Investigating Basic Psychological Need Satisfaction and Value Signatures of Online Behaviors in Young Adults

Niklas Schmitt – 1988204

Department of Positive Clinical Psychology and Technology, University of Twente

202001490: Master Thesis PCPT

Dr. Hanneke Scholten

Dr. C. H. C. Drossaert

August 2021

Abstract

Introduction: The distribution and usage of the digital space has reached new heights, yet too much is still unknown about the effects of engaging in various online behaviors. This is especially true for young adults, as they are the most represented age group online and deal with the important task of identity development during this period of life, a crucial component of their current and future well-being. Part of this development is exploring and committing to a set of values, which are priorities guiding individuals' decision making and behavior. Another crucial part of healthy identity development in young adults is the satisfaction of the basic psychological needs for autonomy, competence, and relatedness. Both values and need satisfaction were scarcely researched in the online context. This led to the current study, investigating relations of online behaviors with values and need satisfaction by employing the method of Ecological Momentary Assessment (EMA), while also associating both identity development processes in the digital space with well-being.

Methods: Two surveys that were carried out before and after the EMA assessed participants' value traits, well-being, and general need satisfaction. During the EMA, participants were asked three times a day for seven days which recent online behavior was most important to them. They were asked to assign importance ratings of every value to this online act, as well as the degree of need satisfaction stemming from this online behavior for autonomy, competence, and relatedness.

Results: After aggregating the data, each online behavior could be associated with a value importance rating. Especially self-direction, hedonism, and stimulation seem to be important motivators when engaging in the digital space, as they were most prevalent. Also, average need satisfaction scores of every online behavior were obtained, with autonomy being mostly satisfied in the digital space. However, neither values nor online need satisfaction was significantly correlated with well-being.

Discussion: The current findings give the first insight into which values are common in the digital space and which psychological needs are satisfied through the online presence of young adults. Especially self-direction, stimulation, and hedonism seemed to be important during participants' online behaviors, even though most other values played a role as well in online behaviors. Regarding the psychological need satisfaction online, particularly autonomy was regularly satisfied through online engagement. Despite these general tendencies, the current study was one of the first to distinguish between different online behaviors regarding value importance and need satisfaction.

Introduction

Over the last two decades, the number of internet users increased immensely. In the year 2000, about 413 million people used the internet, constituting roughly 7% of the world population (Roser et al., 2015). Twenty years later, this number grew to almost 60%, and time spent online is increasing as well (Statista, 2021a; Statista, 2021b). As a result, behaviors such as staying in contact with peers, shopping, consuming entertainment, or acquiring knowledge, among many others, have shifted from offline to online spaces nowadays. The change in the way various activities are carried out paired with the expansive distribution across the globe makes the digital space an enticing topic for well-being research, especially considering the mixed results so far (Keles et al., 2020; Marchant et al., 2017; Padilla-Walker et al., 2010). The meta-analysis by Huang (2010) for example yielded small, but significant associations of internet use and decreased psychological well-being. Similarly, a systematic review by Keles and colleagues (2020) found depression, anxiety, and distress to be related to internet use in adolescents. On the other hand, various studies demonstrated different effects of internet use on well-being, such as finding no relationship at all, or even positive effects (Ali et al., 2015; Jensen et al., 2019; Orben et al., 2019; Verduyn et al., 2017). One explanation for divergent results might be that internet engagement has often been assessed with the simplistic construct of 'screen time', merely capturing time spent in front of devices and neglecting the variety of behaviors exerted online (Hollenstein & Colasante, 2020; Nesi et al., 2020). This is also what Granic and colleagues (2020) point out, calling for research that grants deeper insights into well-being relevant aspects of online experiences, especially regarding young adults.

Highlighting young adults in this domain of research seems even more justified when considering two facts. First, this age group is particularly represented in the digital space, with all of them using the internet in the U.S. and them being the most active age group on social media (Smith & Anderson, 2018; Statista, 2021c). A second reason is that young adulthood is a very susceptible phase of life, as identity development processes take place that are crucial for young adults' well-being (Arnett, 2000). A review by Wängqvist and Frisén (2016) indeed found processes such as self-presentation or identity experiments to extent into the digital space. Other processes, such as the internalization and revelation of personal values, or the satisfaction of basic psychological needs also seem imperative for healthy identity development (Hitlin, 2003; Schwartz, 2012; Wehmeyer et al., 2017). Both processes are well researched within offline

contexts, yet little is known about values and psychological need satisfaction in the digital space. Especially for such complex concepts, using oversimplified constructs such as 'screen time' seem inacceptable. Therefore, the current study used Ecological Momentary Assessment (EMA) to investigate young adults' online behaviors and associated values and need satisfaction real-time.

Young Adults and Well-being

While adolescence was long time viewed to describe the timespan between twelve and eighteen years of age, this perception has changed in recent years towards a more prolonged timespan (Jaworska & MacQueen, 2015; Sawyer et al., 2018). Especially in industrialized countries, fundamental societal changes occurred over the last century, as marriages and first births are now taking place at a later age and increased educational demands for today's economy led to prolonged duration of qualifications (Sawyer et al., 2018). Besides having more chances to thoroughly explore professional directions, adolescents also have more time to develop their personal identity; striving to answer questions about what defines them and what they want to represent now often continues into the mid-twenties (Arnett, 2000; Erikson, 1968; Sharon, 2016). Individuals in this late stage of adolescence are often referred to as young adults, which will also be the case for the remainder of this study (Arnett, 2000).

To investigate how young adults' well-being might be impacted by their online presence, a short conceptualisation of well-being is required. However, this might be easier said than done, as countless definitions of well-being are available that involve both philosophical and psychological aspects (Dodge et al., 2012). Especially in the scientific world, though, defining well-being as a measurable construct seems inevitable. By now, three important well-being elements keep coming up in the literature: emotional, psychological, and social well-being. The former entails the hedonistic aspects of high positive and low negative affect, as well as life satisfaction (Diener et al., 1999). Psychological well-being was defined by Ryff (1989) and comprises the elements self-acceptance, autonomy, positive relations, environmental mastery, purpose in life, and personal growth. Lastly, social well-being describes the need for social- integration, acceptance, contribution, coherence, and actualization (Keyes, 1998).

As of now, research is still divided over general well-being levels in this age group. While some studies suggest that well-being does not significantly change over the life course, especially not during young adulthood, others suggest an association of age and well-being (Baird et al., 2010; Butkovic et al., 2020; Horley & Lavery, 1995). Some of these contrasting studies also found well-being to be highest in adolescence and young adulthood, however more research is required

(Blanchflower & Oswald, 2008; Deaton, 2008). On the other hand, research seems to agree on the fact that young adulthood is an influential period in life that impacts current and future well-being strongly through developmental processes (Stroud et al., 2015). Many of these processes are part of identity development, which is strongly related to well-being, hinting at the importance to enhance healthy identity development (Karas et al., 2015; Sumner et al., 2015).

Identity development

Despite the abundance of research regarding identity development, finding one comprehensive definition of what constitutes an identity seems impossible. However, general agreement exists regarding the fact that personal identity is a rather stable entity, yet also dynamic as it unfolds across the lifespan, and that it comprises a rather consistent set of values, goals, and characteristics constituting the self-image (Erikson, 1968; Marcia, 1980; Schwartz, 2001; Schwartz et al., 2013). Thus, healthy identity development can be described as striving for personal growth and a coherent self-image, processes that are facilitated if basic psychological needs are met (Ryan & Deci, 2000). According to Erikson (1968), efforts to attain growth especially take place during late adolescence, as individuals often have not yet incorporated a set of values and aspirations to the self but are trying to find a proper spot within society (Arnett, 2000). Thus, the most important task during the life period of young adulthood seems to be the attainment of an own identity, setting the course for their future well-being (Sumner et al., 2015). Processes that mainly characterize growth during identity development concern self-exploration, also called crisis by Marcia (1980), and commitment. Self-exploration might best be described as an evaluation of priorities such as values, goals, and the incorporation of new world views, whereas commitment refers to integrating these views into the self-image and sticking to newly developed priorities lastingly (Erikson, 1968; Marcia, 1980). Considerable evidence is supporting the importance of these processes, demonstrating that both self-exploration and commitment contribute to well-being (Karas et al., 2015; Seiffge-Krenke & Weitkampf, 2020). Especially a lack of commitment is related to low levels of well-being, whereas high commitment, particularly when preceded by crisis and thus active self-exploration, is associated with high well-being levels (Schwartz et al., 2011; Waterman, 2007).

The fact that young adults spend large amounts of time in the digital space already points toward the necessity to investigate its effects on such identity relevant processes. This suggestion is backed-up by studies demonstrating that young adults indeed seem to engage in self-exploration such as identity experiments online (Valkenburg et al., 2005; Valkenburg & Peter, 2009). Sivan

and colleagues (2020) asked participants in-depth about self-explorative activities, finding browsing through the digital space as a means to broaden their view and revaluate their perceptions of themselves and others. In specific, such evaluations may lead to a reorganization of priorities and values, which serve as the basis for individuals' behaviors and attitudes (Schwartz, 2012). These revaluations especially take place during young adulthood, leading to a value system that is viewed as a stable part of our identity, allowing for a consistent self-image despite changing contexts and demands (Hitlin, 2003). Thus, it seems imperative to investigate which values are explored and potentially committed to by young adults in the digital space considering their significance for personal identity and well-being.

The Schwartz Theory of Basic Values

Apparently, values seem to form one of the most fundamental aspects of our identity (Hitlin, 2003). One of the most influential theories about values was developed by Schwartz (2012) and has since been adopted widely. He describes values as being the "motivational bases of attitudes and behavior", similar to a driving force for evaluations and behaviors (Schwartz, 2012, S.3). In a way, values reflect how we want to approach the world and what we consider as important in life to pursue, as values are weighed against each other and form a hierarchical system. Also, Schwartz (2012) noted values to be strongly connected to feelings and being context independent, and thus stable entities when eventually committed to.

Schwartz (2012) identified ten basic values, which can be grouped into four categories. Self-transcendence refers to putting selfish intentions last and rather being concerned with caring for other people's well-being and equality. It entails universalism and benevolence, intrinsic values that were found to be associated with higher well-being when committed to than other values (Hope et al., 2013; Schwartz, 2012). Indicating their fundamentally different orientation, self-enhancement values can be found on the opposite side in the circular structure in Schwartz's (2012) model. They are rather extrinsically motivated, as the value achievement relates to a focus on success and the display of abilities, while power priorities describe the seeking of resources and supremacy. A third category is called openness to change and is contrary to conservation, the fourth group of value types. Openness to change comprises hedonism, a pleasure and joy seeking value, stimulation, which describes pursuing new experiences and challenges, and self-direction, which is a similar construct to autonomy (Schwartz & Sortheix, 2018). Lastly, values belonging to the category of conservation are security, focusing on keeping the societal order and avoiding dangers; conformity, describing the tendency to avoid deviations from the norm and to obey; and tradition,

characterized by the adaptation and commitment of cultural or group-level habits to increase cohesion (Schwartz, 2012; Schwartz & Sortheix, 2018). Somewhat surprisingly, Schwartz (2012) yielded quite consistent results when testing priorities of these values across cultures. Humans seem to generally perceive benevolence, universalism, and self-direction as high-priority values, whereas power, stimulation, and tradition are less appreciated within different samples and countries.

Considering these value definitions, it becomes clear how influential they are in driving individuals' behaviors. While some research exists connecting values and behavior, results are limited to offline contexts and mainly linked to prosocial behavior (Benish-Weisman et al., 2019; Daniel et al., 2014). Recently though, a compelling contribution was made by Skimina and colleagues (2018). Though agreeing on the notion that values are quite stable over the life span, they proposed the concept of state values versus trait values. In their view, stable values are called value traits, similar to personality traits, whereas value states are more short-lived and a momentary snapshot of priorities. Their concept of value states describes a more direct relationship between value and behavior, as a value becomes salient in a context and therefore impacts the behavior that is exhibited (Skimina et al., 2019). While different in their function, both value states and value traits comprise the same values defined by Schwartz (2017). In their study, Skimina and colleagues (2019) employed Ecological Momentary Assessment (EMA), a research method that allows for in-the-moment data collection to reduce biases and distortions by having participants respond during or quickly after an event (Shiffman et al., 2008). They asked for recent behavioral acts and the value states that were most important during these acts, identifying certain behaviors as being representative for the most salient value states, as indicated by their participants. Thus, they were able to establish a largely unique and very direct link between values (in the form of states) and behaviors. In addition, Skimina and colleagues (2019) found some associations between the situation-independent value traits and certain behaviors comparable to previous results (Bardi and Schwartz, 2003). In the current study, both approaches will be extended to the digital space, investigating which online behaviors can be linked to both value states and traits.

RQ1: Which value states are most important in various online behaviors to young adults?
RQ2: Can an association be established between young adults' value traits and value states in online behaviors?

Considering the link between values and attitudes, feelings, and behaviors across contexts, it seems obvious that they play a role in subjective well-being, which was confirmed by Schwartz

and Sortheix (2018). The authors investigated how the ten values can be grouped to establish the most robust association with subjective well-being and obtained results that seem to be in line with identity development theory. Growth-related values (self-direction, hedonism, stimulation, benevolence) correlated positively with well-being, except for universalism which involves concern for others similar to benevolence but does not entail the same possibilities to bring change. In contrast, values that are rather concerned with keeping the status quo, called self-protection values (power, security, tradition, conformity) exhibited a negative relationship with well-being, with achievement showing no particular association, similar to universalism. Using this growth-supportive values frame, it will be tested whether the association with subjective well-being can be expanded to a more direct link with behavior reflecting these values in the digital space.

RQ3: Can a positive association be established between online behaviors reflecting growth-related values and well-being?

Self-Determination Theory

Given the fact that growth-related values seem to correlate with well-being, one could ask what determines which values we adopt. Important contributions were made with regard to the adoption of values and identity development in general by Ryan and Deci (2000) with their Self-Determination Theory. They mention two central processes responsible for the adoption of our set of values and goals, namely intrinsic motivation and internalization. Intrinsic motivation describes an innate driving force that lets us enjoy certain activities without expecting a reward or certain outcomes, appealing to us due to basic existential reasons (Legault, 2017; Ryan & Deci, 2000; Ryan & Deci, 2017). For example, the process of exploration is said to be intrinsically motivated, demonstrating how intrinsic motivation influences the adoption of values (Marcia, 1980; Ryan & Deci, 2000; Soenens & Vansteenkiste, 2011). Internalization, on the other hand, describes the adoption of values from our environment such as parents or peers (Ryan & Deci, 2000). While self-explored values are usually accompanied by commitment and well-being as they result from intrinsic motivation, commitment to externally adopted values can vary and might impede well-being if not profoundly internalized into the self-image (Hope et al., 2013; Kasser & Ryan, 1996; Legault, 2017).

Both identity-shaping processes of intrinsically driven self-exploration and internalization of extrinsic values are enhanced when three basic psychological needs are satisfied, identified by Ryan and Deci (2000) as autonomy, competence, and relatedness. Autonomy describes the need

for making independent decisions and acting upon one's own rationale; competence is the need for humans to feel skillful and efficient at what they do; lastly, relatedness constitutes the need for interpersonal relationships and feeling attached to others (Ryan & Deci, 2017). In an environment where these needs are satisfied, personal growth and healthy identity development are fostered (Cordeiro et al., 2018). When autonomy is highly present for example, we perceive ourselves as independent, self-directed individuals, allowing us to explore self-chosen paths, whereas feelings of competency might serve as the required confidence to pursue and thus, commit to these paths (La Guardia, 2009). Relatedness, by means of meaningful relationships with others, might provide us with a safe basis from which we can start self-exploration, and the previously mentioned function of providing social support allows us to grow when facing challenges (Konaszewski et al., 2021). While these direct mechanisms are theoretical, the general enhancement of healthy identity development through need satisfaction was confirmed by Cordeiro and colleagues (2018), demonstrating how autonomy, competence, and relatedness contribute to identity exploration and commitment.

Also, Cordeiro and colleagues (2018) found satisfaction of these needs to eventually increase well-being, a correlation that is strongly supported throughout literature and across cultures (Church et al., 2012; Eryilmaz, 2011; Eryilmaz, 2012). In an earlier study for example, Cordeiro and colleagues (2016) associated need satisfaction with various outcomes and found fulfilment of those needs to be related with higher satisfaction of life and vitality, whereas need-deprived participants exhibited more symptoms of depression, anxiety, and somatization. Another contribution was made by Church and colleagues (2012), demonstrating that a balance of need satisfaction is of importance for perceived well-being. More specifically, Véronneau and colleagues (2005) found each need to relate to some kind of well-being, indicating the necessity to investigate basic psychological need satisfaction in-depth.

However, this is by no means restricted to the offline world, as need satisfaction seems to at least partially underly the motivation to enter the digital space. For instance, higher need satisfaction online is related to internet usage, whereas offline need satisfaction is related to less time spent online (Shen et al., 2013). Granic and colleagues (2020) mention several possibilities for how the digital space might contribute to developmental needs, such as providing meaningful encounters with others via social networks, or online games enhancing feelings of autonomy. These suggestions seem even more plausible when considering the outcomes of a study by Borca and colleagues (2015). In their study, adolescent focus groups found a consensus on the digital space

enhancing their sense of autonomy and the establishment of important relationships. Some empirical evidence in that regard was delivered by Sheldon and colleagues (2011), as Facebook use was found to satisfy the need for relatedness. Direct links between online behaviors and need satisfaction, however, have not been investigated which will be done in the current study. Similarly, it will be examined whether need satisfaction in the digital space can be associated with well-being, as previously done for offline contexts (Cordeiro et al., 2016).

RQ4: Which online behaviors can be linked to the satisfaction of the basic psychological needs autonomy, competence, and relatedness?

RQ5: Can an association be established between satisfaction of the basic psychological needs in the digital space and well-being?

Summary

It seems accurate that a healthy identity is imperative for individuals' current and future well-being, and major strides regarding identity development are made during young adulthood (Erikson, 1968; Marcia, 1980). This form of personal growth is strongly supported when basic psychological needs are satisfied, eventually leading to a coherent and adaptive personal identity (Ryan & Deci, 2000). Constituting a significant component of this identity are values, considering that values form the basis for evaluative processes regarding attitudes and behaviors (Hope et al., 2013; Schwartz, 2012). But most studies investigating values and need satisfaction used retrospective assessments, giving rise to question their reliability due to biases and other inaccuracies. Particularly little is known about how basic psychological needs are satisfied online, and about which values are pursued and expressed in the digital space by young adults. Reasons are that both processes were barely researched online, and effects of the digital space were often assessed with too simplistic constructs, missing out on important in-depth insights. This is where the current study attempts to fill a gap in knowledge, employing Ecological Momentary Assessment to investigate such identity relevant processes in the digital space intensively and in real time. Thus, the aim of the current study is to identify 1) which value states are of importance in certain online behaviors, 2) whether value traits predict value states in online behaviors, 3) whether online behaviors driven by growth-related values correlate with well-being, 4) which online behaviors can be associated with psychological need satisfaction, and 5) whether online need satisfaction can be associated with well-being.

Methods

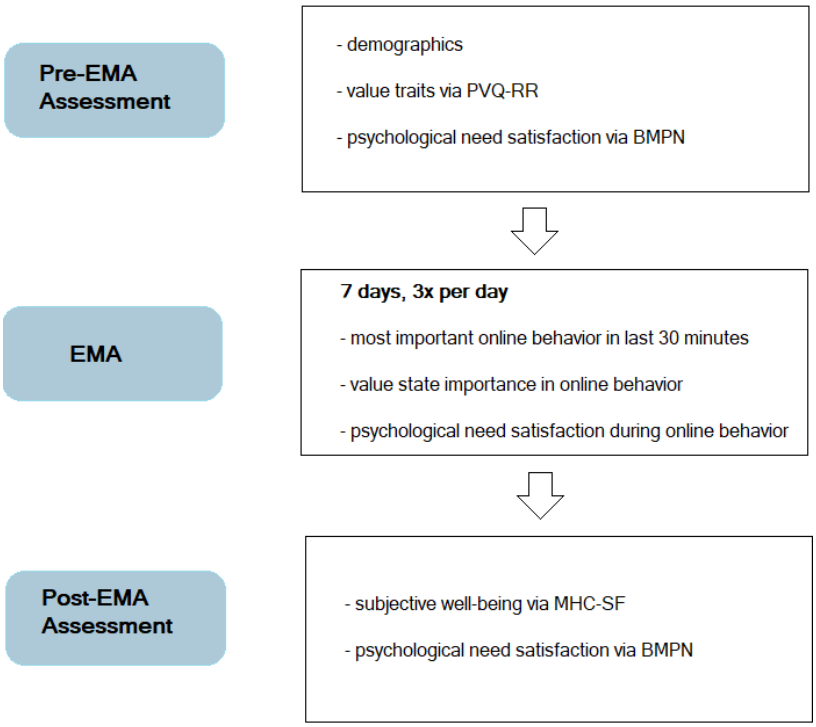
Design & Procedure

This study was a mixed design, combining correlational and exploratory research. The data collection was performed via both Ecological Momentary Assessments (EMA's) to explore state-like experiences, and pre-/post-surveys to assess rather trait-like features. After participants were informed about the rationale of the online study and the confidentiality regarding their data, they were asked to give their consent before proceeding to the pre-EMA survey. Figure 1 gives an overview of the chronology of the study. The first questionnaire assessed the participants' demographics, as well as their value traits and basic psychological need satisfaction. After filling out the pre-EMA survey, respondents were sent an invitation letter via e-mail including a link to a site where they could download the application Ethica (www.ethicadata.com) which was used for filling out the EMA's.

The EMA had a duration of seven days, with each participant being reminded three times per day (i.e., at 12:30 p.m., at 4 p.m., and at 7:30 p.m.) to respond to the items. The reminder leading to the survey became unavailable after 75 minutes. The EMA-survey started by asking participants for the online behavior exerted in the last 30 minutes that was most important to them. A list with eleven different online behaviors in randomized order was presented, including one option to name an online behavior not mentioned in the list. Then, respondents were asked to indicate the importance of each basic value for the stated online behavior by presenting nine such questions in randomized order to them. The value tradition was left off the list, as Skimina and colleagues (2019) convincingly proposed that this value is seldom expressed in daily life, making its use redundant. The value questions were followed by three items asking for the perceived satisfaction of the psychological needs (i.e., autonomy, competence, and relatedness) during the reported online behavior, with each item representing one need. After seven days, participants were asked to fill in the post-EMA survey, which asked for respondents' subjective well-being, and their basic psychological need satisfaction for the past week. This study underwent ethical considerations and was approved by the ethics committee of the faculty of Behavioral, Management and Social sciences at the University of Twente (210428).

Figure 1.

Sequence of Assessments



Participants

Participants were recruited via convenience sampling in the personal environment of the researcher by means of social networking sites and personal chats. Additionally, voluntary response sampling was employed by making the study available in Sona systems (www.sona-systems.com), which is used by the University of Twente and Radboud University for recruiting students as participants. For participation via SONA, 1 credit was obtained for University of Twente students and 2.5 for Radboud students, respectively. Among all eligible participants completing the seven-day study, three Amazon vouchers (50€, 30€, and 20€) were raffled as expense allowance. The inclusion criteria to participate in the study were 1) being aged between 18 and 25 years of age and 2) possessing a smartphone to fill in the EMA's. Also, all three parts of the study (pre-survey, EMA, post-survey) as depicted in Figure 1 must have been completed to be included in the eventual data set. Of the 116 respondents that filled in the pre-survey, 78 entered the EMA of whom 63 eventually also completed the post-survey. Three respondents had to be excluded due to missing

data in the post-survey. For the 60 remaining participants, the average response rate during the EMA's was 80%, which is quite high compared to other studies, although the short duration and only three prompts per day might have played a role in that (van Berkel et al., 2017).

Of the eventual sample (n = 60), 81.7% were female and 18.3% were male. Participants' age range corresponded with that of young adults (18 to 25 years old), with a mean age of 21.95 years (SD = 1.75). All participants had a European background, with German (70 %) and Dutch (21.7 %) nationalities being mainly represented. Other represented nationalities were Portuguese (3.3%), Slovene (1.7%), Greek (1.7%), and Lithuanian (1.7%).

Measures

Online behaviors

Assessing participants' recent online behavior was the first item of the EMA-survey. Respondents were asked to think about all the online behaviors they engaged in within the last 30 minutes, and to then select the one that was most important to them. This served the purpose to identify one single online behavior within a 30-minute time frame and might facilitate the linkage between behavior and values for participants, investigating this "importance" in the subsequent items further. Participants could choose one behavior from a list that comprised ten online activities, for example *"Texting with peers, friends, or family"* or *"Playing online games of any kind"*. Alternatively, they could enter a behavior on their own as the list was not exhaustive.

Value states

The next nine items in the EMA-survey asked for the value states that played a role in the online activity selected by participants. Every item asked for the importance of one value state concerning the online activity, for example *"When you were engaging in this online activity, how important was it to you to experience something new or exciting?"* to assess the basic value state *stimulation*. The wording was partially adopted from Skimina and colleagues (2018) yet also changed to 1) investigate the basic values, whereas Skimina and colleagues (2018) assessed the more nuanced sub-values from the refined theory of values, and 2) fit the online context (Schwartz, 2017; Skimina et al., 2019). For example, the item *"When engaging in this activity, how important was it to you to understand something, or form an opinion on your own?"* was used by Skimina and colleagues (2018) to assess the sub-value *self-direction-thought*. To investigate the basic value *self-direction* comprehensively, which also entails *self-direction-action*, the item was changed to "*When engaging in this online activity, how important was it to you to behave self-determined, or*

to form an opinion on your own?" for the current study. Similar to the PVQ-RR, answers were given on a six-point Likert scale, with *not important at all* being the lowest score, and *very important* being the highest.

Basic psychological need satisfaction during online act

Investigating the satisfaction of each psychological need during the online activity mentioned in the respective EMA was done via one item per need. The three-item measures of each need's satisfaction scale from the BMPN were merged into one item in an attempt to lower participant burden as much as possible while maintaining the construct validity (Sheldon & Hilpert, 2012). The beginning of each item was adapted for the online activity context, as each of the three items started with *"When engaging in this online activity, ..."*. This was followed by *"... I was free to do what interests me and/or expressed my true self*" for autonomy, *"... I did well and/or was successfully completing hard challenges"* for competence, and *"... I felt a sense of contact with people who are important to me, or even felt close and connected to them"* for relatedness. Like the original BMPN, these items were answered on a five-point Likert scale, ranging from *no agreement* to *much agreement*.

Value Traits

The Portrait Values Questionnaire – Refined Version (PVQ-RR) was employed to measure participants' trait values. The PVQ-RR displays 57 short descriptions of individuals attributing high importance to a certain value and is used as a replacement for the original Portrait Values Questionnaire (PVQ), as issues with the psychometric properties kept coming up in the original version, indicating the existence of more values (Cieciuch & Schwartz, 2012; Saris et al., 2013). This led to the refined value theory by Schwartz (2017), who found more nuanced subconstructs for the values of self-direction (*thought, action*), power (*dominance, resources*), security (*personal, societal*), conformity (*rules, interpersonal*), benevolence (*caring, dependability*), and universalism (*nature, concern, tolerance*), while hedonism, stimulation, and achievement were kept unidimensional (also added were the values face and humility). In the PVQ-RR, respondents are asked to compare the illustrated individual to themselves on a six-point Likert scale, with *not like me at all* being the lowest score, and *very much like me* the highest. The descriptions contain one sentence which states what is important to that person, for example *"It is important to her to take care of people she is close to"*, reflecting the value of benevolence-caring (Schwartz & Cieciuch, 2021). The PVQ-RR exhibits improved psychometric properties compared to the original version, such as a solid Cronbach's alpha across 49 cultural groups (α = .70) for the 19 values. More

importantly for the current study, the PVQ-RR is also considered a reliable tool (α = .76) for measuring the ten basic values, as it allows to combine the nuanced sub-values into the higher order, original values (Schwartz & Cieciuch, 2021). For example, after assessing the importance of *self-direction-thought* and *self-direction-action*, results can be combined to obtain the score for the basic value *self-direction*. By that, every participant was assigned an importance score for each of the basic values after person-centering each single response. In the current study, internal reliabilities for the nine basic values (excluding tradition) ranged from a problematic alpha for achievement (α = .30) to a good alpha for conformity (α = .81). Even though achievement did not exhibit good internal reliability, something that also came up in a study by Schwartz and Cieciuch (2021) to some extent, the items are still viewed as the most accurate means to measure the value trait achievement and were used accordingly (Schwartz, 2017; Schwartz & Butenko, 2014). That the internal reliability is problematic despite recent refinements of the achievement items should be explored in future studies as it is beyond the scope of the current study. The mean alpha for all nine values was .68, or .73 if the problematic achievement items would have been excluded. The PVQ-RR was measured before the EMA week.

Basic psychological need satisfaction - general

Basic psychological need satisfaction was measured with the Balanced Measure of Psychological Needs (BMPN). It was developed by Sheldon and Hilpert (2012) and constitutes an upgrade over the previously often used Basic Psychological Needs Scale (BPNS), which was found to contain some problematic items (Johnston & Finney, 2010). The BMPN captures both satisfaction and dissatisfaction of each psychological need (i.e., autonomy, competence, and relatedness), as need satisfaction and dissatisfaction seem to form two distinct dimensions (Sheldon & Hilpert, 2012). For example, the item *"I was really doing what interests me"* is thought to capture autonomy satisfaction, whereas *"There were people telling me what I had to do"* captures autonomy dissatisfaction. Items were answered on a five-point Likert scale, with *no agreement* being the lowest score, and *much agreement* the highest. The six-factor dimensionality, containing three items per factor, was confirmed in various studies, while internal reliability across all six factors was good ($\alpha \geq .77$) (Cordeiro et al., 2016; Neubauer & Voss, 2016; Sheldon et al., 2011). However, Galiana and colleagues (2016) found the negatively worded items (for need dissatisfaction) to be problematic in terms of psychometric properties, which also seems to be the case with other scales, leading to the mere assessment of need satisfaction in the current study (Merritt, 2012). The internal reliabilities of the need satisfaction subscales were close to acceptable

for autonomy (α = .69), good for relatedness (α = .86), and excellent for competence (α = .90) in the pre-measure. The BMPN was also measured after the EMA week, obtaining comparable reliabilities for autonomy (α = .60), relatedness (α = .91), and competence (α = .79). For further analyses, average scores of the three subscales were computed.

Subjective well-being

Participants' subjective well-being was assessed with the Mental Health Continuum – Short Form (MHC-SF) (Keyes et al., 2008). Coming from the field of positive psychology, the MHC-SF is a holistic and well-researched instrument comprising 14 items to measure emotional, psychological, and social well-being across cultures. For example, one item assessing psychological well-being *was "In the last week, how often did you feel that you liked most parts of your personality?"*. Respondents indicated how often they experienced the given feeling during the past month on a six-point Likert scale, with *never* being the lowest score, and *every day* the highest. The three-factor structure of emotional, psychological, and social well-being was for example confirmed by Lamers and colleagues (2011), who also established good psychometric properties. The internal reliability was found to be very high for the MHC-SF (α = .89), and decent correlations with instruments measuring similar constructs were obtained underscoring its validity. In the current study, internal reliabilities of the MHC-SF subscales were acceptable, with Cronbach's alphas ranging between .71 and .78. The MHC-SF was measured after the EMA week and a mean total score of all items was computed for correlational analyses.

Data analysis strategy

Before conducting analyses, cases were excluded from the data set if deliberate response bias was apparent, or if participants failed to complete the post-EMA survey which was required for most correlational analyses (Christensen et al., 2003). Behavioral acts that were reported less than five times ($n > 5$) were excluded as well. In addition, as suggested in other research papers involving values, both value trait and value state responses were person-centered to account for individual differences in general response tendencies. For example, some participants might be hesitant to choose maximum scores, whereas others might exhibit contrasting response patterns which then would impact the results in an unbalanced way (Schwartz & Cieciuch, 2021; Skimina et al., 2019). Thus, participants' scores of each value trait were subtracted by the mean score they gave to all value traits. Similarly, for the value state importance scores assigned to the online behaviors, every EMA value state response by each participant was subtracted by the mean importance he or she assigned to every value states across all behaviors, as done by Skimina and

colleagues (2019). After obtaining person-centered scores for each value state, the data was aggregated and evaluated for general tendencies by obtaining means and standard deviations for each value state and need across all behaviors. Obtaining such overall average scores independent of the behavioral acts uncovered which value states and need satisfactions were generally represented in the digital space. Also, the frequency of each online behavior was obtained.

To investigate the role of values in the digital space more in detail, every online behavior was associated with a mean score of each of the nine values (*RQ1*). Few studies have been conducted to investigate values and behaviors by employing EMA, especially not in the digital space. Skimina and colleagues (2019) successfully used a similar approach in offline contexts, which prompted to align the current study as much as possible to theirs to enhance the scientific base considering the explorative and novel nature. Attempting to establish value signatures for certain behaviors, Skimina and colleagues (2019) deemed a value to be significant for a behavior based on strong deviations from that value's overall mean across all behaviors. However, in the current study, it was expected that the digital space offers much less variability in behaviors and thus in values compared to the offline context. A possible consequence was that some values would have very high means across all behaviors, meaning these values could hardly deviate much from that overall high mean for individual behaviors. This suggested to use a data analysis approach avoiding such thresholds. For that, participants' data were aggregated which resulted in a value importance ranking for each online behavior. The value that on average scored highest for that behavior across all participants was then ranked as most important, and so on. This allowed to determine the three highest ranked, and thus most important values per behavior, resulting in a 'value profile' for each online behavior. To add another layer to these 'profiles' and thus allowing for more in-depth interpretations of each behavior, it was explored which online behaviors could be linked to the satisfaction of the psychological needs autonomy, relatedness, and competence (*RQ4*). After aggregating the EMA data into groups categorized by online behavior, each behavior was associated with a mean need satisfaction score for autonomy, relatedness, and competence. Behaviors were discussed in detail by combining both 'value profiles' and 'need satisfaction profiles'.

Besides these state-like measures, descriptive statistics were obtained for participants' value traits, as well as participants' psychological need satisfaction and subjective well-being for the duration of the EMA. Employing this information, it was first investigated whether participants tend to engage in online behaviors motivated by value states in line with their value traits (*RQ2*).

Although a maximum of three online acts per day were a small sample size, participants were asked to report recent online acts most important to them. This suggested at least some association between reported online behavior and value traits that they perceive as important to them. For example, someone who viewed hedonism as an important value trait might have engaged more regularly in online behaviors expressive of hedonism than behaviors expressive of achievement. Associations between value traits and value states in the digital space were tested by obtaining Spearman's rho. This correlational test was preferred due to the expectation of a non-normal distribution of data which might be caused by the conceivably low variability in values (Puth et al., 2015).

Investigating whether online behaviors expressive of growth-related values (self-direction, hedonism, stimulation, benevolence) could be associated with well-being (*RQ3*), online behaviors were categorized as growth-related if at least two of the three highest ranked values were self-direction, hedonism, stimulation, or benevolence. Spearman's rho was calculated by correlating the proportion of growth-related behaviors, thus independent of the number of reported behaviors, with participants well-being scores which were collected after the EMA. Lastly, Spearman's rho was calculated to investigate whether psychological need satisfaction stemming from online activities could be associated with overall well-being (*RQ5*). Thus, each participant's average need satisfaction scores for autonomy, relatedness, and competence (resulting from the online behaviors they engaged in) and participants' well-being scores were correlated.

Results

General Findings

From the original list comprising ten online behaviors, acts of *online dating* were removed from the data due to a lack of cases ($n < 5$). However, participants had the chance to report own online behaviors as well. Although this was only used for 1.7% ($n = 17$) of all reported online behaviors, it led to the inclusion of *having video conferences related to the university* and *having online class*. An overview of the eventual list and the distribution of reported online behaviors can be seen in Table 1. Overall, 966 online acts have been analyzed. The most frequently reported online acts were *texting with peers, friends, or family* ($n = 245$), *conducting research for school, university, or work-related topics* ($n = 220$), *consuming pictures or (short) videos* ($n = 160$), and *streaming movies, series, live events, music, or podcasts* ($n = 150$).

Table 1.
Distribution of Online Behaviors

Online Behavior	Frequency	Percent
Texting with peers/friends/family	245	25.4
Conducting research for school/university/work	220	22.8
Consuming pictures or short videos	160	16.6
Streaming movies/series/live events/music/podcasts	150	15.5
Searching for information regarding hobbies/travels/products/health /other personal topics	50	5.2
Informing about news and current topics	42	4.3
Playing online games of any kind	41	4.2
Posting pictures or short videos	24	2.5
Online shopping	17	1.8
Video conference (University)	11	1.1
Online Class	6	.6
Total	966	100.0

Answering the first research question about value 'profiles' of online behaviors, Table 2 gives an overview over the mean importance rating of each value state per online behavior. The expectation of having low value variability was confirmed, with six of the eleven online behaviors having *self-direction*, *stimulation*, and *hedonism* as their three highest ranked value states in differing order. Moreover, at least one of these values was found to be part of the three most important value states across all behaviors. This was also demonstrated by the high overall means for *self-direction* (M = 4.75, SD = 1.38), *stimulation* (M = 4.52, SD = 1.48), and *hedonism* (M = 5.09, SD = 1.67). In contrast, *universalism* (M = 3.33, SD = 1.17) and *security* (M = 3.45, SD = 1.26) had the lowest total means and were not within the top three values of any online behavior.

To answer the fourth research question, it was considered how participants rated the psychological need satisfaction of reported online behaviors, where another imbalance became

apparent. As indicated in Table 3, the total mean for *autonomy* (M = 2.27, SD = 1.37) across all behaviors was considerably higher than that of *competence* (M = 1.47, SD = 1.38) or *relatedness* (M = 1.59, SD = 1.54). The bold scores in Table 3 indicate a need satisfaction score for one behavior being higher than that need's total mean score across all behaviors. These scores were highlighted to better understand how specific online behaviors satisfy needs compared to the general online context, as little research has been done about needs and the digital space. In the following, value state and need satisfaction insights will be presented in detail per online behavior.

Table 2.

Online Behaviors With Associated Mean Value State Scores and Standard Deviations (n = 966)

Online Behavior		SD	ST	HD	AC	PW	SC	CN	UN	BN
Consuming pictures	Mean	**4.6**	**5.1**	**6.0**	3.4	3.3	3.0	3.2	3.4	3.2
or (short) videos	(SD)	(1.4)	(1.4)	(1.4)	(1.3)	(1.2)	(.9)	(1.1)	(1.1)	(1.0)
Informing about	Mean	**5.9**	**4.9**	**4.6**	3.5	3.8	3.8	3.7	3.8	3.3
news/current topics	(SD)	(1.9)	(1.2)	(1.2)	(1.3)	(1.4)	(1.1)	(1.2)	(1.3)	(1.1)
Online class	Mean	4.0	**4.3**	3.7	**4.7**	3.5	2.8	**5.3***	4.2	3.7
	(SD)	(1.2)	(1.4)	(.8)	(1.1)	(1.0)	(.6)	(1.6)	(1.2)	(1.8)
Video conference	Mean	**5.8**	4.0	3.8	4.2	**5.2***	3.7	**5.4***	4.1	4.6
(University)	(SD)	(1.4)	(1.4)	(1.0)	(1.7)	(1.8)	(1.5)	(1.1)	(1.5)	(2.1)
Posting pictures or	Mean	**4.8**	**5.1**	**5.6**	3.7	3.7	3.1	3.3	3.8	3.2
(short) videos	(SD)	(1.3)	(1.6)	(1.4)	(1.3)	(1.2)	(.8)	(1.1)	(1.1)	(1.0)
Texting with	Mean	**4.8**	3.9	**4.9**	3.0	3.4	3.8	4.6	3.5	**5.4**
peers/friends/family	(SD)	(1.3)	(1.3)	(1.4)	(1.1)	(1.2)	(1.4)	(1.5)	(1.4)	(1.4)
Research for	Mean	**5.0**	3.9	3.6	4.2	**4.4**	3.6	**4.3**	3.2	3.6
school/	(SD)	(1.3)	(1.2)	(1.2)	(1.3)	(1.5)	(1.4)	(1.5)	(1.0)	(1.4)
university/work										
Informing about	Mean	**5.1**	**4.7**	**5.0**	3.5	3.7	4.1	3.4	3.3	4.1
personal topics	(SD)	(1.3)	(1.6)	(1.6)	(1.1)	(1.3)	(1.7)	(1.1)	(1.1)	(1.9)
Playing online	Mean	4.2	**5.4**	**6.2**	**4.5**	3.9	3.0	3.3	3.1	3.7
games of any kind	(SD)	(1.4)	(1.3)	(1.1)	(1.6)	(1.1)	(1.0)	(1.0)	(1.1)	(1.4)
Streaming movies/	Mean	**4.2**	**5.3**	**6.5**	2.9	3.4	2.9	3.0	3.0	3.0
series/music	(SD)	(1.3)	(1.5)	(1.3)	(.8)	(1.1)	(.8)	(.9)	(.8)	(.9)
Online shopping	Mean	**4.7**	**5.4**	**6.0**	3.2	3.8	3.2	3.1	3.6	2.7
	(SD)	(1.8)	(1.1)	(1.6)	(1.3)	(1.6)	(1.3)	(1.5)	(1.8)	(1.0)
Total	Mean	**4.8**	**4.5**	**5.1**	3.5	3.7	3.4	3.9	3.3	3.9
	(SD)	(1.4)	(1.5)	(1.7)	(1.3)	(1.4)	(1.3)	(1.4)	(1.2)	(1.6)

Note. SD = Self-direction, ST = Stimulation, HD = Hedonism, AC = Achievement, PW = Power, SC = Security, CN = Conformity, UN = Universalism, BN = Benevolence. After person-centering each reported value state score, individual scores ranged from .73 to 8.53. Bold scores indicate the three highest value scores per behavior.

***** Mean scores for one behavior exceeding that value's total mean by one standard deviation

Table 3.

Online Behaviors With Associated Mean Need Satisfaction Scores and Standard Deviations (n = 966)

Online Behavior		Autonomy	Competence	Relatedness
Consuming pictures or (short) videos	Mean	**3.4**	1.8	2.0
	(SD)	(1.4)	(1.2)	(1.3)
Informing about news and current topics	Mean	**3.3**	2.1	2.1
	(SD)	(1.1)	(1.1)	(1.1)
Online class	Mean	2.8	**3.8**	1.3
	(SD)	(1.3)	(1.2)	(.5)
Video conference (University)	Mean	2.8	**3.6**	**2.6**
	(SD)	(1.1)	(1.2)	(1.7)
Posting pictures or (short) videos	Mean	**3.5**	2.2	**3.1**
	(SD)	(1.5)	(1.5)	(1.5)
Texting with peers/friends/family	Mean	**3.6**	2.4	**4.1**
	(SD)	(1.2)	(1.3)	(1.1)
Research for school/university/work	Mean	2.5	**3.5**	1.8
	(SD)	(1.3)	(1.1)	(1.2)
Informing about personal topics	Mean	3.1	2.5	2.2
	(SD)	(1.5)	(1.3)	(1.3)
Playing online games of any kind	Mean	**3.9**	**3.4**	**2.8**
	(SD)	(1.3)	(1.2)	(1.3)
Streaming movies/series/music	Mean	**3.7**	1.6	2.1
	(SD)	(1.3)	(1.1)	(1.5)
Online shopping	Mean	**3.9**	1.9	1.7
	(SD)	(1.3)	(1.2)	(.9)
Total	Mean	3.3	2.5	2.6
	(SD)	(1.4)	(1.4)	(1.5)

Note. Individual scores ranged from 1 to 5. Bold scores indicate higher need satisfaction for one behavior compared to that need's average across all behaviors.

Results of each online behavior

Texting with peers, friends, or family. Results for this online behavior (n = 245) showed that the highest rated and thus most important value state for participants was *benevolence* (M = 5.44, SD = 1.40), which corresponded to the need mostly satisfied, namely *relatedness* (M = 4.09, SD = 1.14). Also important were the values *hedonism* (M = 4.86, SD = 1.43), and *self-direction* (M = 4.76, SD = 1.29), the latter of which seems in line with the second highest need satisfaction, which was *autonomy* (M = 3.60, SD = 1.20). Close behind the three most important values was *conformity* (M = 4.64, SD = 1.47), whereas the least important value for this online behavior was *achievement* (M = 2.97, SD = 1.06). Fittingly, the depreciated value achievement was accompanied by *competence* (M = 2.42, SD = 1.28) having the lowest need satisfaction score, as both constitute related constructs.

Conducting research for school, university, or work-related topics. This online behavior (n = 220) had *self-direction* (M = 5.02, SD = 1.31) as the highest rated value state, *power* (M = 4.37, SD = 1.53) as the second and *conformity* (M = 4.25, SD = 1.50) as the third highest. Similarly high rated was *achievement* (M = 4.15, SD = 1.28), which corresponds to *competence* (M = 3.51, SD = 1.10) being the highest satisfied need. *Universalism* (M = 3.18, SD = 1.04) was the lowest rated value state. What seems notable is that the high self-direction value score was contrasted by *autonomy* (M = 2.46, SD = 1.27) being rated quite low, with *relatedness* (M = 1.80, SD = 1.15) being even lower.

Consuming pictures or (short) videos. The highest rated value states for *consuming pictures or (short) videos* (n = 160) were *hedonism* (M = 5.98, SD = 1.37), *stimulation* (M = 5.11, SD = 1.43), and *self-direction* (M = 4.57, SD = 1.39). For this behavior, the high self-direction score was accompanied by the *autonomy* need (M = 3.36, SD = 1.38) being rated to be mostly satisfied. No other value states had comparable high means for this online behavior, but were rather close to the lowest rated value, *security* (M = 2.97, SD = 0.85). With regards to the other psychological needs, *relatedness* (M = 2.04, SD = 1.25) was second and *competence* (M = 1.79, SD = 1.15) was third, both with rather low ratings.

Streaming movies/series/live events/music/podcasts. For this online behavior (n = 150), the three highest ranked value states were *hedonism* (M = 6.53, SD = 1.25), *stimulation* (M = 5.32, SD = 1.49), and *self-direction* (M = 4.17, SD = 1.32). Again, the high self-direction score was in line with *autonomy* (M = 3.66, SD = 1.30) being mostly satisfied through this behavior. The other value states were rated considerably lower, with *achievement* (M = 2.85, SD = 0.79) being the

lowest. The pattern of low *achievement* being accompanied by low *competence* (*M* = 1.61, *SD* = 1.12) was again found, with *relatedness* (*M* = 2.13, *SD* = 1.47) rather low as well.

Searching for information regarding hobbies/travels/products/health/other personal topics. This online behavior (*n* = 50) was the fifth most frequently reported behavior, with the common value states *self-direction* (*M* = 5.09, *SD* = 1.29), *hedonism* (*M* = 4.97, *SD* = 1.60), and *stimulation* (*M* = 4.69, *SD* = 1.57) being considered most important. Other value states having scored a noticeably high mean were *benevolence* (*M* = 4.11, *SD* = 1.87) and *security* (*M* = 4.09, *SD* = 1.69). The value state with the lowest mean importance rating for this online behavior was *universalism* (*M* = 3.29, *SD* = 1.11). Especially the score for *autonomy* (*M* = 3.12, *SD* = 1.53) suggests need satisfaction and again fits to the high score for self-direction. Both *relatedness* (*M* = 2.24, *SD* = 1.25) and *competence* (*M* = 2.46, *SD* = 1.28) demonstrated rather average satisfaction scores.

Informing about news and current topics. For the online behavior *informing about news and current topics* (*n* = 42), the three highest mean scores were obtained for the value states *self-direction* (*M* = 5.89, *SD* = 1.08), *stimulation* (*M* = 4.91, *SD* = 1.16), and *hedonism* (*M* = 4.63, *SD* = 1.17). The association of self-direction and a*utonomy* (*M* = 3.31, *SD* = 1.05) was supported again, with the latter being the most satisfied need. The lowest score was reported for the value state *benevolence* (*M* = 3.27, *SD* = 1.09). The psychological need satisfaction scores for *relatedness* (*M* = 2.12, *SD* = 1.06) and *competence* (*M* = 2.07, *SD* = 1.05) were comparably low.

Playing online games. The next most frequently reported behavior was *playing online games of any kind* (*n* = 41). The three value states with the highest average importance rating were *hedonism* (*M* = 6.20, *SD* = 1.08), *stimulation* (*M* = 5.39, *SD* = 1.25), and *achievement* (*M* = 4.51, *SD* = 1.59), with *self-direction* (*M* = 4.22, *SD* = 1.41) being close behind. The importance of achievement and self-direction might also be reflected in the high need satisfaction scores for *autonomy* (*M* = 3.85, *SD* = 1.26) and *competence* (*M* = 3.39, *SD* = 1.18), even though the need for *relatedness* (*M* = 2.83, *SD* = 1.30) was satisfied as well to some extent. The lowest rated value state for *playing online games* was *security* (*M* = 2.98, *SD* = 0.96).

Posting pictures or (short) videos. This online behavior (*n* = 24) was associated with high means for the three value states *hedonism* (*M* = 5.61, *SD* = 1.37), *stimulation* (*M* = 5.07, *SD* = 1.63), and *self-direction* (*M* = 4.82, *SD* = 1.29), while no other value states had noticeably high scores. Again, *autonomy* (*M* = 3.50, *SD* = 1.50) being the most satisfied need is in line with the association with self-direction. The lowest means were obtained for *security* (*M* = 3.11, *SD* = 0.83)

and *benevolence* (*M* = 3.19, *SD* = 0.98). The low benevolence score stood in contrast to *relatedness* (*M* = 3.08, *SD* = 1.50) being the second most satisfied need, whereas *competence* (*M* = 2.21, *SD* = 1.50) was least satisfied when posting pictures or (short) videos according to participants.

Online shopping. *Online shopping* (*n* = 17) had the same three highest value states as posting media online, namely *hedonism* (*M* = 6.01, *SD* = 1.60), *stimulation* (*M* = 5.42, *SD* = 1.11), and *self-direction* (*M* = 4.71, *SD* = 1.84), and also exhibited *autonomy* (*M* = 3.94, *SD* = 1.34) as the mostly satisfied need. The lowest average value state was *benevolence* (*M* = 2.71, *SD* = 0.96) for this online behavior. Both need satisfaction scores for *competence* (*M* = 1.88, *SD* = 1.22) and *relatedness* (*M* = 1.65, *SD* = 0.86) were very low compared to autonomy.

Having a video conference for the university. This online act (*n* = 11) was associated with *self-direction* (*M* = 5.78, *SD* = 1.43), *conformity* (*M* = 5.42, *SD* = 1.07), and *power* (*M* = 5.15, *SD* = 1.75) as the three highest value states. However, from the remaining values, especially *benevolence* (*M* = 4.60, *SD* = 2.09) did exhibit a high mean as well. *Security* (*M* = 3.69, *SD* = 1.50) was least associated with this online behavior. The highest need satisfaction mean was found for *competence* (*M* = 3.55, *SD* = 1.21), followed by *autonomy* (*M* = 2.82, *SD* = 1.08) and *relatedness* (*M* = 2.64, *SD* = 1.69), the latter of which was still quite high compared to most other behaviors, corresponding to the solid benevolence score.

Having online class. The least frequently reported online behavior discussed here was *having online class* (*n* = 6). Participants rated *conformity* (*M* = 5.34, *SD* = 1.61) as the most important value state for that act, with *achievement* (*M* = 4.67, *SD* = 1.05) and *stimulation* (*M* = 4.34, *SD* = 1.42) being second and third, respectively. Value states scoring comparably high were *universalism* (*M* = 4.17, *SD* = 1.21) and *self-direction* (*M* = 4.01, *SD* = 1.24), again with *security* (*M* = 2.84, *SD* = 0.60) being the least associated value state. Considering psychological need satisfaction, only *competence* (*M* = 3.83, *SD* = 1.17) scored high, again found for a behavior which also exhibited a high achievement score. A*utonomy* (*M* = 2.83, *SD* = 1.33) was not too far behind, whereas the *relatedness* (*M* = 1.33, *SD* = 0.52) score was close to the minimum.

Correlational Analyses

Descriptive statistics for value, need satisfaction, and well-being trait measures can be found in Table 4. To answer the second research question whether participants tend to engage in online behaviors in line with their value traits, Spearman's rho was computed between value traits and average value states stemming from participants' online behavior. However, only for trait and state value power, the correlation was significant, r_s = .36, *n* = 60, *p* = .004, meaning that

participants high in trait value power also engaged comparably often in online behaviors for which power was an important value state. The correlations for the other values were not significant, with p values ranging from $p = .070$ for self-direction to $p = .791$ for stimulation, exhibiting coefficients between $r_s = -.24$ and $r_s = .24$. This indicates that, besides power, value traits and value states were not significantly related in the current study.

To answer the third research question whether online behaviors that reflect growth-related values (self-direction, hedonism, stimulation, benevolence) could be associated with well-being, a correlational analysis was conducted. Spearman's rho was computed for participants' proportion of online behaviors being characterized by growth-related values and post-EMA well-being scores. The negative correlation was not significant, $r_s = -.19$, $n = 60$, $p = .153$, indicating that no significant association between growth-related value states and well-being was found.

To answer the fifth and last research question whether psychological need satisfaction solely stemming from online behaviors could be associated with well-being, Spearman's rho was computed again. Participants' average need satisfaction scores stemming from their reported online behaviors during the EMA week were correlated with their post-EMA well-being scores. However, the correlation was not significant, with a coefficient close to zero, $r_s = .03$, $n = 60$, $p = .818$, suggesting no relationship between online need satisfaction and well-being for the current sample.

Table 4.

Ranges, Means, and Standard Deviations of Value Traits, Psychological Need Satisfaction post EMA, and Subjective Well-being post EMA (n = 60)

	Mean	SD	Min.	Max.
SD	4.8	.6	3.5	6.3
ST	3.8	1.0	1.6	5.6
HD	4.5	.8	2.7	6.0
AC	4.2	.7	2.0	5.6
PW	2.6	.8	.9	5.1
SC	4.0	.6	1.9	4.9
CN	3.7	.8	2.0	5.3
UN	4.4	.6	2.9	5.6
BN	4.9	.6	2.9	6.0
Autonomy	3.7	.7	1.7	5.0
Competence	3.7	.7	1.7	5.0
Relatedness	4.0	.8	2.3	5.0

Well-Being	4.2	.8	2.2	5.7

Note. SD = Self-direction, ST = Stimulation, HD = Hedonism, AC = Achievement, PW = Power, SC = Security, CN = Conformity, UN = Universalism, BN = Benevolence.

Discussion

The current study attempted to explore two important aspects of young adults' identity formation in the digital space, namely the development and expression of a coherent set of values, and the satisfaction of basic psychological needs. Despite the significance of such processes for individuals' well-being and the omnipresence of the digital space, little is known about the effects of internet activities and the motivations driving them. This is especially true for positive aspects of the digital space. For a long time, the majority of research in this domain involved rather negative expectations, such as attesting increased aggression to violent games or the link between depression and social media (Anderson et al., 2008; Keles et al., 2020). Also, oversimplified concepts such as that of screen time were regularly used in research investigating the digital space, often leading to contrasting results (Granic et al., 2020). This study attempted to explore the behavior of young adults in the digital space more in depth, neglecting such concepts and directly investigating relationships of specific online behaviors with values and needs.

In general, when considering the trait-level data regarding values and need satisfaction for the current sample that was assessed before and after the EMA, results seem to be similar to previous studies. Schwartz (2012) for example found value trait priorities to be comparable across various cultures, with benevolence, universalism, and self-direction as the most important ones, which is also what the current sample of young adults reported. Also, he states that power and stimulation are usually the least prioritized values, again in line with the participants' responses in the current study. Noticeably, while both power and stimulation were least valued on the trait level, stimulation was very important for various online behaviors, being one of the most frequently reported value states. This is a first indication for a divergence between value trait priorities and online behavior in young adults, as a rather depreciated value was regularly expressed in the digital space. When considering the trait-level need satisfaction scores, participants' pre- and post-EMA scores for autonomy, competence, and relatedness were very similar, indicating that need satisfaction during the EMA week seemed to be ordinary for participants and thus, representative. Other young adult populations demonstrated similar need satisfaction scores, though cultural differences seem to exist (Sheldon & Hilpert, 2012). Nishimura and Suzuki (2016) investigated

need satisfaction in Japanese students, and found considerably lower scores, especially for competence and relatedness. Age might play a role as well in psychological need satisfaction, as for example sources for need satisfaction or the drive to pursue those sources might change. While the three basic needs were similarly satisfied in a sample of adults, elderly people reported lower scores for both competence and relatedness (Adie et al., 2008; Ferrand et al., 2014). What is also notable about the trait need satisfaction scores is that they were considerably higher than the average need satisfaction stemming from the online activities. One explanation is that the digital space is obviously not the only source for feelings of autonomy, competence, and relatedness, as it constitutes only one domain in life to possibly satisfy psychological needs. On the other hand, this might indicate that offline activities are stronger resources for autonomy, competence, and relatedness, though more research is necessary about the effects of online engagement before drawing such conclusions. The way we behave online is probably very influential for how these needs are satisfied, as the digital space offers a great number of diverse activities and opportunities.

However, online engagement might be more similar than expected regarding behaviors and associated values, at least for the current sample. Some behaviors were reported very frequently, such as conducting research or texting with peers, whereas others were barely mentioned at all, as it was the case with online shopping. This might point towards either participants having similar behavioral patterns in the digital space, or viewing similar online acts as important to them, as they were asked to report a recent online act that was most important to them. Individual differences were certainly present, however, considering the high standard deviations for value states. Still, it was very possible to distinctly rank value states according to their importance for each behavior after aggregating the data, suggesting that general tendencies did exist in attributing certain value states to online acts. This points toward participants engaging in online acts for similar motivations.

A strong motivation seems to be behaving autonomously and making self-determined decisions, as the digital space appears to provide a wide range of possibilities for that. Autonomy was reported for most reported online behaviors, which is also true for the closely related value self-direction that is associated with well-being (Schwartz & Sortheix, 2018). Considering the importance of the earlier discussed self-exploration process for healthy identity formation, the potential for autonomous decision making within the digital space seems even more valuable (Marcia, 1980; Schwartz et al., 2013). Valkenburg and colleagues (2005) conducted studies in which they found adolescents to regularly make use of the digital space for identity experiments, benefitting their self-exploration. Further, Valkenburg and Peter (2008) found such identity

experiments to enhance the social competences of adolescents through diversity in interaction partners, an effect that was strongest in lonely adolescents. Such self-explorative activities allow individuals to learn and commit to self-chosen paths and values as they were explored on the basis of intrinsic motivation, fostering a healthy and stable identity and eventually, well-being (Marcia, 1980; Ryan & Deci, 2000). Another beneficial aspect related to autonomy seemingly being present in the digital space emerges when considering the wording of the autonomy item ("*I was free … and/or expressed my true self*"). Besides identity formation, being able to genuinely express one's own identity without having to disguise parts of it seems crucial for well-being, an association that was also found in the realm of social media (Wood et al., 2008; Twomey & O'Reilley, 2017). Lastly, the item wording for the self-direction value state ("…, or to form an opinion on your own?") uncovers another positive and autonomy encompassing aspect of the digital space: the possibility to form an own opinion by means of various information sources. Whether it is about scientific research, about politics, or personal topics, the majority of information in the digital space is available to everyone, giving individuals with an internet connection the ability to inform themselves about basically everything. On the other hand, information can also be posted by everyone online, flooding the digital space with false information and the task to differentiate the truth from falsehood (Cohen, 2018). Thus, opportunities for self-exploration and self-expression, as well as the ability to access information from all over the world seem to be an important benefit of the digital space involving self-direction.

Besides self-direction, two other value states stood out across most online behaviors, which are stimulation and hedonism. Similar to self-direction, these values are associated with well-being, as they are viewed as means to gain personal growth and joy (Schwartz & Sortheix, 2018). Hedonism exhibited the highest average score, demonstrating that many activities in the digital space are driven by seeking pleasure. The entertainment facilities seem to occupy a great part of the digital space, allowing most young adults to find something they truly enjoy. What might add to this are the possibilities to consistently seek or learn about new and exciting experiences from around the world, indicated by the high total stimulation score. However, seeking new experiences might entail more than merely pleasure. Research is investigating the inclusion of a fourth basic psychological need into self-determination theory besides autonomy, competence, and relatedness, namely the need for novelty (Gonzalez-Cutre et al., 2016; Triguero et al., 2020). Similar to exploration, it describes the urge to seek new experiences in life, which seems to be something overly represented in the digital space considering the current results. If in future studies, a more

robust association of this fourth need with concepts such as well-being or mental health is established, the digital space might be viewed as an important and easily accessible source for novelty. On the other hand, there might be a downside to it. If the intrinsic need to explore is overly satisfied through the digital space, the motivation to explore new real-life experiences might suffer. This could be an issue when assuming that the digital space cannot replace every aspect of in-persona experiences. However, for now these are mere speculations until more research is conducted into the need for novelty, its association with the value stimulation, and possible effects of the digital space.

Value states and need satisfaction in online behaviors

Besides the more general observations of this first study into the presence of values and psychological need satisfaction in the digital space, the interplay of value states and needs in young adults' online behaviors was also investigated. As mentioned already, the value states hedonism, stimulation, and self-direction were most important in multiple behaviors, for example for both consuming and posting pictures or videos online. These two behaviors are often distinguished in literature: merely consuming social media content is referred to as passive use, whereas posting content or engaging via comments is referred to as active use of social media (Verduyn et al., 2017; Wang et al., 2017). For both types of behavior, hedonism was the highest rated value state, indicating that pleasure seems to be a main driving force for both active and passive usage. The fact that both active and passive engagement were accompanied by high scores for stimulation seems reasonable as well. For passive users, social media allows to consume pictures or videos from around the globe with constantly new and possibly exciting content. This process is even more intensified by platforms employing algorithms to tie users to their devices through continuous excitement (Cohen, 2018; Figueiredo & Bolano, 2017). For active users, posting such content can reach countless people, evoking reactions and feedback that were unprecedented before the introduction of the digital space. Such amounts of real-time feedback from countless individuals might explain some excitement induced by active usage. The third highest value state for both consuming and posting media was self-direction, which was also accompanied by a high autonomy satisfaction score, demonstrating the voluntary engagement to actively or passively use media and the freedom to choose from various contents.

One significant difference became apparent between active and passive use of social media, though, which seems to be in line with previous research. Whereas passive social media usage is often associated with decreased mental health in literature, active usage is often viewed as

benefitting mental health, for example by enjoying online encounters with other individuals (Escobar-Viera et al., 2018). This seems to be confirmed by the current results. Whereas passive social media use was not viewed to satisfy the need for relatedness, active use doubled the relatedness satisfaction score of passive use. While in this study active use merely involved posting pictures or short videos and not chatting, this might still represent an interaction with the recipients of these posts. Possible feedback in form of comments or likes might enhance the feelings of relatedness, in contrast to merely consuming posts of others.

These feelings seem to be even more induced when directly engaging with individuals close to oneself, such as friends or family. This was also found in the study by Griffioen and colleagues (2021), finding participants to perceive online engagement with close individuals as more valuable than with rather unfamiliar persons. Further support comes from the current study, as the average relatedness score for texting with peers, friends, or family was the highest mean need satisfaction score across all needs and behaviors. Close relationships seem to be maintained through online contact, which might include the aspect of social support, indicated by the value benevolence being the most important value state for this online behavior. Thus, helping and being helped by close others seems to be an important drive for engaging in messaging and demonstrates a meaningful benefit of the digital space. Further support for this comes from Valkenburg and Peter (2009), who found instant messaging to positively influence adolescents' friendships through intimate self-disclosure. This points even more into the direction that the digital space is an important component of fostering relationships nowadays. Interestingly, besides hedonism and self-direction, a high rated value state for this online act was conformity, illustrating similarities to in-person encounters as certain norms are followed to avoid conflicts.

Conformity was even more important in three other online behaviors that involved rather mandatory activities, namely having online class, conducting research for occupational domains, or having video conferences for the university. As these online behaviors are not carried out for recreational purposes and involve less autonomy than most other online acts as indicated by the need satisfaction scores, high conformity scores seem reasonable. Possible aspects that might have increased the conformity scores might have been predefined topics to work on or trying to meet other's expectations, giving also rise to low autonomy satisfaction scores. What seems conflicting, though, is that both conducting research and having video conference had self-direction as the most important value state. An explanation might be found in the item wording for that value ('…, *or to form an opinion on your own*?'). The digital space offers an infinite amount of easy-to-access

information, allowing individuals to learn about whatever they seek to form well-informed opinions. During online class, such information is rather unavailable and depend on the teacher, possibly explaining the lower self-direction score for having online class. Besides conformity, these three behaviors have something else in common, namely the high scores for competence need satisfaction. This points towards the digital space being an appropriate means to learn new skills or to study online, whether it is independent or in the class context (Yuwono & Sujono, 2018). Even more so since the COVID-19 outbreak, this seems to be a very valuable asset of the digital space.

Streaming movies or other media, together with playing online games of any kind are two leisure activities that were revolutionized through the digital space. Both exhibited hedonism followed by stimulation as their two highest ranked value states which seems plausible. However, a first difference becomes apparent in the third value, which is self-direction for streaming media and achievement for online games. The competitive nature of most games might explain the latter, whereas the infinite amounts of media in the digital space allow to consume whatever is of interest and thus, a high degree of self-direction. A more important distinction between these two hedonistic acts becomes visible when considering the psychological needs satisfaction. While both exhibited high autonomy scores, feelings of competence or relatedness were not induced by streaming media such as movies or podcasts. Playing online games, on the other hand, showed high scores for alle three needs, including competence and relatedness. This uncovers some strong benefits of the often-criticized domain of online games. Players seem to feel autonomous through various possibilities to engage and decisions that have to be made, competent by mastering challenges in such games or winning over others, and even related through playing with, or possibly even against others. Even though the current study merely looked into need satisfaction (and not dissatisfaction) leading to quite positive outcomes, these findings are in line with some previous research on online games and might give rise to look deeper into beneficial effects of online games (Granic et al., 2014; Ryan et al., 2006).

Associations of values, need satisfaction, and well-being

Concerning the research questions of associating value traits and states (*RQ2*), value states and well-being (*RQ3*), and online need satisfaction and well-being (*RQ5*), it is notable that neither of the three correlational analyses were significant nor exhibited high coefficients. The second research questions aimed to find associations between value traits and value states stemming from online behaviors, yet only the value trait power showed a significant correlation with state power.

This was quite unexpected, as previous research demonstrated different results, finding correlations especially for value traits stimulation, self-direction, and tradition (Bardi & Schwartz, 2003; Skimina et al., 2019). One explanation is that these studies investigated offline behaviors, whereas the current study explored the digital space. It is conceivable that young adults behave much differently online and deviate from their own value traits. Little research exists in this regard, however when it comes to personality traits, behavioral patterns in the digital space show some congruence with traits (Orchard & Fullwood, 2010).

The third and fifth research question aimed to establish associations of certain value states and need satisfaction – both related to online behaviors – with well-being. Again, both associations have been established in the past for offline behaviors but could not be confirmed in the current study (Church et al., 2012; Schwartz & Sortheix, 2018). The reported online behaviors were treated as a representative sample of each participants' online behavior in general, showing which values and needs are regularly pursued in the digital space and how such behavioral patterns might be linked to well-being. However, such associations could not be confirmed by the current results. This could be due to the digital space having less impact on well-being than anticipated, which seems rather improbable considering the time young adults spend online (Statista, 2021b). Also, it could be that despite being asked to report the online behavior most important to them in the last 30 minutes, participants might spend very little time with such activities, leading to an unrepresentative sample of online behaviors. Apparently, more work is needed to investigate associations of values and need satisfaction in the digital space with well-being, as for example an expanded EMA study with a longer duration and more frequent assessments might deliver a more representative picture of young adults' online presence.

Strengths, Limitations & Recommendations

The current study was one of the first of its kind, employing the method of Ecological Momentary Assessment to investigate which values are salient in various online behaviors of young adults and which needs may be satisfied by them. Due to the explorative nature and the limited scope of the current study, the aim was to establish basic insights on which future research can build upon. To increase the validity of these insights for abstract concepts such as values and need satisfaction, EMA was used to lower the risk of recall bias by having participants report their online behaviors and evaluation thereof quickly after engaging in them (Colombo et al., 2019; Stone et al., 1998). This constitutes a strength of the present study, especially with regards to need satisfaction, as positive effects might have still been experienced and thus, reported accurately.

What further adds to this is that the EMA response rate was fairly high with 80%, suggesting that participants' online engagement was captured quite well at different points in time and situations.

Another strength of this study is the avoidance of vague concepts such as screen time, which has been shown to not capture online experiences appropriately (Granic et al., 2020; Orben et al., 2020). Across disciplines such as psychology or communication science, researchers call for a research agenda appropriate for the complexity of internet use, identity, and well-being (Granic et al., 2020; Nesi et al., 2020; Way & Redden, 2017). That is why this study asked participants to report specific online behaviors which made it possible to investigate such behaviors in depth and find more meaningful explanations. Results showed that despite general tendencies, differences do exist between online behaviors, thus time spend online is not an insightful construct to be assessed. The increasing methodological advances such as EMA and the necessity to find out more about consequences of online behaviors for young adults as well as other populations prompt future research to dismiss simplistic concepts such as screen time that fail to capture online experiences thoroughly.

Despite some apparent strengths of the EMA method, it does also bring along some limitations which need to be considered as well. An essential limitation is the demanding nature of this method for participants, requiring researchers to constantly check for opportunities to lower participant burden. For example, only ten online behaviors were presented to participants during the EMA's to decrease participants' time spent on searching for the desired one, which led to combining several acts (such as streaming movies, series, live events, podcasts, or music). As a result, findings for such broad-ranging behaviors have to be interpreted with caution and cannot be broken down into each single act. Though participants had the chance to freely enter an online act, this option was rarely used. On the other hand, a pre-determined list of behaviors might enhance the reliability of the study as no coding and categorizing of behaviors was required and thus, gave less rise to subjectivity. Still, future research might work closer towards the study of Skimina and colleagues (2019), in which participants freely entered various offline acts that were categorized in various steps by different coders to increase some reliability, leading to more specific results.

A similar point can be made about the value theory employed in the current study. The more elaborate 19-values encompassing refined theory of Schwartz (2017) was not used to not overwhelm participants with more than double as much value items as in the current EMA's. Similar to the online behaviors, this would have allowed more specific interpretations of results as values would have been more clearly defined (for example, self-direction thought and self-direction

action). However, while Skimina and colleagues (2019) did use sub-concepts of each value, they also restricted the number of values to nine for unknown reasons, leaving out many sub-concepts. To avoid missing on important value aspects (such as self-direction action), new value items were developed for the current study, combining the wording of Skimina and colleagues (2019) and general value definitions of Schwartz (2012). While developing new items certainly bears risks, it allowed for a more holistic value investigation which seems crucial for basic research. Future research needs to explore further how the balancing act between participant burden and not missing out on concepts can be combined effectively during EMA's. Studies merely focusing on value research would have more capacities to include all value sub-concepts.

Another suggestion for future research relates to the lack of correlations between value traits and value states stemming from reported online behaviors. Some limitations might have led to these results, such as the EMA only spanning over the course of one week with three prompts per day, possibly not capturing a representative sample of participants' online behaviors. Also, when considering the online context, some values might rarely play a role in online behaviors as indicated by very low scores for security, universalism, or achievement. If this is not restricted to the current sample, finding correlations between these value traits and corresponding behaviors will be difficult in the digital space. As this relationship has been established in the past for offline contexts, more research is prompted in this regard to look into whether young adults behave incongruent with their own value priorities in the digital space.

Lastly, a more general limitation has to be made about the representability of the sample. The sample was composed of mainly female participants, limiting the explanatory power for male young adults in the digital space. Also, participants were merely recruited within Europe, with Germany and the Netherlands being mainly represented. Even though the values and their priority rankings are viewed as being universally present across various cultures and countries, associations with behaviors, especially in the digital space, have to be investigated for more diverse samples. Research seems to back up this need, as cultural backgrounds seem to influence internet behaviors (Rosen et al., 2010).

Conclusion

The aim of the current study was to gain first insights into which values are motivating various online behaviors of young adults, and how these behaviors might impact their basic psychological needs. By employing the method of EMA and the recently developed construct of value states, a first step has been made to investigate the complex interaction between young adults'

value traits, their online presence, and their psychological needs. The digital space offers a wide variety of behaviors, each of them presenting different opportunities for young adults to possibly enhance, yet probably also impede healthy identity development. While past research often approached the digital space too simplistic and with a negative expectation, there seems to be a lot of potential regarding beneficial aspects of young adults' online presence to be uncovered. Based on the current findings it seems that young adults' online engagement is often motivated by self-determination, enhancing their sense of autonomy through various online behaviors which is an important requisite for healthy identity development. Also, young adults' inclination to seek excitement and novelty, as well as pleasant experiences seem to be driving their online engagement frequently. Besides offering opportunities to satisfy the need for autonomy, feelings of competence and relatedness seem to be induced as well online, for example when conducting research to deepen one's knowledge or when staying in contact with close others. Considering that growth-related values and the satisfaction of crucial psychological needs seem to play a considerable role in the digital space, more research is needed into how online engagement can foster healthy identity development in young adults. These insights could then be used to promote valuable aspects of the digital space and possibly shape the online experience in a way that enhances these beneficial effects even more.

References

Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion, 32*(3), 189-199. https://doi.org/10.1007/s11031-008-9095-z

Ali, K., Farrer, L., Gulliver, A., & Griffiths, K. M. (2015). Online peer-to-peer support for young people with mental health problems: A systematic review. *JMIR Mental Health, 2*(2). https://doi.org/10.2196/mental.4418

Anderson, C. A., Sakamoto, A., Gntile, D. A., Ihori, N., Shibuya, A., Yukawa, S., Naito, M., & Kobayashi, K. (2008). Longitudinal effects of violent video games on aggression in Japan and the United States. *Pediatrics, 122*(5), 1067-1072. https://doi.org/10.1542/peds.2008-1425

Arnett, J. J. (2000). Emerging adulthood. *American Psychologist, 55*(5), 469-480. https://doi.org/10.1037//0003-066X.55.5.469

Avedissian, T., & Alayan, N. (2021). Adolescent well-being: A concept analysis. *International Journal of Mental Health Nursing, 30*(2), 357-367. https://doi.org/10.1111/inm.12833

Baird, B. M., Lucas, R. E., & Donnellan, M. B. (2010). Life satisfaction across the lifespan: Findings from two nationally representative panel studies. *Social Indicators Research, 99*(2), 183-203. https://doi-org.ezproxy2.utwente.nl/10.1007/s11205-010-9584-9

Bardi, A., & Schwartz, S. H. (2003). Values and behavior: Strength and structure of relations. *Personality and Social Psychology Bulletin, 29*(10), 1207-1220. https://doi.org/10.1177/0146167203254602

Bauer, J. J., McAdams, D. P., & Pals, J. L. (2008). Narrative identity and eudaimonic well-being. *Journal of Happiness Studies, 9*(1), 81-104. https://doi.org/10.1007/s10902-006-9021-6

Benish-Weisman, M., Daniel, E., Sneddon, J., & Lee, J. (2019). The relations between values and prosocial behavior among children: The moderating role of age. *Personality and Individual Differences, 141*, 241-247. https://doi.org/10.1016/j.paid.2019.01.019

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social Science & Medicine, 66*(8), 1733-1749. https://doi.org/10.1016/j.socscimed.2008.01.030

Borca, G., Bina, M., Keller, P. S., Gilbert, L. R., & Begotti, T. (2015). Internet use and developmental tasks: Adolescents‘ point of view. *Computers in Human Behavior, 52*, 49-58. https://doi.org/10.1016/j.chb.2015.05.029

Butkovic, A., Tomas, J., Spanic, A. M., Hlupic, T. V., & Bratko, D. (2020). Emerging adults versus middle-aged adults: Do they differ in psychological needs, self-esteem and life satisfaction? *Journal of Happiness Studies, 21*(3), 779-798. https://doi.org/10.1007/s10902-019-00106-w

Christensen, T. C., Barrett, L. F., Bliss-Moreau, E., Lebo, K., & Kaschub, C. (2003). A practical guide to experience-sampling procedures. *Journal of Happiness Studies, 4,* 53-78. https://doi.org/10.1023/A:1023609306024

Church, A. T., Katigbak, M. S., Locke, K. D., Zhang, H., Shen, J., Vargas-Flores, J. d. J., Ibanez-Reyes, J., Tanaka-Matsumi, J., Curtis, G. J., Cabrera, H. F., Mastor, K. A., Alvarez, J. M., Ortiz, F. A., Simon, J.-Y. R., & Ching, C. M. (2012). Need satisfaction and well-being: Testing self-determination theory in eight cultures. *Journal of Cross-Cultural Psychology, 44*(4), 507-534. https://doi.org/10.1177/0022022112466590

Cieciuch, J., & Schwartz, S. H. (2012). The number of distinct basic values and their structure assessed by PVQ-40. *Journal of Personality Assessment, 94*(3), 321-238. https://doi.org/10.1080/00223891.2012.655817

Cohen, J. N. (2018). Exploring echo-systems: How algorithms shape immersive media environments. *Journal of Media Literacy Education, 10*(2), 139-151. https://doi.org/10.23860/JMLE-2018-10-2-8

Colombo, D., Suso-Ribera, C., Fernandes-Álvarez, J., Felipe, I F., Cipresso, P., Palacios, A. G., Riva, G., & Botella, C. (2019). Exploring affect recall bias and the impact of mild depressive symptoms: An ecological momentary study. In P. Cipresso, S. Seriono, & D. Villani (Eds.), *Pervasive Computing Paradigms for Mental Health. MindCare 2019. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering* (pp. 208-215). Springer.

Cordeiro, P. M. G., Paixao, M. P., Lens, W., Lacante, M., & Luyckx, K. (2018). Parenting styles, identity development, and adjustment in career transitions: The mediating role of psychological needs. *Journal of Career Development, 45*(1), 83-97. Httos://doi.org/10.1177/0894845316672742

Cordeiro, P. M. G., Paixao, M. P., Lens, W., Lacante, M., & Sheldon, K. (2016). Factor structure and dimensionality of the balanced measure of psychological needs among Portugues high school students. Relations to well-being and ill-being. *Learning and Individual Differences, 47*, 51-60. https://doi.org/10.1016/j.lindif.2015.12.010

Daniel, E., Bilgin, A. S., Brezina, I., Strohmeier, C. E., & Vainre, M. (2014). Values and helping behavior: A study in four cultures. *International Journal in Psychology, 50*(3), 186-192. https://doi.org/10.1002/ijop.12086

Deaton, A. (2008). Income, health, and well-being around the world: Evidence from the Gallup World Poll. *Journal of Economic Perspectives, 22*(2), 53-72. https://doi.org/*10.1257/jep.22.2.53*

Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies, 9*, 1-11. https://doi.org/10.1007/s10902-006-9018-1

Diener, E. (2009). Assessing subjective well-being: Progress and opportunities. In E. Diener (Ed.), *Assessing well-being. Social indicators research series.* Springer.

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

Dodge, R., Daly, A. P., Huyton, J., & Sanders, L. D. (2012). The challenge of defining wellbeing. *International Journal of Wellbeing, 2*(3), 222-235. https://doi.org/10.5502/ijw.v2i3.4

Erikson, E. H. (1968). *Identity: Youth and crisis*. W. W. Norton & Company.

Eryilmaz, A. (2011). Satisfaction of needs and determining of life goals: A model of subjective well-being for adolescents in high school. *Educational Sciences: Theory and Practice, 11*(4), 1757-1764.

Eryilmaz, A. (2012). A model of subjective well-being for adolescents in high school. *Journal of Happiness Studies, 13,* 275-289. https://doi.org/10.1007/s10902-011-9263-9

Escobar-Viera, C. G., Shensa, A., Bowman, N. D., & Sidani, J. E. (2018). Passive and active social media use and depressive symptoms among United States adults. *Cyberpsychology, Behavior, and Social Networking, 21*(7), 437-443. https://doi.org/10.1089/cyber.2017.0668

Ethica. (n.d.). [Research instrument]. Retrieved from www.ethicadata.com

Ferrand, C., Martinent, G., & Durmaz, N. (2014). Psychological need satisfaction and well-being in adults aged 80 years and older living in residential homes: Using a self- determination theory perspective. *Journal of Aging Studies, 30*(1), 104-111. https://doi.org/10.1016/j.jaging.2014.04.004

Figueiredo, C., & Bolano, C. (2017). Social media and algorithms: Configurations of the lifeworld colonization by new media. *International Review of Information Ethics, 26,* 26-38. https://doi.org/10.29173/irie277

Galiana, L., Gutierrez, M., Tomas, J. M., & Sancho, P. (2016). Validation of the balanced measure of psychological needs (BMPN) in Spanish and Portuguese: Method effects associated to negatively worded items. *Behavioral Psychology, 24*(1), 73-91.

Gonzalez-Cutre, D., Sicilia, A., Sierra, A. C., Ferriz, R., & Hagger, M. S. (2016). Understanding the need for novelty from the perspective of self-determination theory. *Personality and Individual Differences, 102*, 159-169. https://doi.org/10.1016/j.paid.2016.06.036

Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The benefits of playing video games. *The American Psychologist, 69*(1), 66-78. https://doi.org/10.1037/a0034857

Granic, I., Morita, H., & Scholten, H. (2020). Beyond screen time: Identity development in the digital age. *Psychological Inquiry, 31*(3), 195-223. https://doi.org/10.1080/1047840X.2020.1820214

Griffioen, N., Scholten, H., Lichtwarck-Aschoff, A., van Rooij, M., & Granic, I. (2021). Everyone does it -differently: A window into emerging adults‘ smartphone use. *Humanitites and Social Sciences Communications, 8*(177). https://doi.org/10.1057/s41599-021-00863-1

Hitlin, S. (2003). Values as the core of personal identity: Drawing links between two theories of self. *Social Psychology Quarterly, 66*(2), 118-137. https://doi.org/10.2307/1519843

Hollenstein, T., & Colasante, T. (2020). Socioemotional development in the digital age. *Psychological Inquiry, 31*(3), 250-257. https://doi.org/10.1080/1047840X.2020.1820224

Hope, N. H., Milyavskaya, M., Holding, A. C., & Koestner, R. (2013). Self-growth in the college years: Increased importance of intrinsic values predicts resolution of identity and intimacy stages. *Social Psychological and Personality Science, 5*(6), 705-712. https://doi.org/10.1177/1948550613516875

Horley, J., & Lavery, J. J. (1995). Subjective well-being and age. *Social Indicators Research, 34*, 275-282. https://doi.org/10.1007/BF01079200

Huang, C. (2010). Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking, 13*(3), 241-249. https://doi.org/10.1089=cyber.2009.0217

Jaworska, N., & MacQueen, G. (2015). *Journal of Psychiatry and Neuroscience, 40*(5), 291-293. https://doi.org/10.1503/jpn.150268

Jensen, M., George, M. J., Russel, M. R., & Odgers, C. L. (2019). Young adolescents' digital technology use and mental health symptoms: Little evidence of longitudinal or daily linkages. *Clinical Psychological Science, 7*(6), 1416-1433. https://doi.org/10.1177/2167702619859336

Johnston, M. M., & Finney, S. J. (2010). Measuring basic need satisfaction: Evaluating previous research and conducting new psychometric evaluations of the basic needs satisfaction in general scale. *Contemporary Educational Psychology, 35*(4), 280-296. https://doi.org/10.1016/j.cedpsych.2010.04.003

Karas, D., Cieciuch, J., Negru, O., & Crocetti, E. (2015). Relationships between identity and well-being in Italian, Polish, and Romanian emerging adults. *Social Indicators Research, 121,* 727-743. https://doi.org/10.1007/s11205-014-0668-9

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: Differential coreelates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22*(3), 280-287. https://doi.org/10.1177/0146167296223006

Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety, and psychological distress in adolescents. *International Journal of Adolescence and Youth, 25*(1), 79-93. https://doi.org/10.1080/02673843.2019.1590851

Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly, 61*(2), 121-140. https://doi.org/10.2307/2787065

Keyes, C. L. M., Wissing, M., Potgieter, J. P., Teman, M., Kruger, A., & van Rooy, S. (2008). Evaluation of the mental health continuum – short form (MHC-SF) in Setswana-speaking South Africans. *Clinical Psychology and Psychotherapy, 15*(3), 181-192. https://doi.org/10.1002/cpp.572

Konaszewski, K., Niesiobedzka, M., & Surzykiewicz, J. (2021). Resilience and mental health among juveniles: role of strategies for coping with stress. *Health and Quality of Life Outcomes, 19*(1). https://doi.org/10.1186/s12955-021-01701-3

La Guardia, J. G. (2009). Developing who I am: A self-determination theory approach to the establishment of healthy identities. *Educational Psychologist, 44*(2), 90-104. https://doi.org/10.1080/00461520902832350

Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the mental health continuum – short form (MHC-SF). *Journal of Clinical Psychology, 67*(1), 99-110. https://doi.org/10.1002/jclp.20741

Legault, L. (2017). Self-determination theory. In V. Zeigler-Hill & T. Shackelford (Eds.), *Encyclopedia of personality and individual differences*. Springer. https://doi.org/10.1007/978-3-319-28099-8

Marchant, A., Hawton, K., Stewart, A., Montgomery, P., Singaravelu, V., Lloyd, K., Purdy, N., Daine, K., & John, A. (2017). A systematic review of the relationship between internet use, self-harm and suicidal behaviour in young people: The good, the bad and the unknown. *PLoS One, 12*(8). https://doi.org/10.1371/journal.pone.0181722

Marcia, J. E. (1980). Identity in Adolescence. In J. Adelson (Eds.), *Handbook of adolescent psychology* (p. 109-137). Wiley.

McAdams, D. P. (2018). Narrative identity: What is it? What does it do? How do you measure it? *Imagination, Cognition and Personality, 37*(3), 359-372. https://doi.org/10.1177/0276236618756704

McAdams, D. P., & McLean, K. C. (2013). Narrative identity. *Current Directions in Psychological Science, 22*(3), 233-238. https://doi.org/10.1177/0963721413475622

Merritt, S. M. (2012). The two-factor solution to Allen and Meyer's (1990) affective commitment scale: Effects of negatively worded items. *Journal of Business and Psychology, 27*, 421-436. https://doi.org/10.1007/s10869-011-9252-3

Nesi, J., Telzer, E. H., & Prinstein, M. J. (2020). Adolescent development in the digital media context. *Psychological Inquiry, 31*(3), 229-234. https://doi.org/10.1080/1047840X.2020.1820219

Neubauer, A. B., & Voss, A. (2016). Validation and revision of a German version of the balanced measure of psychological needs scale. *Journal of Individual Differences, 37*(1), 56-72. https://doi.org/10.1027/1614-0001/a000188

Nishimura, T., & Suzuki, T. (2016). Basic psychological need satisfaction and frustration in Japan: Controlling for the big five personality traits. *Japanese Psychological Research, 58*(4), 320-331. https://doi.org/https://doi.org/10.1111/jpr.12131

Orben, A., Dienlin, T., & Przybylski, A. K. (2019). Social media's enduring effect on adolescent life satisfaction. *Proceedings of the National Academy of Sciences, 116*(21), 10226-10228. https://doi.org/10.1073/pnas.1902058116

Orben, A., Weinstein, N., & Przybylski, A. K. (2020). Only holistic and iterative change will fix digital technology research. *Psychological Inquiry, 31*(3), 235-241. https://doi.org/10.1080/1047840X.2020.1820221

Orchard, L. J., & Fullwood, C. (2010). Current perspectives on personality and internet use. *Social Science Computer Review, 28*(2), 155-169. https://doi.org/10.1177/0894439309335115

Padilla-Walker, L. M., Nelson, L. J., Carroll, J. S., & Jensen, A. C. (2010). More than just a game: Video game and internet use during emerging adulthood. *Journal of Youth and Adolescence, 39*(2), 103-113. https://doi.org/10.1007/s10964-008-9390-8

Pennebaker, J. W. & Chung, C. K. (2011). Expressive writing: Connections to physical and mental health. In H. S. Friedman (Ed.), *The oxford handbook of health psychology.* Oxford University Press.

Puth, M.-T., Neuhäuser, M., & Ruxton, G. D. (2015). Effective use of Spearman's and Kendall's correlation coefficients for association between two measured traits. *Animal Behaviour, 102*, 77-84. https://doi.org/10.1016/j.anbehav.2015.01.010

Reese, E., Myftari, E., McAnally, H. M., Chen, Y., Neha, T., Wang, Q., Jack, F., & Robertson, S.-J. (2017). Telling the tale and living well: Adolescent narrative identity, traits, and well-being across cultures. *Child Development, 88*(2), 612-628. https://doi.org/10.1111/cdev.12618

Rosen, D., Stefanone, M. A., & Lackaff, D. (2010). *Online and offline social networks: Investigating culturally-specific behavior and satisfaction.* 43rd Hawaii International Conference on System Sciences, Hawaii. https://doi.org/10.1109/HICSS.2010.292

Roser, M., Ritchie, H., & Ortiz-Ospina, E. (2015). *Internet.* Our World in Data. https://ourworldindata.org/internet

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2017). Self-determination theory: An introduction and overview. In R. M. Ryan & E. L. Deci (Eds.), *Self-determination theory: Basic psychological need sin motivation, development, and wellness* (pp. 3-25). Guilford.

Ryan, R. M., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*(4), 344-360. https://doi.org/10.1007/s11031-006-9051-8

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069-1081. https://doi.org/10.1037/0022-3514.57.6.1069

Saris, W. E., Knoppen, D., & Schwartz, S. H. (2013). Operationalizing the theory of human values: Balancing homogeneity of reflective items and theoretical coverage. *Survey Research Methods, 7*(1), 29-44. https://doi.org/10.18148/srm/2013.v7i1.5040

Sawyer, S. M., Azzopardi, P. S., Wickremarathne, D., & Patton, G. C. (2018). The age of adolescence. *Child & Adolescent Health, 2*(3), 223-228. https://doi.org/10.1016/S2352-4642(18)30022-1

Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online Readings in Psychology and Culture, 2*(1). https://doi.org/10.9707/2307-0919.1116

Schwartz, S. H. (2017). The refined theory of basic values. In S. Roccas & L. Sagiv (Eds.), *Values and behavior: Taking a cross-cultural perspective* (pp. 51-72). Springer.

Schwartz, S. H., & Butenko, T. (2014). Values and behavior: Validating the refined value theory in Russia. *European Journal of Social Psychology, 44*(7), 799-813. https://doi.org/10.1002/ejsp.2053

Schwartz, S. H., & Cieciuch, J. (2021). Measuring the refined theory of individual values in 49 cultural groups: Psychometrics of the revised portrait value questionnaire. *Assessment,* 1-15. https://doi.org/10.1177/1073191121998760

Schwartz, S. J. (2001). The evolution of Eriksonian and Neo-Eriksonian identity theory and research: A review and integration. *Identity, 1*(1), 7-58. https://doi.org/10.1207/S1532706XSCHWARTZ

Schwartz, S. J., Beyers, W., Luyckx, K., Soenens, B., Zamboanga, B. L., Forthun, L. F., Hardy, S. A., Vazsonyi, A. T., Ham, L. S., Kim, S. Y., Whitbourne, S. K., & Waterman, A. S. (2011). *Journal of Youth and Adolescence, 40*(7), 839-859. https://doi.org/10.1007/s10964-010-9606-6

Schwartz, S. J., Cote, J. E., & Arnett, J. J. (2005). Identity and agency in emerging adulthood: Two developmental routes in the individualization process. *Youth & Society, 37*(6), 201-229. https://doi.org/10.1177/0044118X05275965

Schwartz, S. J., Donnellan, M. B., Ravert, R. D., Luyckx, K., & Zamboanga, B. L. (2013). Identity, development, personality, and well-being in adolescence and emerging adulthood: Theory, research, and recent advances. In R. M. Lerner, M. A. Easterbrooks, J. Mistry & I. B. Weiner (Eds.), *Handbook of psychology: Developmental psychology* (pp. 339-364). John Wiley & Sons, Inc.

Schwartz, S. H., & Sortheix, F. (2018). Values and subjective well-being. In E. Diener, S. Oishi & L. Tay (Eds.), *Handbook of well-being* (pp. 1-25). Noba Scholar.

Seiffge-Krenke, I., & Weitkamp, K. (2020). How individuals coping, mental health, and parental behavior are related to identity development in emerging adults in seven countries. *Emerging Adulthood, 8*(5), 344-360. https://doi.org/10.1177/2167696819863504

Sharon, T. (2016). Constructing adulthood: Markers of adulthood and well-being among emerging adults. *Emerging Adulthood, 4*(3), 161-167. https://doi.org/10.1177/2167696815579826

Sheldon, K. M., Abad, N., & Hintsch, C. (2011). A two-process view on Facebook use and relatedness need-satisfaction: Disconnection drives use, and connection rewards it. *Journal of Personality and Social Psychology, 100*(4), 766-775. https://doi.org/10.1037/a0022407

Sheldon, K. M., & Hilpert, J. C. (2012). The balanced measure of psychological needs (BMPN) scale: An alternative domain general measure of need satisfaction. *Motivation and Emotion, 36*(4), 439-451. https://doi.org/10.1007/s11031-012-9279-4

Shen, C.-X., Liu, R.-D., & Wang, D. (2013). Why are children attracted to the internet? The role of need satisfaction perceived online and perceived in daily real life. *Computers in Human Behavior, 29*(1), 185-192. https://doi.org/10.1016/j.chb.2012.08.004

Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annual Reviwe of Clinical Psychology, 4*, 1-32. https://doir.org/10.1146/annurev.clinpsy.3.022806.091415

Singer, J. A. (2020). Narrative identity in a digital age: What are the human risks? *Psychological Inquiry, 31*(3), 224-228. https://doi.org/10.1080/1047840X.2020.1820217

Sivan, A., Tam, V. C. W., Siu, G. P. K., & Stebbins, R. A. (2020). Adolescents‘ self-exploration in leisure experience. *Leisure/Loisir, 44*(4), 441-468. https://doi.org/10.1080/14927713.2020.1815561

Skimina, E., Cieciuch, J., Schwartz, S. H., Davidov, E., & Algesheimer, R. (2018). Testing the circular structure and importance hierarchy of value states in real-time behaviors. *Journal of Research in Personality, 74,* 42-49. https://doi.org/10.1016/j.jrp.2018.02.001

Skimina, E., Cieciuch, J., Schwartz, S. H., Davidov, E., & Algesheimer, R. (2019). Behavioral signatures of values in everyday behavior in retrospective and real-time self-reports. *Frontiers in Psychology, 10*(281). https://doi.org/10.3389/fpsyg.2019.00281

Smith, A., & Anderson, M. (2018). *Social media use in 2018.* Pew Research Center. https://tinyurl.com/3t55thz7

Soenens, B., & Vansteenkiste, M. (2011). When is identity congruent with the self? A self-determination theory perspective. In S. J. Schwartz, K. Luyckx & V. L. Vignoles (Eds.), *Handbook of identity theory and research* (pp. 381-402). Springer.

Sona Systems. (n.d.). [Research instrument]. Retrieved from www.sona-systems.com

Statista. (2021a). *Global digital population as of October 2020.* https://tinyurl.com/er9uhb3e

Statista. (2021b). *Time spent online by internet users worldwide from 2013 to 2019, by device.* https://tinyurl.com/wjbbeaus

Statista. (2021c). *Share of adults in the United States who use the internet in 2019, by age group.* https://tinyurl.com/4pe74fus

Stone, A. A., Schwartz, J. E., Neale, J. E., Shiffman, S., Marco, C. A., Hickox, M., Paty, J., Porter, L. S., & Cruise, L. J. (1998). A comparison of coping assessed by ecological momentary assessment and retrospective recall. *Journal of Personality and Social Psychology, 74*(6), 1670-1680. https://doi.org/10.1037//0022-3514.74.6.1670

Stroud, C., Walker, L. R., Davis, M., & Irwin, C. E. (2015). Investing in the health and well-being of young adults. *Journal of Adolescent Health, 56*(2), 127-129. https://doi.org/10.1016/j.jadohealth.2014.11.012

Sumner, R., Burrow, A. L., & Hill, P. L. (2015). Identity and purpose as predictors of subjective well-being in emerging adulthood. *Emerging Adulthood, 3*(1), 46-54. https://doi.org/10.1177/2167696814532796

Trigueros, R., Alvarez, J. F., Cangas, A. J., Aguilar-Parra, J. M., Mendez-Aguado, C., Rocamora, P., & Lopez- Liria, R. (2020). Validation of the scale of basic psychological needs towards physical exercise, with the inclusion of novelty. *International Journal of Environmental Research and Public Health, 17*(2). https://doi.org/10.3390/ijerph17020619

Twomey, C., & O´Reilly, G. (2017). Associations of self-presentation on Facebook with mental health and personality variables: A systematic review. *Cyberpsychology, Behavior, and Social Networking, 20*(10), 587-595. https://doi.org/10.1089/cyber.2017.0247

Valkenburg, M. P., & Peter, J. (2008). Adolescents' identity experiments on the internet: Consequences for social competence and self-concept unity. *Communication Research, 35*(2), 208-231. https://doi.org/10.1177/0093650207313164

Valkenburg, M. P., & Peter, J. (2009). The effects of instant messaging on the quality of adolescents' existing friendships: A longitudinal study. *Journal of Communication, 59*(1), 79-97. https://doi.org/10.1111/j.1460-2466.2008.01405.x

Valkenburg, P. M., Schouten, A. P., & Peter, J. (2005). Adolescents' identity experiments on the internet. *New Media & Society, 7*(3), 383-402. https://doi.org/10.1177/1461444805052282

Van Berkel, N., Ferreira, D., & Kostakos, V. (2017). The experience sampling method on mobile devices. *ACM Computing Surveys, 50*(6), 93-133. https://doi.org/10.1145/3123988

Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review, 11*(1), 274-302. https://doi.org/10.1111/sipr.12033

Véronneau, M.-H., Koestner, R. F., & Abela, J. R. Z. (2005). Intrinsic need satisfaction and well-being in children and adolescents: An application of the self-determination theory. *Journal of Social and Clinical Psychology, 24*(2), 280-292. https://doi.org/10.1521/jscp.24.2.280.62277

Wang, J.-L., Gaskin, J., Rost, D. H., & Gentile, D. A. (2017). The reciprocal relationship between passive social networking sites (sns) usage and users' subjective well-being. *Social Science Computer Review, 36*(5), 511-522. https://doi.org/10.1177/0894439317721981

Wängqvist, M., & Frisén, A. (2016). Who am I online? Understanding the meaning of online contexts for identity development. *Adolescent Research Review, 1*(2), 139-151. https://doi.org/10.1007/s40894-016-0025-0

Waterman, A. S. (2007). Doing well: The relationship of identity status to three conceptions of well-being. *Identity, 7*(4), 289-307. https://doi.org/10.1080/15283480701600769

Waters, T. E. A., & Fivush, R. (2015). Relations between narrative coherence, identity, and psychological well-being in emerging adulthood. *Journal of Personality, 83*(4), 441-451. https://doi.org/10.1111/jopy.12120

Way, A., & Redden, S. M. (2017). The study of youth online: A critical review and agenda. *Review of Communication, 17*(2), 119-136. https://doi.org/10.1080/15358593.2017.1293838

Wehmeyer, M. L., Shogren, K. A., Little, T. D., & Lopez, S. J. (2017). *Development of self-determination through the life course.* Springer. https://doi.org/10.1007/978-94-024-1042-6

Wood, A., Linley, P., Maltby, J., Baliousis, M., & Joseph, S. (2008). The authentic personality: A theoretical and empirical conceptualization and the development of the authenticity scale. *Journal of Counselling Psychology, 55*(3), 385-399. https://doi.org/10.1037/0022-0167.55.3.385

Yuwono, K. T., & Sujono, H. D. (2018). The effectiveness of e-learning: A meta-analysis. *Journal of Physics: Conference Series, 1140*. https://doi.org/10.1088/1742-6596/1140/1/012024

Appendix A

Questionnaires Used in the Current Study

Pre-EMA Survey

Demographics

1. How old are you?
2. What is your gender?
3. What is your nationality?

Portrait Values Questionnaire – Revised Version (PVQ-RR)

Here we briefly describe different people. Please read each description and think about how much that person is or is not like you. (six-point Likert scale: not like me at all (1), …, very much like me (6)).

1. It is important to her to form her views independently.

2. It is important to her that her country is secure and stable.

3. It is important to her to have a good time.

4. It is important to her to avoid upsetting other people.

5. It is important to her that the weak and vulnerable in society be protected.

6. It is important to her that people do what she says they should.

7. It is important to her never to think she deserves more than other people.

8. It is important to her to care for nature.

9. It is important to her that no one should ever shame her.

10. It is important to her always to look for different things to do.

11. It is important to her to take care of people she is close to.

12. It is important to her to have the power that money can bring.

13. It is very important to her to avoid disease and protect her health.

14. It is important to her to be tolerant toward all kinds of people and groups.

15. It is important to her never to violate rules or regulations.

16. It is important to her to make her own decisions about her life.

17. It is important to her to have ambitions in life.

18. It is important to her to maintain traditional values and ways of thinking.

19. It is important to her that people she knows have full confidence in her.
20. It is important to her to be wealthy.
21. It is important to her to take part in activities to defend nature.
22. It is important to her never to annoy anyone.
23. It is important to her to develop her own opinions.
24. It is important to her to protect her public image.
25. It is very important to her to help the people dear to her.
26. It is important to her to be personally safe and secure.
27. It is important to her to be a dependable and trustworthy friend.
28. It is important to her to take risks that make life exciting.
29. It is important to her to have the power to make people do what she wants.
30. It is important to her to plan her activities independently.
31. It is important to her to follow rules even when no-one is watching.
32. It is important to her to be very successful.
33. It is important to her to follow her family's customs or the customs of a religion.
34. It is important to her to listen to and understand people who are different from her.
35. It is important to her to have a strong state that can defend its citizens.
36. It is important to her to enjoy life's pleasures.
37. It is important to her that every person in the world have equal opportunities in life.
38. It is important to her to be humble.
39. It is important to her to figure things out herself.
40. It is important to her to honor the traditional practices of her culture.
41. It is important to her to be the one who tells others what to do.
42. It is important to her to obey all the laws.
43. It is important to her to have all sorts of new experiences.
44. It is important to her to own expensive things that show her wealth.
45. It is important to her to protect the natural environment from destruction or pollution.
46. It is important to her to take advantage of every opportunity to have fun.
47. It is important to her to concern herself with every need of her dear ones.

48. It is important to her that people recognize what she achieves.

49. It is important to her never to be humiliated.

50. It is important to her that her country protect itself against all threats.

51. It is important to her never to make other people angry.

52. It is important to her that everyone be treated justly, even people she doesn't know.

53. It is important to her to avoid anything dangerous.

54. It is important to her to be satisfied with what she has and not ask for more.

55. It is important to her that all her friends and family can rely on her completely.

56. It is important to her to be free to choose what she does by herself.

57. It is important to her to accept people even when she disagrees with them.

Balanced Measure of Psychological Needs (BMPN)

Please read each of the following statements carefully, thinking about how true this is for you. (five-Point Likert scale: no agreement (1), …., much agreement (5)).

1. I was free to do things my own way.
2. My choices expressed my "true self".
3. I was really doing what interests me.
4. I was successfully completing difficult tasks and projects.
5. I took on and mastered hard challenges.
6. I did well even at the hard things.
7. I felt a sense of contact with people who care for me, and whom I care for.
8. I felt close and connected with other people who are important to me.
9. I felt a strong sense of intimacy with the people I spent time with.

EMA-Survey

1. Think about all the online behaviours you engaged in during the last 30 minutes. Which one was most important to you?
   Consuming pictures or (short) videos (such as stories, YouTube videos…)
   Posting pictures or (short) videos (such as stories, YouTube videos…)
   Texting with peers, friends, or family

Conducting research for school, university, or work-related topics

Searching for information, for example regarding hobbies, travels, products, or health related

Playing online games of any kind

Streaming movies, series, live events, music, or podcasts

Online dating

Online shopping

Informing about news or current topics (including news sides, twitter…)

Other, namely: _____

2. When you were engaging in this online activity, how important was it to you to behave self-determined, or to form an opinion on your own?
3. When you were engaging in this online activity, how important was it to you to experience something new or exciting?
4. When you were engaging in this online activity, how important was it to you to enjoy yourself?
5. When you were engaging in this online activity, how important was it to you to be better at something than others are?
6. When you were engaging in this online activity, how important was it to you to express authority or be in control of resources?
7. When you were engaging in this online activity, how important was it to you to decrease risk for you or others?
8. When you were engaging in this online activity, how important was it to you to do what some else expected, or to avoid upsetting someone?
9. When you were engaging in this online activity, how important was it to you to support someone you did not know, or to protect the environment?
10. When you were engaging in this online activity, how important was it to you to help someone with whom you are in regular contact?
11. When engaging in this online activity, I was free to do what interests me and/or expressed my true self.
12. When engaging in this online activity, I did well and/or was successfully completing hard challenges.

13. When engaging in this online activity, I felt a sense of contact with people who are important to me, or even felt close and connected to them.

Post-EMA Survey

Mental Health Continuum – Short Form (MHC-SF)

In the last week, how often did you feel… (six-Point Likert scale: never (1), once or twice a month (2), about once a week (3), two or three times a week (4), almost every day (5), every day (6)).

1. Happy?
2. Interested in Life?
3. Satisfied?
4. That you liked most parts of your personality?
5. Good at managing the responsibilities of your daily life?
6. That you had warm and trusting relationships with others?
7. That you have experiences that challenge you to grow and become a better person?
8. Confident to think or express your own ideas and opinions?
9. That your life has a sense of direction or meaning to it?
10. That you had something important to contribute to society?
11. That you belonged to a community (like a social group, your neighbourhood, your city)?
12. That our society is becoming a better place for people?
13. That people are basically good?
14. That the way our society works makes sense to you?

Balanced Measure of Psychological Needs (BMPN)

Please read each of the following statements carefully, thinking about how true this is for you for the last week. (five-Point Likert scale: no agreement (1), …., much agreement (5)).

1. I was free to do things my own way.
2. My choices expressed my "true self".
3. I was really doing what interests me.
4. I was successfully completing difficult tasks and projects.
5. I took on and mastered hard challenges.
6. I did well even at the hard things.

7. I felt a sense of contact with people who care for me, and whom I care for.
8. I felt close and connected with other people who are important to me.
9. I felt a strong sense of intimacy with the people I spent time with.