

cruitment and data reduction procedures yielded a final sample of 445 students that were included in the analyses. The survey questionnaire asked for a host of sociodemographic and Internet use information and included measures deemed to assess several dimensions of Internet use motives and the severity of an Internet addiction syndrome. Besides this, established scale measures assessing different aspects of psychosocial adaptation (loneliness, social support, self-esteem, self-efficacy beliefs, career-related strain, stress levels, coping behaviors, impulsivity) and mental health (depression, generalized anxiety disorder, social phobia, ADHD, substance abuse symptoms) were also given.

In order to assess the mediating role of social-compensatory Internet use motives in the association between loneliness and Internet addiction, a conditional process model of Internet addiction was developed (Hayes, 2013). During model development, a parallel multiple mediator model served as a starting point. As derived from exploratory factor analysis, scale indicators of three different Internet use motives (information & learning, fun & entertainment, social & personal unfolding) were included as mediator variables. While the initial findings demonstrated a partial mediation of loneliness effects through two of the Internet use motives (fun & entertainment, social & personal unfolding), the indirect effect through fun-related use motives could not be substantiated throughout model development and proved to be spurious. Having established the mediating role of social-compensatory Internet use motives, the next step of model development provided a test of the hypothesis that this mediating effect would be conditional on employed levels of social web application use. In order to test for both the existence and the specificity of this hypothesized moderation effect, a first stage moderated parallel multiple mediator model was developed (Edwards & Lambert, 2007), in which loneliness and the intensity of social web application use were modelled to interactively shape the strength of Internet use motives. This analysis showed that there indeed was a significant interaction between loneliness and the intensity of social web application use and that this effect was specific for the social-compensatory Internet use motives: the higher the levels of social web application use, the stronger the link between loneliness and social-compensatory Internet use motives. This also translated to a significant conditional indirect effect of loneliness on Internet addiction. With increasing levels of social web application use, loneliness was more tightly associated with Internet addiction, and this was due to the conditional indirect effects of loneliness through social-compensatory Internet use motives. This conditional indirect effect proved to be robust, in that the inclusion of several sociodemographic, psychosocial and mental health covariates did not essentially change the pattern of results.

While the conditional indirect effect of loneliness through social-compensatory Internet use motives was in the expected direction and clearly is in line with an account of compensatory Internet use, it should not be overlooked that it was of only small magnitude. The inclusion of the interaction term between loneliness and social web application use intensity accounted for only an additional 1.3% of variance in social-compensatory use motive scores. Additionally, loneliness was significantly and indirectly associated with Internet addiction irrespective of social web application use (i.e. even when a person's Internet use did not encompass any social web applications). While these findings may also be due to some unconsidered methodological factors, they would suggest that lonely persons' Internet use may not need to include the use of social web applications in order to be social compensatory in orientation and to be associated with Internet addiction. The significant unconditional indirect effect portion of loneliness is clearly contrary to hypothesis and not easy to reconcile with a strict account of social-compensatory Internet use, such as the one suggested by Kardefelt-Winther (2014a). The present findings could be taken to mean that lonely people are drawn to some features of the Internet environment helping them to compensate for psychosocial deficiencies felt in the in-person world and that these features need not necessarily be related to social purposes. This finding is interesting and generally in line with predictions derived from the original cognitive-behavioral model of pathological Internet use (Davis, 2001). For Davis, the Internet environment per se was a source contributing to maladaptive cognitions (about the self and the world; e.g. negative self-efficacy beliefs or expected failure in real-life social contexts) in those experiencing social isolation. While acknowledging that social features and services like chat rooms and emails might be an important aspect of such persons pathological Internet use, Davis (2001) also noted that it may also be pastime and procrastinating uses of the technology that may endanger the development of Internet addiction. The present study findings would suggest that both social feature use and other-purpose uses of the Internet are involved in the development of social-compensatory Internet use motives. They hence are generally in line with the major predictions of this modeling framework and exemplify how actual amount and type of Internet use can meaningfully be integrated into empirical evaluations of the cognitive-behavioral model of Internet addiction.

2.2 Moderating effects of loneliness in the situational uses of Facebook (Study 2)

The second study presented herein was an experience sampling study of situational Facebook use conducted in field settings. A convenience sample of 65 participants (15 males, 50 females), mainly consisting of Psychology freshmen during their first academic year, was recruited and reported on their feeling states (affective well-being, worries, loneliness feelings) and

Facebook use behaviors up to seven times per day and throughout a study period of two weeks. Protocol compliance to the employed fixed-interval assessment schedule was excellent (94.27%). Due to the employed data reduction procedures, a total of 3341 sampled situations were considered for the main analyses involving multilevel modeling. Besides the ESM data, a priori and post hoc questionnaires assessed for several person-level characteristics including basic sociodemographic and Internet use information. Additionally, these questionnaires included established measures of psychosocial adaptation and mental health (loneliness, self-esteem, social insecurity, coping behaviors, satisfaction with life, depression), as well as scales deemed to assess general and Facebook-specific forms of Internet addiction.

In order to account for the nested nature of the data (i.e. repeated situational assessments “nested” within the same individual), a multilevel analytic framework was chosen for testing the study hypotheses (Bolger & Laurenceau, 2013; Nezlek, 2012; Snijders & Bosker, 2012). Following the rationale outlined in Heck et al. (2014), the statistical model was developed in several steps, starting at the lowest level of the data hierarchy (i.e. the situation level) and building upward (i.e. to the person level). In these analyses, situation-level Facebook use was used as a criterion measure and state loneliness as an indicator of situationally unmet affiliation needs. Generally in line with predictions, these analyses revealed a significant, yet gender-disparate effect of state loneliness on subsequent levels of Facebook use. For women, state loneliness was significantly and positively associated with the subsequent amount of Facebook use, whereas for men the association was slightly negative and insignificant. Likewise, at the person-level, higher levels of trait loneliness were associated with higher levels of (average) Facebook use across situations. Perfectly in line with predictions, the size of state loneliness effects on subsequent Facebook use varied across persons and part of this variability could be accounted for by a person’s level of trait loneliness. Probing of this cross-level interaction revealed that at higher levels of trait loneliness, state feelings of loneliness were a stronger driver of subsequent Facebook use.

While the pattern of these findings was generally in line with the research hypotheses, an evaluation of obtained findings in terms of effect size showed that state and trait loneliness indicators could only explain a small portion of variance in Facebook use and its situational contingencies. At the situation level, state loneliness made up for a meager 0.3% of variance in situational Facebook use, whereas loneliness accounted for 4.5% of between-person variability in average Facebook use. Moreover, the cross-level interaction term including trait loneliness accounted for 10.8% of between-person variability in state loneliness slopes. Thus, although the pattern of findings is in line with the account of compensatory Internet use (Kardefelt-Winther, 2014a), they should not be over-interpreted to show the centrality of (social com-

compensatory) Facebook use in the lonely. Moreover, other identified cross-level interactions indicated that the “social need”-associated regulatory dynamics of Facebook use are not solely governed by a person’s level of trait loneliness, but also influenced by other factors such as gender, social insecurity or the degree of experienced Facebook addiction. This lack of specificity could be taken to mean that a broader set of stressors, environmental pressures and psychosocial problems might play a role in the evolution of social-compensatory Facebook use.

3. When uses and gratifications help to understand Internet use of lonely persons

Turning back to the initially posed conceptual questions, loneliness indeed was related to the use of the Internet medium. The general pattern of findings that emerged from the present studies is that the Internet represents a media environment with a certain appeal to lonely persons. The following subsections will integrate the obtained findings into the greater conceptual underpinnings of the present research program and discuss their implications in terms of questions answered and unresolved.

3.1 The uses and gratifications account of Internet use in the lonely

The U&G account explicitly states that media use behaviors are active and contingent on the need structure of a person (Katz et al., 1973; Palmgreen, 1984; Schenk, 2007; Schweiger, 2007). Moreover, the effects sought, as well as those actually obtained from this targeted use, are represented cognitively as so-called gratifications (Katz et al., 1973; Palmgreen, 1984). The effects sought from media use can be regarded as the motives driving media use in a need-contingent manner (Schweiger, 2007). Only when the gratifications sought from a medium are obtained through its use in a consistent and reliable manner, will use of that medium be maintained (Katz et al., 1973; Palmgreen, 1984). Therefore, higher consumption levels of specific media content (such as social web applications) could be regarded as an implicit indicator of positive cost-benefit ratio in terms of social gratification obtainment. These cost-benefit ratios are assumed to vary across persons and to result from psychosocial characteristics and societal influences (Rubin & Windahl, 1986; Schweiger, 2007). Based on these lines of reasoning, one could expect to find lonely people to evaluate social media including social Internet services more favorable in terms of their social gratifications. And if they do so at the molar (i.e. the cross-situational level), it might also be that these media are used in a manner highly responsive to the situational social need states of the lonely person.

3.2 Social media dependency in the lonely?

In line with these major predictions, there was consistent evidence for social-compensatory Internet use in the lonely. This could be shown at the level of social-compensatory use motives (Study 1, Chapter II) as well as at the level of situational use behaviors (Study 2, Chapter III). While accounts of loneliness coping before the Internet age showed a rather passive and escapist picture of media use in the lonely (Perse & Rubin, 1990; Rubenstein & Shaver, 1982a; Rubin et al., 1985), the present findings add to a body of research showing that lonely persons peak on social-compensatory Internet use motives and seem to cope with their loneliness experience in targeted ways (Brand, Laier, et al., 2014; Caplan, 2003; J. Kim et al., 2009; Morahan-Martin & Schumacher, 2003; K. M. Sheldon et al., 2011; Teppers et al., 2014; Z. Wang et al., 2012).

The present findings hence show how psychological and media use accounts can be meaningfully integrated in the study of use behaviors and their resultant effects, such as Internet addiction. Both the conducted studies revealed significant associations between trait indicators of loneliness and content-independent as well as content-specific forms of Internet addiction. While this finding is in line with the cognitive-behavioral model of Internet addiction (Caplan, 2003; Davis, 2001), it can also be reconciled with a media dependency perspective (Rubin & Windahl, 1986). When social and personal characteristics reduce the likelihood of using interpersonal communication channels for the satisfaction of social needs, then mediated channels such as the Internet might become viable functional alternatives providing similar or even better gratifications. This entails the risk of dependent media relationships, where the satisfaction of a person's needs becomes solely contingent on the provisions a respective media channel has to offer (Rubin & Windahl, 1986). In line with this reasoning, there was a stronger contingency between state feelings of loneliness and subsequent Facebook use in the trait lonely (Study 2, Chapter III). While this finding clearly is in line with this prediction, yet another one obtained in the same study is not. While there were between-person differences in state loneliness slopes in predicting the amount of interpersonal contacts, these could not be shown to be contingent on a person's level of trait loneliness. This means that trait lonely were no more or less likely to engage in social contacts when in a lonely state. However, they were more prone to engage in Facebook use when in such a state. Could it be that this higher appeal of social media services for the regulation of social need states might be a key mechanism contributing to the establishment of additive media use behaviors in the lonely? As shown by Teppers et al. (2014) in a longitudinal study of adolescents, baseline levels of peer-related loneliness were longitudinally associated with increases in loneliness-alleviating and social-skill-compensating Facebook use motives. Unfortunately, these researchers did not as-

sess addictive use of Facebook and its relation to both trait indicators of loneliness as well as Facebook use motives. Given that motives as the ones studied by Teppers et al. (2014) have been identified as one of the key correlates of addictive use (Ryan et al., 2014), their findings might nonetheless be taken to suggest that loneliness may indeed lead to the establishment of an addictive patterns of use in the lonely. Future studies might try to investigate the longitudinal relationships between loneliness and Facebook addiction, while at the same time acknowledging the potential mediating effects of underlying use motives. Of key interest in this respect is the amenability and potential instability of psychosocial problems, which may arise as well as cease to exist following major life transitions. In this context, the transition to university may represent a highly attractive research model of such a transition process. Both compensatory accounts of Internet use (Kardefelt-Winther, 2014a) and media dependency accounts (Rubin & Windahl, 1986) would suggest finding a rather high reactivity in “addictive” patterns of Internet use following such a transition. Only when there is something to compensate (e.g. a lack of satisfying social relationships) or when a medium is the most viable functional alternative for the satisfaction of social needs, maladaptive patterns of the Internet use will emerge. From this perspective, it would be likely to detect increases in addictive use in those who fail in mastering a major life transition with its accompanying social changes and pressures. Contrary to this, persons who remain well-adapted and those who improve in their psychosocial adaptation following a life transition can be expected to show decreases in addictive Internet use. This perspective of high amenability/reactivity might be contrasted with one of high stability, which could be inferred from neurobiological accounts of Internet addiction. With increasing engagement and the accompanied reinforcement effects, neurobiological changes occur at the level of the brain that in themselves will contribute to the maintenance of excessive use of the Internet, e.g. by reducing self-control capacities (Brand, Young, et al., 2014; Montag & Reuter, 2015; Sepede et al., 2016; Turel et al., 2014). Moreover, conditioned Internet stimuli should elicit higher levels of cue reactivity in those having engaged in excessive use patterns, irrespective of major changes in life contexts (Brand & Laier, 2015; L. Liu et al., 2016; Lorenz et al., 2013; Thalemann et al., 2007; Voon et al., 2014). It would be very interesting to contrast such functional/compensatory accounts of behavioral excess with those of uncontrollable excess/addiction. An alternative perspective might suggest that addiction-associated self-regulatory deficits might in themselves lead to a stronger social-compensatory use orientation. Corresponding findings were recently reported by Gámez-Guadix, Calvete, Orue, and Las Hayas (2015), who were able to show that baseline levels of self-regulation deficits in the use of the Internet were longitudinally predictive of increases both in the preference for online social relationships and mood-regulatory Internet use motives. This would suggest that there might

be intertwined relations between social need regulatory Internet use and self-regulatory deficits in Internet use. In line with this, the present ESM study found that both Facebook addiction levels (the assessment of which included an indicator of loss of control over Facebook use) and trait levels of loneliness were moderating state loneliness slopes in Facebook use. It would be interesting to further investigate the role of use orientation in Internet addiction and to establish the temporal order of compensatory versus dysregulated uses. Such studies might be conducted in university student samples, since the present study findings suggest that freshmen might serve an interesting population for modeling the plausibility of these contrasting theoretical perspectives.

3.3 When loneliness coping is less than meets the eye

Notwithstanding the importance of contextual determinants of addictive media use, yet another critical aspect that has received insufficient attention throughout this work was the consideration of the precise types of endorsed activities. Study 1 (Chapter II) made use of an indicator of social web application use intensity, Study 2 (Chapter III) employed assessments of the amount of general Facebook use at the situation level. While these indicators are good in specifying the molar shape of behavioral orientation, they have little to offer when it comes to the micro-contextual specification of behaviors. It will certainly be of importance to know what features of Facebook were used because of state feelings of loneliness, as will be a more fine-grained specification of qualitative aspects of social web application uses in studies of Internet addiction. Providing such a highly informative background of qualitative use information might help to reach a better understanding of social-compensatory Internet use. Additionally, such a specification will also help to differentiate between alternate purpose uses of Facebook. As already noted, the SNS allows for a broad variety of different activities, some of which are clearly social in nature (e.g. messaging), while others are clearly entertainment-oriented (e.g. watching funny video clips). What type of Internet activities could one expect to result from lonely traits and lonely states?

As has been reviewed in the very beginning of this work, loneliness has been associated with more passive styles of coping with problems and stress in general (see Section I.1.3.1). Furthermore, loneliness has been associated with Internet use motives and activities related to entertainment, social compensation and escapism (Morahan-Martin & Schumacher, 2003; Seepersad, 2004; Teppers et al., 2014). Therefore, loneliness coping in the online realm may take several forms. As implied by cognitive and social skill accounts of loneliness (W. H. Jones & Carver, 1991; W. H. Jones et al., 1982; Peplau et al., 1982; Peplau & Perlman, 1982b), attributions and beliefs about the causes of loneliness and one's ability to overcome them might be

of vital importance for the coping behaviors adopted. Likewise, loneliness has been associated with a more negative type of social information processing, such as a hypervigilance toward social threat cues (J. T. Cacioppo & Hawkley, 2009; J. T. Cacioppo, Hawkley, et al., 2006), lower levels of interpersonal trust (Rotenberg, 1994) and more negative views about one's social relationships in general (Duck et al., 1994). Loneliness has also been found to be both a predictor for and a consequence of adopting more passive social strategies in a longitudinal study of university students (Nurmi & Salmela-Aro, 1997; Nurmi, Toivonen, Salmela-Aro, & Eronen, 1996). These observations might also be important for online social interactions, since a lonely persons' social strategies might translate into more passive or dysfunctional social communication behaviors in the online realm (Leung, 2002).

In their review of the literature concerning coping through media use, Knobloch-Westerwick, Hastall, and Rossmann (2009) note that the media offer a variety of both adaptive and maladaptive ways for coping with problems in life. They note that the various ways of media coping should be differentiated along two dimensions, namely the focus of the coping strategy adopted (problem-focused vs. emotion-focused) and the coping orientation reflected in the type of media use (approach vs. avoidance orientation). The coping focus dimension relates to the degree to which a certain behavior aims at dealing with the external demands (the problem itself) versus the inner demands (i.e. the emotional consequences) of a stressor. The coping orientation dimension represents the degree to which the behavior directly approaches the stressor and its associated demands (external/internal) or avoids them. Table IV.1 shows an adapted representation of this coping scheme for loneliness coping. When adopting this scheme, one must assume that online social relationships and the gratifications obtained from them cannot substitute for real-life interactions and social bonds, especially when they remain largely unintegrated in one's in-person life (Bonetti, Campbell, & Gilmore, 2010; Cummings, Butler, & Kraut, 2002; H. Liu et al., 2013; Suler, 1999). Approach-oriented coping strategies then might involve Internet use aimed at empowering oneself to establish and manage in-person relationships more competently, which could be regarded as a form of problem-focused coping (as it deals with the external demands of the stressor "loneliness"). Another approach-oriented strategy might involve engaging in online social relationships to gratify one's unfulfilled social needs, e.g. by forming highly intimate and reinforcing virtual relationships or by chatting with distant friends in order to feel socially connected. This latter approach might be regarded as emotion-focused, since it deals with the internal demands of the stressor "loneliness." While being aimed at alleviating the aversive experience, such a strategy does not necessarily change one's capacity to handle in-person relationships more competently. Note, however, that initial engagement in such emotion-focused approach cop-

ing might well translate to in-person contexts. This might occur in the case of active social media use, e.g. by finding new acquaintances with similar interests and establishing in-person relationships with them in the long run. Therefore, there might be longer-term transitions between the different forms of approach coping. Avoidance coping might also be both problem-focused and emotion-focused. Emotion-focused attempts might best be regarded as “escapist,” in that they are aimed at overcoming the dysphoric psychological state of loneliness by engaging in any type of unrelated activity. On the other hand, problem-focused avoidance coping aims at actively avoiding content reminiscent of one’s own problems in life. Note that this boundary between escapist and problem-avoidance coping is somewhat artificial, since they might simply represent two sides of the same coin (i.e. by the consumption of unrelated entertainment content, one actively avoids loneliness topics).

Table IV.1

Coping scheme exemplifying various ways of coping with loneliness according to their coping focus and underlying coping orientation (adapted from Knobloch-Westerwick et al., 2009, p. 210)

		Coping Focus	
		Problem Focused	Emotion Focused
Coping Orientation	Approach	Information & Guidance Seeking	Reassurance & Reappraisal Seeking
		browsing websites and engaging in boards/communities so as to receive information and advice for managing one’s loneliness and face-to-face relationships/interactions more competently	deriving social gratifications from online relationships by chatting with online acquaintances or distant friends, diminishing the importance of satisfying relationships in everyday/offline life
	Avoidance	Behavioral & Mental Disengagement	Escapism
		deliberately avoiding websites, boards, chats, and web content dealing with idealization of social provisions in order not to be hindered by unrealistic expectancies in everyday social interactions	watching entertaining movies or engaging in fun-providing online games that are unrelated to social isolation and competence to forget about the distressing experience

In their review of the media coping literature, Knobloch-Westerwick et al. (2009) found evidence for both avoidance and approach coping in a broad array of different studies. Whereas more content-insensitive studies of television use found evidence for escapist coping, i.e. higher levels of overall and entertainment viewing, content-sensitive studies could show considerable evidence for approach coping. In a laboratory study of browsing patterns, Knobloch-

Westerwick et al. (2009) found that a person's relationship status and the satisfaction with that status both were associated with differential browsing patterns of web content related to relationships topics. Dissatisfied singles spent a higher amount of time viewing such information compared to satisfied singles, whereas the reverse was true for persons living in a relationship. While the latter finding of an avoidance of relationship topics in persons dissatisfied with their ongoing relationship might be suggestive of problem-focused avoidance coping, the increased interest of dissatisfied singles in relationship topics may be suggestive of problem-focused approach coping.

This clearly points to the fact that studies of Internet effects in the context of loneliness should be sensitive to the various ways of Internet use, since they might be indicative of different coping orientations. These differences, in turn, might explain negative effects of the media. In the study of Internet addiction, uses concerning loneliness coping might be contrasted with other uses. Among these alternative uses that have been discussed in relation to addictive use are habitual (Caplan, 2010; Gámez-Guadix et al., 2015; LaRose, 2010; LaRose et al., 2003; LaRose, Mastro, et al., 2001) and procrastinate uses (Thatcher, Wretschko, & Fridjhon, 2008). The intensity with which these different uses are adopted might depend on psychosocial factors of the person. Likewise, the different uses might differ in their situational effects. For example, Reinecke and Hofmann (2016) were able to show that procrastinating media use led to negative media effects (negative self-evaluation), whereas recreational media use led to more positive effects (entertainment experience). These different media-induced experiences, in turn, led to differential effects on situational well-being (i.e. more positive well-being after recreational uses). This effect-oriented perspective seems all the more interesting given the finding that social media use does not necessarily lead to increases in positive affect (Kross et al., 2013) or a gratification of social needs (Z. Wang et al., 2012). Therefore, future studies of situation-level social media use might integrate an effects perspective and look for between-person differences in these situational contingencies both in the prediction of uses and in media effects.

4. Major problems and avenues for future studies

Given the many interesting findings and their implications for both the current conceptualization and the future study of Internet addiction in the lonely, the current studies were hampered by a multitude of problems that should be kept in mind. In closing this work, these problems will be mentioned and potential remedies be discussed.

As already discussed in the respective study chapters, the empirical analyses conducted were causal in nature (for a thorough discussion of such a rationale and ensuing problems,

see Morgan & Winship, 2014), although the data were acquired in a cross-sectional manner. This is especially true for the online survey study reported in Chapter II, which treated Internet addiction as resulting from trait loneliness and associated attempts at social compensation. While this type of arrangement of the data is grounded in substantive theory (Caplan, 2003; Davis, 2001) and has received empirical support in several studies (Brand, Laier, et al., 2014; Caplan, 2002, 2003, 2005, 2007, 2010; Davis et al., 2002; J. Kim et al., 2009; D. Li et al., 2010; Morahan-Martin & Schumacher, 2003), the majority of studies are hampered by their one-sided and cross-sectional approach. Studies that integrated a bidirectional account of effects showed that loneliness can be both a cause and an effect of Internet addiction (Celik et al., 2014; J. Kim et al., 2009). However, studies that adopted a longitudinal approach in the study of Internet addiction and social-compensatory use motives were not unequivocal (Muusses, Finkenauer, Kerkhof, & Billedo, 2014; Teppers et al., 2014; Yao & Zhong, 2014). Two studies found baseline levels of trait loneliness to be non-predictive for subsequent changes in Internet addiction (Muusses et al., 2014; Yao & Zhong, 2014), but found consistent evidence for the reverse predictive relationship (i.e. Internet addiction levels predicted increases in loneliness over time). Contrary to this, another study found consistent bidirectional predictive associations between peer-related loneliness and social-compensatory use motives in Facebook use (Teppers et al., 2014). Given these controversial results, future empirical studies of the cognitive-behavioral model of Internet addiction should try to assess the complex and potentially bidirectional associations between psychosocial traits, Internet use (motives), and Internet addiction over longer periods of time. In doing so, one could try to repeatedly assess the constructs of interest throughout the course of major life transitions such as university entry. Such an approach might also help to reach conclusions regarding static vs. dynamic conceptualizations of Internet addiction risk and contribute to the conceptualization of behavioral addictions.

Another limitation was the focus on university student populations, which certainly limits the generalizability of study results. Future studies will have to provide evidence that the obtained loneliness effects can be replicated in other populations, such as school students or people in paid work. Different everyday contexts allow for different media use behaviors, therefore not necessarily allowing for loneliness-contingent uses of social media like Facebook. Moreover, studying at a distant university might introduce instances of social separation from one's previous social network that would not necessarily be experienced in other settings such as undergoing vocational training in a business close to one's home. These are aspects that need to be acknowledged and incorporated in future studies of Internet use and addiction. Another problem related to the employed sampling procedures is the recruitment of conven-

ience samples. For the ESM study (Chapter III), this resulted in a large proportion of Psychology freshmen during their first academic year, whereas for the online survey this resulted in a heterogeneous sample of students of unknown residence. By assembling a comprehensive list of student representatives, effort was made to guarantee participation at equal probability for students from different universities and subjects of study. Nonetheless, since many appeals to contribution were left unanswered or were declined, sampling bias could have resulted. Moreover, as has already been shown in the context of online surveys (Bethlehem, 2010; Khazaal et al., 2014; Weigold, Weigold, & Russell, 2013), there is the problem of self-selection of participants. While the degree and nature of bias might depend on the actual content of the study (Khazaal et al., 2014), there is no possibility to rule out such bias effects in the presented online research findings (Chapter II). Potential remedies to this problem are discussed by Bethlehem (2010). As an example, one might use a population or local university student register, from which a random subpopulation is approached and asked to participate. This would require financial and personnel resources, however, that were unavailable for the present investigations.

In the context of limited resources, another problem eventually causing subject burden was the use of rather outdated PDA devices in the service of the ESM study presented in Chapter III. By now, there are several software options available for use on participants' private mobile phones. An affordable alternative could be the integration of online survey and experience sampling methods, e.g. by providing subjects with web links to online surveys at randomly varying times. Albeit easy to implement, such a procedure would require both constant access to the Internet and mobile phone reception. If this were impossible to guarantee for the study population of interest (e.g. students living in both metropolitan and rural areas), the study sampling and data acquisition might be biased in unforeseeable ways. In this regard, the costs of software/hardware solutions must be weighed against the benefits they promise. At present, there would appear to be no single all-in-one solution, since available software solutions differ in their applicability on different operating systems.

Another problem that was left untreated is the inherent unreliability of employed measures. As already discussed extensively in the study chapters, the measurement error inherent in the employed indicator variables used may biased coefficient estimates, as obtained from the linear (mixed) models, to some extent. A possible future solution to this problem would be the use of latent variable models, such as structural equation modeling (Byrne, 2013; Hoyle, 2012; Kline, 2015), which allows for the integration of complex modeling frameworks such as latent variable based moderated mediation analysis (Marsh et al., 2012; Maslowsky et al., 2015; Muthén & Asparouhov, 2003) or multilevel structural equation modeling analysis (du

Toit & Toit, 2008; Kline, 2015; Muthén, 1997). As general purpose software solutions are becoming increasingly common and affordable in this field of statistical software, future studies might adopt a latent variable modeling framework. Before doing so in ESM studies of social media use, however, scale measures for the assessment of both psychological states and media use behaviors need to be developed that are short, reliable and validated for use in German language countries.

V. References

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APPENDIX

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Appendix A – Online Survey used for Study 1

IMN-Studie

Herzlich willkommen zur Studie „Das Internet und die Merkmale seiner Nutzer (IMN-Studie)“

Vielen Dank für Ihr Interesse!!!

Mithilfe dieser Umfrage soll mehr über die Zusammenhänge verschiedener Formen des Internetgebrauchs und bestimmten Eigenschaften seiner Nutzer herausgefunden werden. Hierzu werden Sie im Folgenden zu Ihrer Internetnutzung, Ihrer Person, Ihrem Befinden und zu Aspekten ihres sozialen Lebens befragt.

Mehr Erkenntnisse in diesem Bereich könnten in Zukunft dabei helfen, mögliche problematische Formen des Internetgebrauchs besser zu verstehen und Betroffenen in Zukunft besser helfen zu können.

An der Umfrage dürfen alle Personen teilnehmen, die älter als 18 Jahre alt sind.

Bei der Beantwortung der Fragen ist es wichtig, dass Sie diese so spontan und wahrheitsgemäß wie möglich beantworten. Es gibt hierbei keine richtigen oder falschen Antworten.

- Teilnehmen können Personen über **18 Jahre**.
- Die Teilnahme ist **freiwillig** und kann zu jedem Zeitpunkt abgebrochen werden.
- Die Bearbeitung dauert ca. **20-30 Minuten**, kann aber unterbrochen und zu einem späteren Zeitpunkt fortgesetzt werden. Die Umfrage ist nicht für Smartphones geeignet.

Zu keinem Zeitpunkt werden Daten erhoben, welche einen Rückschluss auf Ihre Person zulassen (KEIN Name, KEIN Geburtsdatum etc.). Dies bedeutet, dass die erhobenen Daten im Rahmen der technischen Möglichkeiten **anonym** erhoben und gespeichert werden.

Die Daten werden **ausschließlich zu wissenschaftlichen Zwecken** erhoben und ausgewertet. Falls Sie vorab Fragen/Anmerkungen haben, können Sie sich gerne an uns wenden. Schreiben Sie hierzu eine E-Mail an: andreas.reissmann@ur.de

Am Ende der Umfrage haben Sie die Möglichkeit an einem Gewinnspiel teilzunehmen. Unter allen Teilnehmern werden nach Abschluss der Datenerhebung **5 x 25€** verlost.

Mit der Teilnahme an der Befragung erklären Sie, dass Sie die Information zu dieser Befragung zur Kenntnis genommen haben und damit einverstanden sind, dass die im Fragebogen erhobenen anonymen Daten ausschließlich zum Zweck wissenschaftlicher Analysen verwendet werden.

Wir wünschen Ihnen nun viel Erfolg und Freude bei der Bearbeitung der Fragen!!!

IMN-Studie


Fragenseite 1 von 18

Im Folgenden werden Ihnen einige Fragen zu Ihrer Person sowie zu allgemeinen Aspekten Ihrer Internetnutzung gestellt. Bitte beantworten Sie alle Fragen und lassen Sie keine der Fragen aus.

Wie alt sind Sie?

Ich bin Jahre alt

In dieses Feld dürfen nur Ziffern eingetragen werden.

 (bitte in ganzen Jahren angeben)

Welches Geschlecht haben Sie?

- weiblich
- männlich

Welche Staatsbürgerschaft haben Sie?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Deutsche Staatsbürgerschaft
- Andere Staatsbürgerschaft
- Doppelte Staatsbürgerschaft

bei doppelter oder anderer Staatsbürgerschaft bitte genaue Angaben im Textfeld:

Was ist Ihre Muttersprache?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- deutsch
- andere

bei anderer Muttersprache bitte genaue Angaben im Textfeld nebenan

Welchen Familienstand haben Sie?

Bitte wählen Sie eine der folgenden Antworten:

Bitte auswählen..

Haben Sie derzeit einen festen Partner/ eine feste Partnerin?

- Ja
- Nein

Wie ist Ihre derzeitige Wohnsituation? Ich lebe...

Bitte wählen Sie eine der folgenden Antworten:

Bitte auswählen..

Wie viele Personen leben, wohnen und wirtschaften gemeinsam in Ihrem Haushalt? Zählen Sie dabei bitte sich selbst und auch Kinder mit. (z.B. 1 Person, d.h. nur Sie selbst)

In meinem Haushalt leben insgesamt Personen

In dieses Feld dürfen nur Ziffern eingetragen werden.

In welcher Wohngegend leben Sie?

Bitte wählen Sie eine der folgenden Antworten:

Bitte auswählen..

Welchen höchsten Bildungsabschluss haben Sie bislang erreicht?

Bitte wählen Sie eine der folgenden Antworten:

Bitte auswählen..

Sind Sie zurzeit erwerbstätig? Unter Erwerbstätigkeit wird jede bezahlte bzw. mit einem Einkommen verbundene Tätigkeit verstanden, egal welchen zeitlichen Umfang sie hat.

Bitte wählen Sie eine der folgenden Antworten:

- vollzeit erwerbstätig
- teilzeit erwerbstätig
- geringfügig erwerbstätig (450-Euro Job bzw. Mini-Job)
- "Ein-Euro-Jobber" (bei Bezug von Arbeitslosengeld II)
- gelegentlich oder unregelmäßig beschäftigt
- berufliche Ausbildung/ Lehre (auch Formen der bezahlten schulischen/universitären Ausbildung wie bei dualem Studium etc.)
- vorübergehend freigestellt bzw. beurlaubt (z.B. Elternzeit)
- nicht erwerbstätig – arbeitslos/ arbeitssuchend
- nicht erwerbstätig – schulische/universitäre/berufliche Ausbildung ohne Gehalt
- nicht erwerbstätig – (Früh-)Rente
- nicht erwerbstätig – Hausfrau/-mann

Studieren Sie derzeit an einer staatlich anerkannten (Fach-)Hochschule/Universität?

- Ja
- Nein

In welchen der folgend genannten Fachbereiche lässt sich Ihr Studium einordnen?

Bitte wählen Sie eine der folgenden Antworten:

- Agrar- und Forstwissenschaften**
- Beamtenstudiengänge** (Bibliotheks-, Verwaltungswesen, Polizei etc.)
- Gesellschafts- und Sozialwissenschaften** (Politik, Pädagogik, Psychologie, Sport, Theologie, Soziologie etc.)
- Ingenieurwissenschaften** (Architektur, Bau-/Maschinenbau-/Wirtschaftsingenieurwesen, Elektrotechnik, Nautik, Mechatronik etc.)
- Kunst, Gestaltung, Musik, Theater und Film**
- Lehramtsstudiengänge** (incl. Berufsschule)
- Medizin und Gesundheitswesen** (Human-/Tier-/Zahnmedizin, Pharmazie, Pflegewissenschaften/-management etc.)
- Naturwissenschaften und Mathematik** (Mathematik, Physik, Biologie, (Bio-)Chemie, Informatik, Geowissenschaften, Ernährungswissenschaften etc.)
- Rechts- und Wirtschaftswissenschaften** (Jura, BWL, VWL, Wirtschaftsinformatik, Logistik etc.)
- Sprach- und Kulturwissenschaften** (Neue/Klassische Philologien, Geschichte, Germanistik, Anglistik, Philosophie, Kulturwissenschaften/Ethnologie etc.)

IMN-Studie


Fragenseite 2 von 18

Im Folgenden werden Ihnen einige Fragen zu Ihrer Person sowie zu allgemeinen Aspekten Ihrer Internetnutzung gestellt. Bitte beantworten Sie alle Fragen und lassen Sie keine der Fragen aus.

Welchen Zugang/ Welche Zugänge zum Internet nutzen Sie?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Smartphone
- Tablet
- privater PC/Laptop
- beruflicher/schulischer/universitärer Arbeitsplatzrechner
- PC im Internet-Café
- internetfähige Spielekonsole (Playstation, Xbox, Wii etc.)
- andere internetfähige Hardware

 (Mehrfachantworten sind erlaubt)

Die folgenden Fragen beziehen sich allesamt ausschließlich auf Ihre private Nutzung des Internets. Bitte berücksichtigen Sie dies bei der Beantwortung der Fragen.

Für welche Zwecke und Aktivitäten nutzen Sie das Internet?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Ich nutze das Internet nicht für private Zwecke
- bestehende private Kontakte pflegen
(facebook, E-Mail, Skype, WhatsApp etc.)
- neue Kontakte knüpfen
(Chats, Dating-Seiten, facebook, etc.)
- Surfen/ ungerichtete Informationssuche
- zielgerichtete Informationssuche
(wikipedia, Nachrichten, Preisvergleiche, Foren lesen, Urlaubsplanung etc.)
- Einkaufen/ Auktionen
(z.B. amazon, ebay, zalando, alternate etc.)
- Unterhaltung – Anschauen/Download von Videos/Bildern
(youtube, 9gag.com, Mediatheken etc.)
- Unterhaltung – Hören/Download von Musik
(itunes, amazon, spotify, Online-Radio etc.)
- Unterhaltung – Onlinespiele
(WoW, Battlefield, Bubble Shooter, Quizduell etc.)
- regelmäßiges Schreiben in Foren
- Onlinewetten/-glücksspiele
(Poker, Sportwetten, etc.)
- Onlinebanking
- Pornographie
- Andere Aktivität(en)

 (Mehrfachantworten sind erlaubt)

Welche(n) andere(n) Aktivität(en) gehen Sie im Internet nach?

Bitte wählen Sie mindestens eine Antwort.

Aktivität 1

Aktivität 2

Aktivität 3

Aktivität 4

Aktivität 5

Wie häufig gehen Sie Ihren Internetaktivitäten nach?

	mehrmals täglich	täglich	mehrmals die Woche	einmal die Woche	weniger als einmal in der Woche
bestehende private Kontakte pflegen (facebook, E-Mail, Skype, WhatsApp etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
neue Kontakte knüpfen (Chats, Dating-Seiten, facebook, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surfen/ ungerichtete Informationssuche	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Homepage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie lange gehen Sie den von Ihnen genannten Internetaktivitäten im Internet pro Woche (Stunden pro Woche) nach?

bestehende Kontakte pflegen ca. Stunden pro Woche

neue Kontakte knüpfen ca. Stunden pro Woche

ungerichtetes Surfen ca. Stunden pro Woche

Homepage ca. Stunden pro Woche

(Die Nutzungsdauer soll nur bei Aktivitäten angegeben werden, denen mindestens einmal in der Woche nachgegangen wird)

Wie viele Stunden pro Woche nutzen Sie das Internet insgesamt für Ihre privaten Zwecke?

Ich nutze das Internet für ca. Stunden pro Woche für private Zwecke

In dieses Feld dürfen nur Ziffern eingetragen werden.

(da man Aktivitäten auch parallel betreiben kann, entspricht diese Angabe nicht unbedingt der Summe der einzelnen, von Ihnen genannten Aktivitäten)

Die folgenden Aussagen beziehen sich auf mögliche Nutzungsmotive für Ihre Onlineaktivitäten. Bitte lesen Sie jede Aussage und überlegen Sie, inwiefern Sie dieser zustimmen würden. Zum Ausdruck des Grades Ihrer Zustimmung steht Ihnen die folgende Skala zur Verfügung:

- 1: "Stimme ganz und gar nicht zu"
- 2: "Stimme weitgehend nicht zu"
- 3: "Stimme teilweise zu"
- 4: "Stimme weitgehend zu"
- 5: "Stimme voll und ganz zu"

Ich nutze das Internet ...

	Stimme ganz und gar nicht zu	Stimme weitgehend nicht zu	Stimme teilweise zu	Stimme weitgehend zu	Stimme voll und ganz zu
... damit ich mitreden kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich Denkanstöße bekomme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich informieren möchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dabei entspannen kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es mir Spaß macht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich dann nicht allein fühle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich ablenken möchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es aus Gewohnheit dazugehört	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Stimme ganz und gar nicht zu	Stimme weitgehend nicht zu	Stimme teilweise zu	Stimme weitgehend zu	Stimme voll und ganz zu
... weil ich dort Dinge erfahre, die für meinen Alltag nützlich sind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dort Stress abbauen kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dort die Unterstützung erhalte, die ich brauche	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es Spannung und Unterhaltung bietet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dort die Sorgen des Alltags vergessen kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es praktisch und bequem ist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dort ich selbst sein kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich so mir wichtigen Personen nahe sein kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fragenseite 4 von 18

Die folgenden Fragen beziehen sich auf Ihr Verhalten sowie Ihre Gedanken und Gefühle in Zusammenhang mit Ihren Internetaktivitäten. Beziehen Sie sich in Ihren Antworten bitte auf den Zeitraum der letzten drei Monate.

Bitte beantworten Sie die folgenden Fragen anhand der folgenden Skala:

1 - "überhaupt nicht"

2 - "selten"

3 - "manchmal"

4 - "oft"

5 - "immer"

	Überhaupt nicht	Selten	Manchmal	Oft	Immer
Wie oft stellen sie fest, dass Sie länger als beabsichtigt im Internet waren?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft vernachlässigen Sie alltägliche Pflichten, um mehr Zeit online zu verbringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig leiden Ihre Noten, Ihre schulische, Ihre universitäre oder Ihre berufliche Arbeit darunter, weil Sie so viel Zeit online verbringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig verhalten Sie sich ausweichend oder defensiv, wenn Sie jemand fragt, was Sie online tun?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft reagieren Sie patzig, schimpfen oder sind genervt, wenn Sie jemand stört, während Sie online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fehlt Ihnen der Schlaf, weil Sie sich spät nachts noch online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Überhaupt nicht	Selten	Manchmal	Oft	Immer
Wie oft denken Sie ans Internet, wenn Sie offline sind oder stellen sich vor, online zu sein?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft ertappen Sie sich dabei zu sagen: „Nur noch ein paar Minuten“, während Sie online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig versuchen Sie weniger Zeit im Internet zu verbringen und schaffen es nicht?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig versuchen Sie zu verbergen, wie lange Sie online waren?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft kommt es vor, dass sie lieber mehr Zeit online verbringen als mit anderen auszugehen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fühlen Sie sich deprimiert, verstimmt oder nervös, wenn Sie offline sind – was sich ändert, wenn Sie wieder online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IMN-Studie

Fragenseite 5 von 18

Im Folgenden finden Sie eine Liste mit Aussagen, die Ihre Gefühle und Gedanken zu sich selbst betreffen. Bitte lesen Sie jede dieser Aussagen und entscheiden Sie, inwiefern diese auf Sie zutrifft oder nicht. Drücken Sie den Grad Ihrer Zustimmung mit Hilfe der vorgegebenen Antwortskala aus:

- 1 - "trifft gar nicht zu"
 2 - "trifft wenig zu"
 3 - "trifft etwas zu"
 4 - "trifft ziemlich zu"
 5 - "trifft voll und ganz zu"

	trifft gar nicht zu	trifft wenig zu	trifft etwas zu	trifft ziemlich zu	trifft voll und ganz zu
Alles in allem bin ich mit mir selbst zufrieden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Lösung schwieriger Probleme gelingt mir immer, wenn ich mich darum bemühe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hin und wieder denke ich, dass ich gar nichts taue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich besitze eine Reihe guter Eigenschaften.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es bereitet mir keine Schwierigkeiten, meine Absichten und Ziele zu verwirklichen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kann vieles genauso gut wie die meisten anderen Menschen auch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fürchte, es gibt nicht viel, worauf ich stolz sein kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auch bei überraschenden Ereignissen glaube ich, dass ich gut damit zurecht kommen werde.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft wenig zu	trifft etwas zu	trifft ziemlich zu	trifft voll und ganz zu
Ich fühle mich von Zeit zu Zeit richtig nutzlos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich mit einer neuen Sache konfrontiert werde, weiß ich, wie ich damit umgehe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich halte mich für einen wertvollen Menschen, jedenfalls bin ich nicht weniger wertvoll als andere auch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich wünschte, ich könnte vor mir selbst mehr Achtung haben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich mit einem Problem konfrontiert werde, habe ich meist mehrere Ideen, wie ich damit fertig werde.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alles in allem neige ich dazu, mich für einen Versager zu halten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe eine positive Einstellung zu mir selbst gefunden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was auch immer passiert, ich werde schon klarkommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft wenig zu	trifft etwas zu	trifft ziemlich zu	trifft voll und ganz zu
Manchmal tue ich spontan Dinge, die ich besser nicht getan hätte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um mich besser zu fühlen, mache ich manchmal Sachen, die ich später bereue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich denke normalerweise genau nach, bevor ich etwas unternehme.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich entscheide meist nach sorgfältigem und logischem Überlegen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was ich begonnen habe, führe ich auch zu Ende.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich teile meine Zeit gut ein, so dass ich Aufgaben rechtzeitig erledigen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin bereit Risiken einzugehen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin gerne bereit, etwas zu wagen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Die im folgenden angeführten Aussagen betreffen Fragen und Probleme, die nach Erwerb der (Fach-)Hochschulreife im Hinblick auf die eigene Berufs- oder Studienwahl und die berufliche Zukunft aufkommen können.

Geben Sie bitte an, inwieweit diese Aussagen auf Sie selbst zutreffen.

Um den Grad Ihrer Zustimmung zur jeweiligen Aussage auszudrücken, stehen Ihnen vorgegebene Antwortabstufungen zur Verfügung.

	trifft gar nicht zu	trifft wenig zu	trifft teilweise zu	trifft ziemlich zu	trifft sehr zu
Ich kenne die nach dem Abitur verfügbaren Ausbildungsmöglichkeiten noch zu wenig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich konnte mich bisher mit niemandem gründlich über meine Berufs- oder Studienwahl unterhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Für mich sind die vielen Berufsmöglichkeiten noch zu unübersichtlich.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich bisher noch nicht ausreichend auf meine Berufs- oder Studienwahl vorbereitet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manchmal bin ich ganz unsicher, was ich später einmal beruflich machen will.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich möchte gern wissen, ob die gegenwärtig von mir ins Auge gefasste Ausbildung bzw. das Studium wirklich das Richtige für mich ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft wenig zu	trifft teilweise zu	trifft ziemlich zu	trifft sehr zu
Es ist für mich ziemlich schwierig, mich für eine bestimmte Berufs- und Ausbildungsmöglichkeit zu entscheiden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kenne meine hauptsächlich beruflichen Stärken und Schwächen noch zu wenig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich noch zu wenig darüber informiert, welche beruflichen Möglichkeiten ich später einmal haben werde.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin mir noch nicht sicher, welche berufliche Tätigkeit mir auf die Dauer zusagen könnte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es beschäftigt mich, dass meine beruflichen Interessen und meine Fähigkeiten auf verschiedenen Gebieten liegen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft wenig zu	trifft teilweise zu	trifft ziemlich zu	trifft sehr zu
Ich bin mir nicht sicher, ob ich meine Ausbildung bzw. mein Studium wirklich schaffen werde.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich war lange Zeit nicht sicher, für welche Ausbildung oder welches Studium ich mich entscheiden soll.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich weiß noch zu wenig darüber Bescheid, welche Anforderungen in den für mich in Frage kommenden Berufen gestellt werden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin noch nicht sicher, welche Berufe ich erfolgreich ausüben könnte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich schätze meine beruflichen Fähigkeiten und Begabungen von Zeit zu Zeit immer wieder anders ein.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Zweifel, ob ich für den Beruf, den ich gegenwärtig in Erwägung ziehe, wirklich geeignet bin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft wenig zu	trifft teilweise zu	trifft ziemlich zu	trifft sehr zu
Ich möchte gern wissen, welche Berufe am besten zu mir passen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich mich jetzt schon für eine bestimmte Berufsmöglichkeit entscheiden müsste, würde ich mich nicht sehr wohl fühlen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es beschäftigt mich, wie bzw. wo ich nach Beendigung meiner Ausbildung eine mir entsprechende Stelle finden kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es bereitet mir Sorgen, dass die Beschäftigungsaussichten in den für mich in Frage kommenden Berufen eher schlecht sind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich befürchte, längere Zeit nach Abschluß meiner Ausbildung keinen entsprechenden Arbeitsplatz zu bekommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Wir möchten wissen, was Sie über die folgenden Aussagen denken. Lesen Sie bitte jede der Aussagen sorgfältig durch und geben Sie an, wie stark Sie der Aussage zustimmen oder sie ablehnen.

	Stimme ganz und gar nicht zu	Stimme weitgehend nicht zu	Stimme eher nicht zu	Neutral	Stimme eher zu	Stimme weitgehend zu	Stimme voll und ganz zu
Es gibt einen besonderen Menschen, der für mich da ist, wenn ich es brauche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt einen besonderen Menschen, mit dem ich meine Freuden und Sorgen teilen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Familie gibt sich große Mühe mir zu helfen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bekomme von meiner Familie den emotionalen Beistand und die Unterstützung, die ich brauche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe einen besonderen Menschen, der mir ein echter Trostspender ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Freunde geben sich große Mühe mir zu helfen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Stimme ganz und gar nicht zu	Stimme weitgehend nicht zu	Stimme eher nicht zu	Neutral	Stimme eher zu	Stimme weitgehend zu	Stimme voll und ganz zu
Wenn etwas schief geht, kann ich mich auf meine Freunde verlassen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kann mit meiner Familie über meine Probleme sprechen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Freunde, mit denen ich meine Freuden und Sorgen teilen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt in meinem Leben einen besonderen Menschen, der sich für meine Gefühle interessiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Familie ist gewillt, mir beim Fällen von Entscheidungen zu helfen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kann mit meinen Freunden über meine Probleme sprechen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Bitte geben Sie zu jeder der nachfolgenden 11 Aussagen an, inwiefern sie auf Ihre **momentan empfundene Lebenssituation** zutrifft. Klicken Sie hierzu auf die passende Antwortmöglichkeit.

	NEIN!	nein	mehr oder weniger	ja	JA!
Es gibt immer Jemanden in meiner Umgebung, mit dem ich die alltäglichen Probleme besprechen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mir fehlt eine richtig gute Freundin / ein richtig guter Freund.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle eine allgemeine Leere.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt genug Menschen, auf die ich mich bei Problemen stützen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich vermisse Geborgenheit und Wärme.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich finde, daß mein Freundes- und Bekanntenkreis zu klein ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	NEIN!	nein	mehr oder weniger	ja	JA!
Ich kenne viele Menschen, auf die ich mich wirklich verlassen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt genügend Menschen, mit denen ich mich eng verbunden fühle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich vermisse Menschen um mich herum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich oft im Stich gelassen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich es brauche, sind meine Freunde immer für mich da.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Wahrgenommene Belastung

Die folgenden Fragen beziehen sich auf Ihre Gefühle und Gedanken **während des letzten Monats**. Sie werden jeweils gebeten anzugeben, wie häufig Sie die angesprochenen Gefühle oder Gedanken hatten. Obwohl manche der Fragen ähnlich sind, bestehen zwischen ihnen Unterschiede, so dass Sie jede Frage als eigenständig betrachten sollten.

Beantworten Sie bitte alle Fragen der Reihe nach durch Anklicken der für Sie jeweils zutreffenden Antwortalternative. Bitte gehen Sie bei der Beantwortung der Fragen zügig vor, ohne lange darüber nachzudenken. Das heißt, versuchen Sie bitte nicht im Einzelnen aufzuzählen, wie häufig Sie die angesprochenen Gefühle oder Gedanken hatten, sondern kreuzen Sie jeweils die Antwortalternative an, die Ihnen als beste Schätzung erscheint.

	nie	selten	manchmal	häufig	sehr häufig
Wie oft waren Sie im letzten Monat aufgebracht, weil Dinge unerwartet eingetreten sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie sich im letzten Monat nicht in der Lage gefühlt, die wichtigen Angelegenheiten in Ihrem Leben im Griff zu haben?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie sich im letzten Monat nervös und belastet gefühlt?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft ist es Ihnen im letzten Monat gelungen, mit den Ärgernissen des täglichen Lebens fertig zu werden?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat das Gefühl gehabt, dass Sie wichtige Veränderungen in Ihrem Leben mit Erfolg meistern?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat auf Ihre Fähigkeit vertraut, Ihre persönlichen Probleme lösen zu können?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat das Gefühl gehabt, dass Ihnen die Dinge leicht von der Hand gehen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	nie	selten	manchmal	häufig	sehr häufig
Wie oft haben Sie im letzten Monat erlebt, dass Sie nicht alles bewältigen konnten, was Sie zu erledigen hatten?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft ist es Ihnen im letzten Monat gelungen, störende Ereignisse in Ihrem Leben unter Kontrolle zu bringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat das Gefühl gehabt, über allem zu stehen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie sich im letzten Monat geärgert, weil Dinge passiert sind, die außerhalb Ihrer Kontrolle lagen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat gemerkt, dass Sie über Dinge nachdachten, die Sie noch zu erledigen haben?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft konnten Sie im letzten Monat bestimmen, wie Sie Ihre Zeit verbringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie im letzten Monat das Gefühl gehabt, Schwierigkeiten würden sich so häufen, dass Sie sie nicht überwinden könnten?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Beurteilen Sie bitte, inwiefern die folgenden Aussagen auf Ihr Denken und Handeln in vergangenen unangenehmen oder schwierigen Situationen zutreffen. Bitte machen Sie zu jeder Aussage eine Angabe.

	überhaupt nicht	ein bisschen	ziemlich	sehr
Ich habe mich mit Arbeit oder anderen Sachen beschäftigt, um auf andere Gedanken zu kommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mich darauf konzentriert, etwas an meiner Situation zu verändern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir eingeredet, daß das alles nicht wahr ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Alkohol oder andere Mittel zu mir genommen, um mich besser zu fühlen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe aufmunternde Unterstützung von anderen erhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe es aufgegeben, mich damit zu beschäftigen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe aktiv gehandelt, um die Situation zu verbessern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich wollte einfach nicht glauben, daß mir das passiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe meinen Gefühlen freien Lauf gelassen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe andere Menschen um Hilfe und Rat gebeten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	überhaupt nicht	ein bisschen	ziemlich	sehr
Um das durchzustehen, habe ich mich mit Alkohol oder anderen Mitteln besänftigt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, die Dinge von einer positiveren Seite zu betrachten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mich selbst kritisiert und mir Vorwürfe gemacht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, mir einen Plan zu überlegen, was ich tun kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um mich besser zu fühlen, habe ich das Internet genutzt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jemand hat mich getröstet und mir Verständnis entgegengebracht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gar nicht mehr versucht, die Situation in den Griff zu kriegen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, etwas Gutes in dem zu finden, was mir passiert ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Witze darüber gemacht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe etwas unternommen, um mich abzulenken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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(Fortsetzung)

	überhaupt nicht	ein bisschen	ziemlich	sehr
Ich habe mich damit abgefunden, daß es passiert ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe offen gezeigt, wie schlecht ich mich fühle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe das Internet genutzt, um nicht mehr daran zu denken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, Halt in meinem Glauben zu finden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, von anderen Menschen Rat oder Hilfe einzuholen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gelernt, damit zu leben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir viele Gedanken darüber gemacht, was hier das Richtige wäre.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir für die Dinge, die mir widerfahren sind, selbst die Schuld gegeben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gebetet oder meditiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe alles mit Humor genommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IMN-Studie

Fragenseite 12 von 18

Im Folgenden werden Ihnen einige Fragen dazu gestellt, welche Erfahrungen Sie mit Alkohol, Tabak und anderen Suchtmitteln gemacht haben.

Hierzu werden Sie befragt, ob Sie überhaupt, also im Laufe Ihres gesamten Lebens, Erfahrungen mit einer der verschiedenen Substanzen gemacht haben, und welche Erfahrungen Sie in den letzten drei Monaten gemacht haben.

Diese Mittel können geraucht, geschluckt, geschnupft, inhaliert, gespritzt oder in Form von Tabletten eingenommen werden:

- **Tabak:** Zigaretten, Zigarren, Kautabak, etc.
- **Alkoholische Getränke:** Bier, Wein, Spirituosen, etc.
- **Cannabis:** Marijuana, Gras, Haschisch, etc.
- **Kokain:** Koks, Crack, etc.
- **Amphetamine:** Speed, Appetitzügler, Ecstasy, etc.
- **Inhalantien:** Stickstoffverbindungen, Klebstoff, Benzin, Lösungsmittel etc.
- **Schlaf-/Beruhigungsmittel:** Valium, Oxazepam, Rohypnol, etc.
- **Halluzinogene:** LSD, Meskalin, Ketamin, Atropin/Skopolamin (z.B. Engelstrompete, Stechapfel) etc.
- **Opiate:** Heroin, Morphium, Methadon, Codein, etc.

Einige der hier aufgeführten Mittel können von einem Arzt als **Medikamente** verschrieben werden (wie z.B. Amphetamine, Beruhigungsmittel oder Schmerzmittel). In diesem Fragebogen sollen Mittel, die so eingenommen wurden, wie sie vom Arzt verschrieben wurden, nicht erfasst werden. Wenn Sie jedoch diese Medikamente aus anderen Gründen eingenommen haben, als vom Arzt verschrieben, bzw. häufiger als verschrieben oder in einer höheren Dosierung, dann können Sie hier Angaben zu Ihrem Konsum dieser Mittel machen.

Da Sie auch nach Ihrem etwaigen Gebrauch verschiedener illegaler Substanzen gefragt werden, sei nochmals darauf hingewiesen, dass alle Ihre Angaben streng vertraulich behandelt werden und wir keine Informationen erheben, die direkt auf Ihre Person rückschließen lassen.

IMN-Studie

Fragenseite 13 von 18

Welche der folgenden Substanzen haben Sie in Ihrem bisherigen Leben jemals konsumiert ?

(gemeint ist nur nicht-medizinischer Gebrauch)

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

<input checked="" type="checkbox"/> Tabak
<input checked="" type="checkbox"/> Alkoholische Getränke
<input checked="" type="checkbox"/> Cannabis
<input checked="" type="checkbox"/> Kokain
<input checked="" type="checkbox"/> Amphetamine
<input checked="" type="checkbox"/> Inhalantien
<input checked="" type="checkbox"/> Beruhigungsmittel und Schlaftabletten
<input checked="" type="checkbox"/> Halluzinogene
<input checked="" type="checkbox"/> Opiate
<input checked="" type="checkbox"/> Andere
<input type="checkbox"/> Ich habe noch keine dieser Substanzen jemals konsumiert.

Welche andere Substanz haben Sie in Ihrem bisherigen Leben bereits konsumiert?

(auch Angabe mehrerer Substanzen möglich)

Bitte wählen Sie mindestens eine Antwort.

andere Substanz 1	<input type="text" value="Salvia Divinorum"/>
andere Substanz 2	<input type="text"/>
andere Substanz 3	<input type="text"/>

<< Zurück

Weiter >>

IMN-Studie

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Haben Sie eine der von Ihnen genannten Substanzen auch im Zeitraum der letzten drei Monate konsumiert?

- Ja
- Nein

Welche der von Ihnen genannten Substanzen haben Sie im Zeitraum der letzten drei Monate konsumiert?*Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.*

- Tabak
- Alkoholische Getränke
- Cannabis
- Kokain
- Amphetamine
- Inhalantien
- Beruhigungsmittel und Schlaftabletten
- Halluzinogene
- Opiate
- Salvia Divinorum

Wenn Sie an die letzten drei Monate zurückdenken, wie oft haben Sie dann die von Ihnen genannten Substanzen konsumiert?

	1-2 mal	monatlich	wöchentlich	täglich oder fast täglich
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Wenn Sie an die letzten drei Monate zurückdenken, wie oft haben Sie einen starken Wunsch oder ein starkes Verlangen verspürt, eine der von Ihnen genannten Substanzen zu konsumieren?

	nie	1-2 mal	monatlich	wöchentlich	täglich oder fast täglich
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wenn Sie an die letzten drei Monate zurückdenken, wie oft hat der Konsum der von Ihnen genannten Substanzen zu Problemen geführt, d.h. zu gesundheitlichen oder finanziellen Problemen, zu Konflikten mit dem Gesetz, oder zu Schwierigkeiten im sozialen Umfeld?

	nie	1-2 mal	monatlich	wöchentlich	täglich oder fast täglich
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wenn Sie an die letzten drei Monate zurückdenken, wie oft haben Sie es wegen des Konsums der von Ihnen genannten Substanzen nicht geschafft, Dinge zu erledigen, die man für gewöhnlich von Ihnen erwartet ?

	nie	1-2 mal	monatlich	wöchentlich	täglich oder fast täglich
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

IMN-Studie

Fragenseite 16 von 18

Haben sich Freunde, Verwandte oder andere Personen **jedemals** besorgt gezeigt, weil Sie eine der folgend genannten Substanzen konsumieren?

	nie	ja, in den letzten drei Monaten	ja, aber nicht in den letzten drei Monaten
Tabak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannabis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beruhigungsmittel und Schlafmittel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Halluzinogene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opiate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salvia Divinorum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Haben Sie **jedemals** versucht, den Konsum einer der von Ihnen genannten Substanzen zu kontrollieren, zu reduzieren oder ganz aufzugeben und es nicht geschafft ?

	nie	ja, in den letzten drei Monaten	ja, aber nicht in den letzten drei Monaten
Tabak	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alkoholische Getränke	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cannabis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kokain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amphetamine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inhalantien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Beruhigungsmittel und Schlafmittel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Halluzinogene	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Opiate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Salvia Divinorum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Wie oft fühlten Sie sich im Verlauf der **letzten zwei Wochen** durch folgende Beschwerden beeinträchtigt?

	Überhaupt nicht	An einzelnen Tagen	An mehr als der Hälfte der Tage	Beinahe jeden Tag
Gefühle der Nervosität, Ängstlichkeit oder Anspannung	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unfähigkeit, Sorgen zu stoppen oder zu kontrollieren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Übermäßige Sorgen bezüglich verschiedener Angelegenheiten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schwierigkeiten, sich zu entspannen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
So rastlos sein, dass das Stillsitzen schwer fällt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schnelle Verärgerung oder Gereiztheit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Angstgefühle, so als könnte etwas Schreckliches passieren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie oft fühlten Sie sich im Verlauf der **letzten zwei Wochen** durch die folgenden Beschwerden beeinträchtigt?

	Überhaupt nicht	An einzelnen Tagen	An mehr als der Hälfte der Tage	Beinahe jeden Tag
Wenig Interesse oder Freude an Ihren Tätigkeiten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Niedergeschlagenheit, Schwermut oder Hoffnungslosigkeit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schwierigkeiten ein- oder durchzuschlafen oder vermehrter Schlaf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Müdigkeit oder Gefühl, keine Energie zu haben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verminderter Appetit oder übermäßiges Bedürfnis zu essen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schlechte Meinung von sich selbst; Gefühl, ein Versager zu sein oder die Familie enttäuscht zu haben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schwierigkeiten, sich auf etwas zu konzentrieren, z.B. beim Zeitunglesen oder Fernsehen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waren Ihre Bewegungen oder Ihre Sprache so verlangsamt, dass es auch anderen auffallen würde? Oder waren Sie im Gegenteil „zappelig“ oder ruhelos und hatten dadurch einen stärkeren Bewegungsdrang als sonst?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gedanken, dass Sie lieber tot wären oder sich Leid zufügen möchten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bitte überprüfen Sie, wie sehr Sie die folgenden Probleme **während der letzten Woche** belastet haben.

Nutzen Sie zur Angabe des Schweregrads, mit welchem das jeweilige Problem Sie belastet hat, bitte die vorgegebene Antwortskala.

	Überhaupt nicht	Wenig	Ziemlich	Sehr stark	Extrem
Aus Angst vor Verlegenheit vermeide ich es, bestimmte Dinge zu tun oder Personen anzusprechen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich vermeide Aktivitäten durch die ich im Mittelpunkt der Aufmerksamkeit stehe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sich zu schämen oder dumm zu wirken, gehören zu meinen schlimmsten Ängsten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lesen Sie bitte die nachfolgenden Fragen und beurteilen Sie selbst, inwiefern diese Ihr Verhalten und Empfinden **in den letzten 6 Monaten** widerspiegeln.

Nutzen Sie bitte die vorgegebene Antwortskala, um die Häufigkeit des jeweils fragten Verhaltens für sich selbst anzugeben.

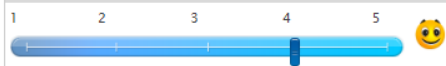
	Niemals	Selten	Manchmal	Oft	Sehr oft
Wie oft haben Sie Probleme, die letzten Feinheiten einer Arbeit zum Abschluss zu bringen, nachdem Sie die wesentlichen Punkte erledigt haben?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fällt es Ihnen schwer, Dinge in die Reihe zu bekommen, wenn Sie an einer Aufgabe arbeiten, bei der Organisation gefragt ist?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft haben Sie Probleme, sich an Termine oder Verabredungen zu erinnern?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft vermeiden Sie oder verzögern Sie, die Aufgabe zu beginnen, wenn Sie vor einer Aufgabe stehen, bei der sehr viel Denkvermögen gefragt ist?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft sind Ihre Hände bzw. Füße bei langem Sitzen in Bewegung?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fühlen Sie sich übermäßig aktiv und verspüren den Drang Dinge zu tun, als ob Sie von einem Motor angetrieben würden?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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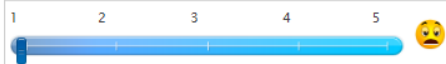
Fragenseite 18 von 18

Fanden Sie die Ihnen vorgelegte Version des Fragebogens visuell ansprechend und klar gegliedert?

(von "1 - sehr unübersichtlich und gar nicht ansprechend" bis "5- sehr übersichtlich und ansprechend")

**Fanden Sie die Anzahl der Fragen zu hoch und die Bearbeitungsdauer zu lang?**

(von "1- viel zu viele Fragen, zu lang" bis "5- gute Anzahl an Fragen, nicht zu lang")

**Hätten Sie konkrete Verbesserungsvorschläge für die visuelle oder auch inhaltliche Gestaltung des Fragebogens?**

VIIIEEEEEL zu kurze Umfrage!!!!

🔔 (Angaben zu dieser Frage sind freiwillig)

Appendix B - Digitized Surveys used for Study 2

1. ESP-Questionnaire Programming

```

questions-live.txt - Editor
Datei Bearbeiten Format Ansicht ?
-|welche Messung steht bei Ihnen an? |Morgenmessung %NEXT 35 |Messung unter dem Tag |Abendmessung %NEXT 15
1|wie fühlen Sie sich gerade? %TYPE slider|sehr gut|sehr schlecht
2|wie einsam fühlen Sie sich gerade? %TYPE slider %PROB 50 %NEXT 5|gar nicht|sehr stark
3|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
4|wie einsam fühlen Sie sich gerade? %TYPE slider %NEXT 6|gar nicht|sehr stark
5|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
6|wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE slider %PROB 50 %NEXT 9|gar keine|sehr viel
7|wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE slider|gar keinen|sehr viel
8|wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE slider %NEXT 10|gar keine|sehr viel
9|wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE slider|gar keinen|sehr viel
10|In Minuten ausgedrückt, wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE text %PROB 50 %NEXT 13
11|In Minuten ausgedrückt, wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE text
12|In Minuten ausgedrückt, wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE text %NEXT 899
13|In Minuten ausgedrückt, wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE text %NEXT 899
15|wie fühlen Sie sich gerade? %TYPE slider|sehr gut|sehr schlecht
16|wie einsam fühlen Sie sich gerade? %TYPE slider %PROB 50 %NEXT 19|gar nicht|sehr stark
17|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
18|wie einsam fühlen Sie sich gerade? %TYPE slider %NEXT 20|gar nicht|sehr stark
19|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
20|wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE slider %PROB 50 %NEXT 23|gar keine|sehr viel
21|wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE slider|gar keinen|sehr viel
22|wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE slider %NEXT 24|gar keine|sehr viel
23|wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE slider|gar keinen|sehr viel
24|In Minuten ausgedrückt, wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE text %PROB 50 %NEXT 27
25|In Minuten ausgedrückt, wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE text
26|In Minuten ausgedrückt, wie viel Zeit haben Sie seit der letzten Befragung auf Facebook verbracht? %TYPE text %NEXT 28
27|In Minuten ausgedrückt, wie viel direkten Kontakt hatten Sie seit der letzten Befragung? %TYPE text
28|Die folgenden Fragen beziehen sich darauf, wie Sie Ihre DIREKTEN sozialen Interaktionen des heutigen Tages bewerten. |OK
29|wie stark waren die Interaktionen von emotionaler Nähe geprägt? %TYPE slider |gar nicht |sehr stark
30|wie stark haben die Interaktionen Ihnen das Gefühl vermittelt, Teil einer Gemeinschaft (Freunde, Familie etc.) zu sein? %TYPE slider |gar nicht |sehr stark
31|wie zufrieden sind Sie mit den DIREKTEN sozialen Interaktionen des heutigen Tages? %TYPE slider |gar nicht |sehr stark
32|wie gestresst waren Sie in den DIREKTEN sozialen Interaktionen des heutigen Tages? %TYPE slider %NEXT 899 |gar nicht |sehr stark
35|wie fühlen Sie sich gerade? %TYPE slider|sehr gut|sehr schlecht
36|wie einsam fühlen Sie sich gerade? %TYPE slider %PROB 50 %NEXT 39|gar nicht|sehr stark
37|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
38|wie einsam fühlen Sie sich gerade? %TYPE slider %NEXT 899|gar nicht|sehr stark
39|wie beunruhigt fühlen Sie sich gerade? %TYPE slider|gar nicht|sehr stark
899|Haben Sie sich bei der Bearbeitung des Fragebogens vertippt und möchten Eingaben korrigieren? |Ja %NEXT -1 |nein
900|Das war's - Sie können das Gerät nun ausschalten. Zum Start einer späteren Messung klicken Sie einfach auf 'OK' und folgen Sie den Anweisungen. |OK

```

2. Lab-based assessment of trait measures

FGA-Termin 1

0% 100%


Im Folgenden werden Ihnen einige Fragen zu Ihrer Person sowie zu allgemeinen Aspekten Ihrer Internetnutzung gestellt. Bitte beantworten Sie alle Fragen und lassen Sie keine der Fragen aus.

Hier gibt der Versuchsleiter einen individualisierten VP-Code für Sie ein:

Wie alt sind Sie?

Ich bin Jahre alt

In dieses Feld dürfen nur Ziffern eingetragen werden.

 (bitte in ganzen Jahren angeben)

Welches Geschlecht haben Sie?

weiblich

männlich

Welche Staatsbürgerschaft haben Sie?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

Deutsche Staatsbürgerschaft

Andere Staatsbürgerschaft

Doppelte Staatsbürgerschaft

bei doppelter oder anderer Staatsbürgerschaft bitte genaue Angaben im Textfeld:

Was ist Ihre Muttersprache?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

deutsch

andere

bei anderer Muttersprache bitte genaue Angaben im Textfeld nebenan

Haben Sie derzeit einen festen Partner / eine feste Partnerin?

Ja

Nein

Wie ist Ihre derzeitige Wohnsituation? Ich lebe...

Bitte wählen Sie eine der folgenden Antworten:

Wie viele Personen leben, wohnen und wirtschaften gemeinsam in Ihrem Haushalt? Zählen Sie dabei bitte sich selbst und auch Kinder mit. (z.B. 1 Person, d.h. nur Sie selbst)

In meinem Haushalt leben insgesamt Personen

In dieses Feld dürfen nur Ziffern eingetragen werden.

In welcher Wohngegend leben Sie?

Bitte wählen Sie eine der folgenden Antworten:

Welchen höchsten Bildungsabschluss haben Sie bislang erreicht?

Bitte wählen Sie eine der folgenden Antworten:

Sind Sie zurzeit erwerbstätig? Unter Erwerbstätigkeit wird jede bezahlte bzw. mit einem Einkommen verbundene Tätigkeit verstanden, egal welchen zeitlichen Umfang sie hat.

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- vollzeit erwerbstätig
- teilzeit erwerbstätig
- geringfügig erwerbstätig (450-Euro Job bzw. Mini-Job)
- "Ein-Euro-Job" (bei Bezug von Arbeitslosengeld II)
- gelegentlich oder unregelmäßig beschäftigt
- berufliche Ausbildung/ Lehre
- vorübergehend freigestellt bzw. beurlaubt (z.B. Elternzeit)
- nicht erwerbstätig (auch: Rentner)

Im Folgenden werden Ihnen einige Fragen zu Ihrer Person sowie zu allgemeinen Aspekten Ihrer Internetnutzung gestellt. Bitte beantworten Sie alle Fragen und lassen Sie keine der Fragen aus.

Welchen Zugang / Welche Zugänge zum Internet nutzen Sie?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Smartphone
- Tablet
- privater PC/Laptop
- beruflicher/schulischer/universitärer Arbeitsplatzrechner
- PC im Internet-Café
- internetfähige Spielekonsole (Playstation, Xbox, Wii etc.)
- andere internetfähige Hardware

(Mehrfachantworten sind erlaubt)

Die folgenden Fragen beziehen sich allesamt ausschließlich auf Ihre private Nutzung des Internets. Bitte berücksichtigen Sie dies bei der Beantwortung der Fragen.

Für welche Zwecke und Aktivitäten nutzen Sie das Internet?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Ich nutze das Internet nicht für private Zwecke
- bestehende private Kontakte pflegen
(facebook, E-Mail, Skype, WhatsApp etc.)
- neue Kontakte knüpfen
(Chats, Dating-Seiten, facebook, etc.)
- Surfen/ ungerichtete Informationssuche
- zielgerichtete Informationssuche
(wikipedia, Nachrichten, Preisvergleiche, Foren lesen, Urlaubsplanung etc.)
- Einkaufen/ Auktionen
(z.B. amazon, ebay, zalando, alternate etc.)
- Unterhaltung – Anschauen/Download von Videos/Bildern
(youtube, 9gag.com, Mediatheken etc.)
- Unterhaltung – Hören/Download von Musik
(itunes, amazon, spotify, Online-Radio etc.)
- Unterhaltung – Onlinespiele
(WoW, Battlefield, Bubble Shooter, Quizduell etc.)
- regelmäßiges Schreiben in Foren
- Onlinewetten/-glücksspiele
(Poker, Sportwetten, etc.)
- Onlinebanking
- Pornographie
- Andere Aktivität(en)

(Mehrfachantworten sind erlaubt)

Welche(n) andere(n) Aktivität(en) gehen Sie im Internet nach?

Bitte wählen Sie mindestens eine Antwort.

Aktivität 1

Aktivität 2

Aktivität 3

Aktivität 4

Aktivität 5

Welche der von Ihnen genannten Internetaktivitäten nutzen Sie am häufigsten? Wählen Sie hierzu zunächst bis zu **maximal DRE** von Ihnen am häufigsten genutzten Internetaktivitäten an.

Bitte wählen Sie maximal 3 Antworten.

<input checked="" type="checkbox"/> bestehende private Kontakte pflegen (facebook, E-Mail, Skype, WhatsApp etc.)
<input type="checkbox"/> Unterhaltung – Hören/Download von Musik (itunes, amazon, spotify, Online-Radio etc.)
<input checked="" type="checkbox"/> HalliGalli

Wie häufig gehen Sie ihren **Haupt-Internetaktivitäten** nach?

	mehrmals täglich	täglich	mehrmals die Woche	einmal die Woche	weniger als einmal in der Woche
bestehende private Kontakte pflegen (facebook, E-Mail, Skype, WhatsApp etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HalliGalli	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie lange gehen Sie den von Ihnen genannten Hauptaktivitäten im Internet **pro Woche** (Stunden pro Woche) nach?

bestehende Kontakte pflegen ca. Stunden pro Woche

HalliGalli ca. Stunden pro Woche

ⓘ (Die Nutzungsdauer soll nur bei Aktivitäten angegeben werden, denen mindestens einmal in der Woche nachgegangen wird)

Wie viele Stunden pro Woche nutzen Sie das Internet insgesamt für Ihre privaten Zwecke?

Ich nutze das Internet für ca. Stunden pro Woche für private Zwecke

In dieses Feld dürfen nur Ziffern eingetragen werden.

Die folgenden Aussagen beziehen sich auf mögliche Nutzungsmotive für Ihre Onlineaktivitäten. Bitte lesen Sie jede Aussage und überlegen Sie, inwiefern Sie dieser zustimmen würden. Zum Ausdruck des Grades Ihrer Zustimmung steht Ihnen die folgende Skala zur Verfügung:

- 1: "Stimme ganz und gar nicht zu"
 2: "Stimme weitgehend nicht zu"
 3: "Stimme teilweise zu"
 4: "Stimme weitgehend zu"
 5: "Stimme voll und ganz zu"

Ich nutze das Internet ...

	Stimme ganz und gar nicht zu	Stimme weitgehend nicht zu	Stimme teilweise zu	Stimme weitgehend zu	Stimme voll und ganz zu
... damit ich mitreden kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich Denkanstöße bekomme	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich informieren möchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dabei entspannen kann	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es mir Spaß macht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich dann nicht allein fühle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich mich ablenken möchte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil es aus Gewohnheit dazugehört	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... weil ich dort Dinge erfahre, die für meinen Alltag nützlich sind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die folgenden Fragen beziehen sich auf Ihr Verhalten sowie Ihre Gedanken und Gefühle in Zusammenhang mit Ihren Internetaktivitäten. Beziehen Sie sich in Ihren Antworten bitte auf den Zeitraum der letzten drei Monate.

Bitte beantworten Sie die folgenden Fragen anhand der folgenden Skala:

- "überhaupt nicht"
- "selten"
- "manchmal"
- "oft"
- "immer"

	Überhaupt nicht	Selten	Manchmal	Oft	Immer
Wie oft stellen sie fest, dass Sie länger als beabsichtigt im Internet waren?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft vernachlässigen Sie alltägliche Pflichten, um mehr Zeit online zu verbringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig leiden Ihre Noten, Ihre schulische, Ihre universitäre oder Ihre berufliche Arbeit darunter, weil Sie so viel Zeit online verbringen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig verhalten Sie sich ausweichend oder defensiv, wenn Sie jemand fragt, was Sie online tun?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft reagieren Sie patzig, schimpfen oder sind genervt, wenn Sie jemand stört, während Sie online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fehlt Ihnen der Schlaf, weil Sie sich spät nachts noch einloggen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Überhaupt nicht	Selten	Manchmal	Oft	Immer
Wie oft denken Sie ans Internet, wenn Sie offline sind oder stellen sich vor, online zu sein?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft ertappen Sie sich dabei zu sagen: „Nur noch ein paar Minuten“, während Sie online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig versuchen Sie weniger Zeit im Internet zu verbringen und schaffen es nicht?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie häufig versuchen Sie zu verbergen, wie lange Sie online waren?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft kommt es vor, dass sie lieber mehr Zeit online verbringen als mit anderen auszugehen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie oft fühlen Sie sich deprimiert, verstimmt oder nervös, wenn Sie offline sind – was sich ändert, wenn Sie wieder online sind?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Beurteilen Sie bitte, inwiefern die folgenden Aussagen auf Ihr Denken und Handeln in vergangenen unangenehmen oder schwierigen Situationen zutreffen. Bitte machen Sie zu jeder Aussage eine Angabe.

	überhaupt nicht	ein bisschen	ziemlich	sehr
Ich habe mich mit Arbeit oder anderen Sachen beschäftigt, um auf andere Gedanken zu kommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mich darauf konzentriert, etwas an meiner Situation zu verändern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir eingeredet, daß das alles nicht wahr ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Alkohol oder andere Mittel zu mir genommen, um mich besser zu fühlen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe aufmunternde Unterstützung von anderen erhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe es aufgegeben, mich damit zu beschäftigen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe aktiv gehandelt, um die Situation zu verbessern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	überhaupt nicht	ein bisschen	ziemlich	sehr
Ich wollte einfach nicht glauben, daß mir das passiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe meinen Gefühlen freien Lauf gelassen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe andere Menschen um Hilfe und Rat gebeten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Um das durchzustehen, habe ich mich mit Alkohol oder anderen Mitteln besänftigt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, die Dinge von einer positiveren Seite zu betrachten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mich selbst kritisiert und mir Vorwürfe gemacht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, mir einen Plan zu überlegen, was ich tun kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Fortsetzung)

	überhaupt nicht	ein bisschen	ziemlich	sehr
Jemand hat mich getröstet und mir Verständnis entgegengebracht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gar nicht mehr versucht, die Situation in den Griff zu kriegen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, etwas Gutes in dem zu finden, was mir passiert ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Witze darüber gemacht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe etwas unternommen, um mich abzulenken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mich damit abgefunden, daß es passiert ist.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe offen gezeigt, wie schlecht ich mich fühle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	überhaupt nicht	ein bisschen	ziemlich	sehr
Ich habe versucht, Halt in meinem Glauben zu finden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe versucht, von anderen Menschen Rat oder Hilfe einzuholen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gelernt, damit zu leben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir viele Gedanken darüber gemacht, was hier das Richtige wäre.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mir für die Dinge, die mir widerfahren sind, selbst die Schuld gegeben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe gebetet oder meditiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe alles mit Humor genommen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Im Folgenden finden Sie eine Liste mit Aussagen, die Ihre Gefühle und Gedanken zu sich selbst betreffen. Bitte lesen Sie jede dieser Aussagen und entscheiden Sie, inwiefern diese auf Sie zutrifft oder nicht. Drücken Sie den Grad Ihrer Zustimmung mit Hilfe der vorgegebenen Antwortskala aus:

"trifft gar nicht zu"
 "trifft kaum zu"
 "trifft eher zu"
 "trifft voll und ganz zu"

	trifft gar nicht zu	trifft kaum zu	trifft eher zu	trifft voll und ganz zu
Alles in allem bin ich mit mir selbst zufrieden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hin und wieder denke ich, dass ich gar nichts taue.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich besitze eine Reihe guter Eigenschaften.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kann vieles genauso gut wie die meisten anderen Menschen auch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fürchte, es gibt nicht viel, worauf ich stolz sein kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	trifft gar nicht zu	trifft kaum zu	trifft eher zu	trifft voll und ganz zu
Ich fühle mich von Zeit zu Zeit richtig nutzlos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich halte mich für einen wertvollen Menschen, jedenfalls bin ich nicht weniger wertvoll als andere auch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich wünschte, ich könnte vor mir selbst mehr Achtung haben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alles in allem neige ich dazu, mich für einen Versager zu halten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe eine positive Einstellung zu mir selbst gefunden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bitte geben Sie für die folgenden 5 Aussagen an, inwieweit Sie diesen zustimmen.

	stimme überhaupt nicht zu	stimme nicht zu	stimme eher nicht zu	weder/ noch	stimme eher zu	stimme zu	stimme völlig zu
In den meisten Bereichen entspricht mein Leben meinen Idealvorstellungen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Lebensbedingungen sind ausgezeichnet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin mit meinem Leben zufrieden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bisher habe ich die wesentlichen Dinge erreicht, die ich mir für mein Leben wünsche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich mein Leben noch einmal leben könnte, würde ich kaum etwas ändern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie oft fühlten Sie sich im Verlauf der letzten zwei Wochen durch die folgenden Beschwerden beeinträchtigt?

	Überhaupt nicht	An einzelnen Tagen	An mehr als der Hälfte der Tage	Beinahe jeden Tag
Wenig Interesse oder Freude an Ihren Tätigkeiten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Niedergeschlagenheit, Schwermut oder Hoffnungslosigkeit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schwierigkeiten ein- oder durchzuschlafen oder vermehrter Schlaf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Müdigkeit oder Gefühl, keine Energie zu haben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Verminderter Appetit oder übermäßiges Bedürfnis zu essen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schlechte Meinung von sich selbst; Gefühl, ein Versager zu sein oder die Familie enttäuscht zu haben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schwierigkeiten, sich auf etwas zu konzentrieren, z.B. beim Zeitunglesen oder Fernsehen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waren Ihre Bewegungen oder Ihre Sprache so verlangsamt, dass es auch anderen auffallen würde? Oder waren Sie im Gegenteil „zappelig“ oder ruhelos und hatten dadurch einen stärkeren Bewegungsdrang als sonst?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gedanken, dass Sie lieber tot wären oder sich Leid zufügen möchten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Im folgenden finden Sie eine Reihe von Aussagen, die Ihre Beziehungen und Einstellungen zu anderen Menschen und zu sich selbst betreffen. Bitte überlegen Sie bei jeder Aussage kurz ob und wie stark Sie ihr zustimmen bzw. Sie sie ablehnen. Klicken Sie dann auf das entsprechende Antwortfeld.

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Ich fühle mich in Einklang mit mir selbst.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich schaffe es nicht, Freunde zu finden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe einen Menschen, der mir die Bestätigung gibt, die ich brauche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich allein bin, weiß ich meist nicht recht, was ich machen soll oder kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich wünsche mir mehr sexuelle Verbundenheit mit (einem) anderen Menschen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Ich habe oft die Gelegenheit versäumt, Bekanntschaften zu Freundschaften auszubauen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe leicht ein Gefühl der Teilnahmslosigkeit und inneren Leere, wenn ich mit anderen Menschen zusammen bin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt (fast) keine Menschen, mit denen ich mich wirklich eng verbunden fühle.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es fällt mir schwer, Einsamkeit als etwas zum Leben Gehörendes zu akzeptieren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich weiß nicht recht, wie ich die Kontakte zu anderen Menschen vertiefen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Fortsetzung)

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Die anderen legen meist keinen großen Wert auf meine Gesellschaft.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe Vertrauen in meine Fähigkeit, eine befriedigende Partnerschaft aufzubauen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aus dem Alleinsein schöpfe ich neue Kraft.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe soviel mitmenschliche Geborgenheit, wie ich mir wünsche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich einsam bin, weiß ich mir nicht zu helfen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Ich weiß, an wen ich mich wenden kann, wenn ich in Schwierigkeiten gerate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich meist als Außenseiter, wenn ich mit einer Gruppe von Leuten zusammen bin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es fällt mir im allgemeinen leicht, Freundschaften zu schließen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Normalerweise ergreife ich die Initiative, wenn ich mit anderen etwas unternehmen will, anstatt darauf zu warten, daß mich jemand anspricht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auch wenn ich allein bin, kann ich mich mit anderen Menschen eng verbunden fühlen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Fortsetzung)

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Es gibt jemanden, der sich wirklich für mich interessiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Letztlich bleibt immer ein unüberwindbarer Graben zwischen mir und den anderen Menschen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich allein bin, fühle ich mich rasch einsam.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe eine befriedigende Partnerbeziehung zu einem Menschen, der mir etwas bedeutet und dem ich auch etwas bedeute.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Kontakte zu anderen Menschen sind im allgemeinen so tiefgehend, wie ich es mir wünsche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Mir fehlen Leute, mit denen zusammen ich mich vergnügen kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich vermisse einen Menschen, mit dem ich meine Sorgen und Freuden teilen könnte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alleinsein ist für mich etwas Schlimmes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bisher hat mir auch in meinen engsten Beziehungen die eigentliche Verbundenheit gefehlt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In der Regel finde ich einen Zugang zu anderen Menschen, wenn ich dies möchte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Fortsetzung)

	Ich lehne vollkommen ab.	Ich lehne überwiegend ab.	Weder noch / unentschieden	Ich stimme überwiegend zu.	Ich stimme vollkommen zu.
Ich habe gute Möglichkeiten, mir Alleinsein so angenehm wie möglich zu gestalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt Menschen, für deren Wohlbefinden ich wichtig bin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Zu viel Nähe zu anderen Menschen ist mir unbehaglich.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Liebesbeziehungen sind selten von langer Dauer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich habe mindestens einen guten Freund bzw. eine gute Freundin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich nicht ab und zu allein bin, kann ich auch die Gemeinsamkeit nicht richtig schätzen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es gibt jemanden in meiner Nähe, der mich wirklich versteht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Auf den folgenden Seiten finden Sie Feststellungen über das Verhalten in zwischenmenschlichen Situationen. Versuchen Sie, sich die betreffende Situation so anschaulich wie möglich vorzustellen. Beurteilen Sie, wie Sie selbst sich in dieser konkreten Situation üblicherweise fühlen oder wie sie reagieren würden.

Neben jeder Feststellung sind sechs Antwortmöglichkeiten angegeben.

Diese reichen von:

"Stimmt gar nicht" (trifft nie zu)

bis

"Stimmt vollkommen" (trifft fast immer zu).

Die Felder dazwischen geben Ihnen die Möglichkeit, Ihre Antwort feiner abzustufen: Sie stehen für eine zunehmende oder abnehmende Zustimmung Ihrerseits bezüglich der jeweiligen Feststellung. Beginnen Sie jetzt mit der Beantwortung auf den folgenden Seiten. Bitte lassen Sie keine Feststellung aus und arbeiten Sie zügig, ohne zu lange zu überlegen. Versuchen Sie bitte nicht, einen guten Eindruck zu machen, sondern antworten Sie nach Ihrem Bauchgefühl und möglichst wahrheitsgemäß.

	stimmt gar nicht					stimmt vollkommen
Ich unterlasse alles, was Widerspruch herausfordern könnte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn mir jemand ins Wort fällt, fordere ich ihn auf, mich ausreden zu lassen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bei Meinungsverschiedenheiten bin ich immer der Erste, der nachgibt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich finde es schwierig, andere zu loben oder ein Kompliment zu machen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin sehr selbstsicher.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich neige dazu, eher nachzugeben als einen Streit anzufangen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	stimmt gar nicht					stimmt vollkommen
Es ist mir unangenehm, wenn ich jemandem zu Dank verpflichtet bin.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In Gegenwart von Autoritätspersonen bin ich immer verwirrt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich vermeide möglichst unangenehme Auseinandersetzungen, auch wenn sie notwendig wären.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn mich mein Vorgesetzter zu Unrecht tadelt, kann ich mich immer erfolgreich verteidigen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich lasse meine Entscheidungen leicht wieder von anderen Leuten umwerfen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es fehlt mir sicher an Selbstvertrauen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(Fortsetzung)

	stimmt gar nicht					stimmt vollkommen
Ich äußere meinen Ärger sofort, wenn ein Freund mich zu Unrecht kritisiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn jemand meine Arbeit kritisiert, bringe ich gar nichts mehr zustande.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich kann immer eine angemessene Bezahlung für meine Arbeit fordern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin gewöhnlich still "um des lieben Friedens willen".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es ist mir unangenehm, Freunde um einen Gefallen zu bitten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich sehr schnell hilflos.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	stimmt gar nicht					stimmt vollkommen
Ich habe ständig Angst, dass ich etwas Falsches sagen oder tun könnte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Forderungen kann ich leicht durchsetzen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es ist mir peinlich, wenn andere mir Hilfe anbieten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es fällt mir schwer, jemanden zu sagen, dass ich ihn mag.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich versuche fast immer, meine Gefühle zu verbergen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Es ist mir unmöglich mit Menschen, die mir nahe stehen, zu streiten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die Fragen auf den folgenden Seiten beziehen sich auf Ihre Nutzung des sozialen Netzwerkdienstes Facebook.

Wie oft gehen Sie den folgend genannten Aktivitäten im sozialen Netzwerk Facebook nach?

	Nie	Einmal im Monat	Mehrmals im Monat	Einmal in der Woche	Mehrmals in der Woche	Einmal am Tag	Mehrmals am Tag	Einmal pro Stunde	Mehrmals pro Stunde	Die ganze Zeit über
Überprüfen der eigenen Facebook-Seite	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Überprüfen der eigenen Facebook-Seite vom Smartphone aus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Überprüfen der eigenen Facebook-Seite von PC/Laptop/Tablet aus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Überprüfen der eigenen Facebook-Seite in der Arbeit/Schule/Universität	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Nie	Einmal im Monat	Mehrmals im Monat	Einmal in der Woche	Mehrmals in der Woche	Einmal am Tag	Mehrmals am Tag	Einmal pro Stunde	Mehrmals pro Stunde	Die ganze Zeit über
Posten von Fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Posten von Status-Updates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Browsen von Nutzerprofilen und Fotos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lesen von Mitteilungen und Kommentaren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Komentieren von Mitteilungen, Kommentaren, Status-Updates, Fotos etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Klicken des „Gefällt mir“-Buttons bei Mitteilungen, Kommentaren, Fotos etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benutzen des Chat-Dialogs für "Private Nachrichten"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bitte beantworten Sie die folgenden Fragen zu Ihren Facebook-Freunden und -Bekanntschäften.

Wie viele Freunde haben Sie auf Facebook?

In dieses Feld dürfen nur Ziffern eingetragen werden.

Sie können sich hierzu in einem neuen Tab kurz auf Facebook einloggen und die genaue Zahl verifizieren

	0	1-50	51-100	101-175	176-250	251-375	376-500	501-750	751 oder mehr
Wie viele Ihrer Facebook-Freunde kennen Sie persönlich?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wie viele Personen haben Sie online kennengelernt, die sie noch nie persönlich getroffen haben?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mit wie vielen Personen haben Sie regelmäßig Kontakt, die sie noch nie persönlich getroffen haben?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sind Sie mit Ihrer/m letzten Ex-PartnerIn nach wie vor über Facebook befreundet?

Bitte wählen Sie eine der folgenden Antworten:

- nein – obwohl er bzw. sie einen Facebook-Account besitzt
- ja
- trifft nicht auf mich zu – Ex-PartnerIn hat keinen Facebook-Account
- trifft nicht auf mich zu – ich habe keine/n Ex-PartnerIn

Sind Sie mit Ihrer Ex-Partnerin bzw. Ihrem Ex-Partner auch "offline" noch befreundet?

Bitte wählen Sie eine der folgenden Antworten:

- nein
- ja

Besuchen Sie auf Facebook regelmäßig die Profil-Seite Ihres Ex-Partners bzw. Ihrer Ex-Partnerin?

Bitte wählen Sie eine der folgenden Antworten:

- überhaupt nicht
- sehr selten
- eher selten
- eher häufig
- sehr häufig
- ständig

Wie viele Gedanken machen Sie sich über die frühere Beziehung zu Ihrem Ex-Partner bzw. Ihrer Ex-Partnerin?

Bitte wählen Sie eine der folgenden Antworten:

- überhaupt nicht
- sehr wenig
- eher wenig
- eher viel
- sehr viel
- ständig

Freundschaften und Bekanntschaften gehen bisweilen zu Bruch: Sie enden in Streit oder man entfernt sich aus verschiedenen anderen Gründen zunehmend voneinander.

Im realen Leben führt dies häufig dazu, dass man sich (soweit als möglich) aus dem Weg geht und somit nur noch wenig von der betreffenden Person mitbekommt.

Die folgenden Aussagen beziehen sich darauf, wie man auf Facebook mit Freundschaften umgeht, die im realen Leben eigentlich beendet sind. Lesen Sie bitte jede der Aussagen durch, und überlegen Sie, inwiefern diese auf Ihren Umgang mit den Betreffenden im Rahmen Ihres Facebook-Accounts zutreffen.

	trifft gar nicht zu	trifft eher nicht zu	trifft eher zu	trifft voll und ganz zu
Aufgekündigte Freundschaften lösche ich grundsätzlich aus meiner Freundesliste.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aufgekündigte Freundschaften ignoriere ich auf Facebook, ohne sie zu löschen (z.B. Ausblenden von Neuigkeiten).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich hole mir über Facebook keine Informationen zu aufgekündigten Freundschaften ein (über Dritte bzw. über deren Facebook-Seite)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mit aufgekündigten Freundschaften bleibe ich häufig weiterhin über Facebook befreundet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mit aufgekündigten Freundschaften versuche ich über Facebook im Kontakt zu bleiben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook hilft mir im Umgang mit aufgekündigten Freundschaften.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Wie häufig in den vergangenen 12 Monaten...

	Sehr selten	Selten	Manchmal	Oft	Sehr oft
...haben Sie viel Zeit damit verbracht über Facebook oder die geplante Benutzung von Facebook nachzudenken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...haben Sie den Drang verspürt, Facebook immer mehr zu benutzen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...haben Sie Facebook benutzt, um persönliche Probleme zu vergessen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...haben Sie erfolglos versucht, die Benutzung von Facebook zu reduzieren	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...sind Sie ruhelos oder aufgewühlt gewesen, wenn Sie Facebook nicht benutzen konnten oder durften?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...haben Sie Facebook in einem Ausmaß benutzt, dass dies einen negativen Einfluss auf Ihre täglichen Verpflichtungen (Beruf, Studium etc.) hatte?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Lab-based assessment of experiences

Hier gibt der Versuchsleiter Ihren individualisierten VP-Code ein:

Bitte geben Sie für die folgenden 5 Aussagen an, inwieweit Sie diesen zustimmen.

	stimme überhaupt nicht zu	stimme nicht zu	stimme eher nicht zu	weder/ noch	stimme eher zu	stimme zu	stimme völlig zu
In den meisten Bereichen entspricht mein Leben meinen Idealvorstellungen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Meine Lebensbedingungen sind ausgezeichnet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich bin mit meinem Leben zufrieden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bisher habe ich die wesentlichen Dinge erreicht, die ich mir für mein Leben wünsche.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich mein Leben noch einmal leben könnte, würde ich kaum etwas ändern.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die folgenden Aussagen beziehen sich darauf, wie Sie das Protokoll der Untersuchung (Zeitpunkte und Häufigkeit der Messungen) in Ihrem Alltag **an Werktagen** empfunden haben.

Bitte geben Sie anhand der vorgegebenen Skala an, wie sehr die jeweilige Aussage auf Sie zutrifft.

	trifft gar nicht zu	trifft eher nicht zu	trifft eher zu	trifft voll und ganz zu
Die Messungen habe ich als störend empfunden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen haben mich von meinem eigentlichen Alltag abgehalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen und das vereinbarte Protokoll haben sich gut in meinen Alltag eingefügt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Häufig hatte ich keine Lust mehr, die Messungen durchzuführen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Häufig habe ich mich einfach blind durch die Messungen geklickt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Morgenmessung war für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen unter dem Tag waren für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Abendmessung war für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die folgenden Aussagen beziehen sich darauf, wie Sie das Protokoll der Untersuchung (Zeitpunkte und Häufigkeit der Messungen) in Ihrem Alltag **an Wochenenden** empfunden haben.

Bitte geben Sie anhand der vorgegebenen Skala an, wie sehr die jeweilige Aussage auf Sie zutrifft.

	trifft gar nicht zu	trifft eher nicht zu	trifft eher zu	trifft voll und ganz zu
Die Messungen habe ich als störend empfunden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen haben mich von meinem eigentlichen Alltag abgehalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen und das vereinbarte Protokoll haben sich gut in meinen Alltag eingefügt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Häufig hatte ich keine Lust mehr, die Messungen durchzuführen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Häufig habe ich mich einfach blind durch die Messungen geklickt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Morgenmessung war für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Messungen unter dem Tag waren für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Abendmessung war für mich schwierig einzuhalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die folgenden Aussagen beziehen sich darauf, für wie sinnvoll und geeignet Sie die verwendete Methode und das durchgeführte Untersuchungsprotokoll empfunden haben.

Bitte geben Sie jeweils an, wie sehr Sie den folgenden diesbezüglichen Aussagen zustimmen.

	trifft gar nicht zu	trifft nicht zu	trifft eher nicht zu	trifft eher zu	trifft zu	trifft voll und ganz zu
Die verwendete Methode erscheint mir aus technischer Sicht ungeeignet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Versendung der SMS halte ich für verbesserungswürdig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Das Untersuchungsprotokoll erreicht aus meiner Sicht nicht das Ziel, möglichst unaufdringlich im Alltag der ProbandInnen durchführbar zu sein.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Das Format der Fragen auf den Palm-Geräten hat mir gefallen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auf das zusätzliche technische Gerät (das Palm-PDA) zu achten, empfand ich als nervig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die kurzen Fragebögen waren gut und vor allem schnell zu bearbeiten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Die folgenden Aussagen beziehen sich darauf, inwiefern die Untersuchung und ihre Inhalte bei Ihnen bestimmte Denkprozesse ausgelöst hat.

Bitte geben Sie für jede der Aussagen an, inwiefern Sie dieser zustimmen.

	trifft gar nicht zu	trifft nicht zu	trifft eher nicht zu	trifft eher zu	trifft zu	trifft voll und ganz zu
Die Untersuchung hat dazu geführt, dass ich über meine sozialen Kontakte nachgedacht habe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Untersuchung hat dazu geführt, dass ich über meinen Internetkonsum nachgedacht habe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Untersuchung hat dazu geführt, dass ich über die Art und Weise meiner Facebook-Nutzung nachgedacht habe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Untersuchung hat dazu geführt, dass ich mich schlecht fühlte, wenn ich Facebook benutzt habe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Forschung sollte sich meiner Meinung nach mit wichtigeren Themen beschäftigen als mit Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Eidesstattliche Versicherung

Ich erkläre hiermit an Eides Statt, dass ich die vorliegende Arbeit ohne unzulässige Hilfe Dritter und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt habe. Die aus anderen Quellen direkt oder indirekt übernommenen Textpassagen, Daten, Bilder oder Grafiken sind unter Angabe der Quelle gekennzeichnet. Bei der Auswahl und Auswertung folgenden Materials haben mir die nachstehend aufgeführten Personen in der jeweils beschriebenen Weise entgeltlich / unentgeltlich geholfen; dies ist auch in der Dissertation an den entsprechenden Stellen explizit ausgewiesen:

1. Christian Blum: unentgeltliche Hilfe bei der Auswahl und Implementierung eines SMS-Scheduling Services (Aapi SMS Scheduler) im Rahmen der Experience Sampling Studie in Kapitel III
2. Dr. Benjamin Wanklerl und Dorottya Bornemissza: unentgeltliche Hilfe bei der Einrichtung eines php-Skripts zur Verwirklichung einer von den Surveyantworten (Studie in Kapitel II) unabhängigen Verlosungsprozedur für einwilligende TeilnehmerInnen
3. Dr. Emanuel Finger: unentgeltliche Hilfe und Beratung bei der Installation und Einrichtung der Umfrage-Software Limesurvey auf einem Server der Universität Regensburg
4. Iris Balk und Katrin Gerstmayr: unentgeltliche Mitarbeit im Rahmen von wissenschaftlichen Qualifikationsarbeiten im Rahmen der Datenerhebungen zur Experience Sampling Studie in Kapitel III; Koordination und Durchführung von Datenerhebungen im Labor
5. Prof. em. Dr. Hermann Brandstätter: unentgeltliche und freundliche Weitergabe des Fragebogens zur Laufbahnproblembelastung seines früheren Kollegen Karl Heinz Seifert (†), mitsamt Auswertungshinweisen

Weitere Personen waren an der inhaltlich-materiellen Erstellung der vorliegenden Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die entgeltliche Hilfe von Vermittlungs- beziehungsweise Beratungsdiensten (Promotionsberater oder anderer Personen) in Anspruch genommen. Niemand hat von mir unmittelbar oder mittelbar geldwerte Leistungen für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen. Die Arbeit wurde bisher weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt.

Ich versichere an Eides Statt, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

Vor Aufnahme der obigen Versicherung an Eides Statt wurde ich über die Bedeutung der eidesstattlichen Versicherung und die strafrechtlichen Folgen einer unrichtigen oder unvollständigen eidesstattlichen Versicherung belehrt.

Regensburg, den _____,

(Andreas Reißmann)

Unterschrift des die Versicherung an Eides Statt aufnehmenden Beamten

Erklärung zu laufenden Promotionsverfahren

Hiermit erkläre ich, dass ich neben dem aktuell beantragten Promotionsverfahren an der Fakultät für Psychologie, Pädagogik und Sportwissenschaft der Universität Regensburg kein anderes Promotionsverfahren beantragt habe, weder zu einem früheren Zeitpunkt noch an anderer Stelle.

Regensburg, den _____,

(Andreas Reißmann, Antragssteller)