Self-compassion Mediates the Association Between Trait Anxiety and Mobile Attachment in Digital Natives but Not Digital Immigrants

Leora Hodes
ACSENT Laboratory
Department of Psychology
University of Cape Town

Supervisor: Kevin Thomas
Co-supervisor: Jessica Oosthuizen
Word count:
Abstract: 250
Main text: 7998

PLAGIARISM DECLARATION

1. I know that Plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.

2. I have used the American Psychological Association formatting for citation and referencing. Each significant contribution to, and quotation in, this project from the work or works, of other people has been attributed, cited and referenced.

3. This project is my own work.

4. I have not allowed, and will not allow anyone to copy my work with the intention of passing it off as his or her own work.

Name: Leora Hodes

Signature: 

Student number: HDSLEO001

Date: 1 November 2018

Abstract

Smartphones are among the most ubiquitous and desired objects in contemporary society. Hence, many people are strongly attached to their smartphones, so much so that separation from the device causes significant distress. Cyberpsychological research suggests that individuals with greater smartphone attachment tend to show higher levels of trait anxiety (i.e., anxiety as a personality characteristic that remains stable over time), but that this association might be mediated by individual difference factors. This study assessed whether self-compassion, a concept that describes being kind and non-judgmental to oneself, mediates relations between trait anxiety and smartphone attachment. Because smartphone use has only become pervasive over the past 10 years, I also aimed to assess whether this mediational relationship differed between *digital natives* and *digital immigrants* (i.e., individuals born into the technological world versus those born before the widespread adoption of personal computers and smartphones). Digital natives (n = 104; aged 18-25 years) and digital immigrants (n = 117; aged 30-60 years) completed the State-Trait Anxiety Inventory, Self-Compassion Scale, Mobile Attachment Questionnaire, and a smartphone use scale. The mediational hypothesis was confirmed only within the sample of digital natives. Moreover, digital natives showed significantly greater mobile attachment than digital immigrants, although device use was heavier in the latter (thereby suggesting that smartphone use is not synonymous with smartphone attachment). Generally, this research adds understanding to the human-smartphone interaction. More specifically, it suggests that programmatic interventions to improve levels of self-compassion could buffer the negative implications of an unhealthy smartphone attachment, especially in young adults.

Keywords: anxiety; attachment; digital natives; digital immigrants; self-compassion; smartphones

Widespread adoption of the smartphone approximately 10 years ago revolutionized ways in which people interact with themselves and with others. Because smartphones are now so ubiquitous and because so many people express discomfort when not in close proximity to their devices, the cyberpsychological literature has begun to explore the attachment humans have to their smartphones in terms of classical attachment theory (Ainsworth, 1989; Bowlby, 1958).

The concept of *smartphone attachment* suggests that separation from one's smartphone can cause significant anxiety. Moreover, individuals with high levels of smartphone attachment tend to show concomitantly high levels of *trait anxiety* (i.e., anxiety as a personality characteristic that remains stable over time; Spielberger & Vagg, 1984). However, the association between smartphone attachment and trait anxiety is not straightforward. For instance, its strength appears to be modified by individual difference factors, including ways in which the person relates to and understands themselves (see, e.g., Hussain, Griffiths, & Sheffield, 2017). The Eastern philosophical concept of *self-compassion* describes a way of relating to the self, marked by positive, non-judgmental, and kind thoughts and behaviors (Neff, 2003b), and there are suggestions in the literature that more self-compassionate individuals tend to be less anxious (see, e.g., Bergen-Cico & Cheon, 2013). Hence, it is of interest to investigate whether self-compassion mediates the relationship between trait anxiety and smartphone attachment.

Smartphone Attachment and Anxiety

Classic attachment theory suggests that an infant's attachment to its primary caregivers takes one of three basic forms: secure, anxious-resistant, or anxious-avoidant (Bowlby, 1958). In the *secure* attachment pattern, the child can tolerate separation from the caregiver, and is comfortable with venturing from the secure base established by the caregivers. In contrast to the other two patterns, this is considered a healthy attachment. In the *anxious-resistant* attachment pattern, the child is anxious about exploring the world and clings to the caregivers. In the *anxious-avoidant* attachment pattern, the child relies on support from the caregivers but also constantly expects to be rejected (Ainsworth, 1989; Bowlby, 1988).

Of particular interest here, is that these infant attachment patterns can persist into adulthood and extend to other relationships. For instance, Ammaniti and colleagues (2000) reported that 23 of their sample of 31 Italian adolescents (74%) displayed attachment pattern stability over a 4-year period spanning childhood and adolescence. Bartholomew and Horowits (1991), using a sample of 69 American students, found that family attachment

ratings correlated moderately with friendship attachment ratings (e.g., individuals with an anxious-avoidant parental attachment showed difficulty relying on friends).

Recent research has begun to explore attachment to material objects in the same terms as Bowlby's theory described an infant's attachment to its parents. Because many contemporary cultures emphasize acquiring material objects, those objects take on an underlying emotional significance and provide comfort, so that being deprived of them, even temporarily, can cause distress (Bell & Spikins, 2018). Hence, children might show attachment to specific teddy bears, whereas adults might show attachment to family heirlooms (Gjersoe, Hall, & Hood, 2015).

Because smartphones are one of the most prevalent and desired objects in modern society, it is unsurprising that researchers have directly applied the rich literature on classic attachment theory to the sub-discipline of cyberpsychology (Konok, Gigler, Bereczky, & Miklósi, 2016). In other words, the conceptual framework provided by that theory has begun to guide investigations into the human-smartphone interaction. This framework supports research into the construct of smartphone attachment[1] (i.e., the notion that individuals form emotional attachments to their smartphones). Here, that construct is operationally defined as either a healthy secure attachment, where separation does not cause distress, or an unhealthy anxious attachment, where separation causes distress.

The centrality of anxiety to this definition has been demonstrated empirically. For instance, cross-sectional studies of Taiwanese and Lebanese university students report positive correlations between levels of anxiety (measured by the Generalized Anxiety Disorder-7 scale; Spitzer, Kroenke, Williams, & Löwe, 2006) and cellphone addiction (defined as spending over 5 hours on a cellphone daily; Boumosleh & Jaalouk, 2017; Hong, Chiu, & Huang, 2012). Similarly, but this time in an experimental design, Konok and colleagues (2017) showed that Hungarian university students who reported higher levels of smartphone attachment (measured by the Mobile Attachement Questionnaire; Kornok, Pogány, & Miklósi, 2017) displayed greater state anxiety (as measured by the State-Trait Anxiety Inventory; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) than individuals with lower levels when their devices were confiscated.

[1]This study avoids casting frequent cellphone use as an "addiction", because this rhetoric has negative and possibly stigmatizing implications. Furthermore, any statement that individuals who use their phones regularly are "addicts" implies that smartphones are exclusively bad, and neglects their beneficial aspects (see, e.g., Ahn & Jung, 2014; Stern & Burke Odland, 2017).

Using a young adult sample is common in the smartphone literature; few studies focus on older samples (Asante, 2018). Such a focus might be useful, however, given that generational differences exist between *digital natives* (viz., members of the generation born into the technological world and who have been taught to live with, and rely on, these devices) and *digital immigrants* (viz., individuals born before the widespread adoption of personal computers and smartphones, and who may have had to learn to adjust to the digital world; Prensky, 2001).

Assessing these generational differences, Asante (2018) concluded that age is a core predictor of mobile attachment, with younger individuals tending to display significantly higher levels. Other studies suggest that, on average, younger-generation samples are more dependent on smartphones and use them for more diverse purposes than older-generation samples (see, e.g., Anshari et al., 2016). Similarly, Forgays, Hyman, and Schreiber (2014) presented participants with a hypothetical situation that involved their smartphones being taken away, and measured self-reported anxiety in response to that situation. Results indicated a main effect of age, with the oldest members of the sample (50-68 years) reporting the least anxiety.

Self-Compassion: A mediator of relations between smartphone attachment and anxiety?

Previous research suggests that although problematic smartphone use is positively associated with anxiety, this relationship may be mediated by individual difference variables, including personality traits and emotional stability (Hussain et al., 2017). A similar strand of research suggests that stress coping mechanisms and high self-esteem are protective factors against developing an unhealthy smartphone attachment (Boumosleh & Jaalouk, 2017; Wang et al., 2017). Hence, a developing area of investigation involves quantifying third factors, innate to individuals and largely encompassing the ways in which people relate to themselves, that mediate associations between smartphone attachment and trait anxiety.

Iskender and Akin (2011) proposed that Internet addiction (i.e., excessive amounts of time spent online) is more likely to occur in individuals with low self-compassion. This latter philosophical concept, which draws on insights from Buddhism, involves “being touched by and open to one’s own suffering, not avoiding or disconnecting from it, generating the desire to alleviate one’s suffering and to heal oneself with kindness” (Neff, 2003b, p. 87).

The psychological literature suggests that self-compassion is founded on three pillars: (1) *self-kindness*, which entails compassion to oneself, and which is contrasted against self-criticism; (2) *common humanity*, which entails viewing one’s individual experiences as part of a greater human experience rather than isolating events that only happen to oneself; and

(3) *mindfulness*, which entails being able to hold distressing thoughts in a balanced awareness without being consumed by them, and which is contrasted against over-identification (Neff, 2003b).

Of particular importance to this study is the relationship between self-compassion and trait anxiety. Bergen-Cico and Cheon (2013) showed that a mindfulness intervention led to decreases in trait anxiety and increases in self-compassion, and concluded that self-compassion provided a protective factor against trait anxiety. Similarly, Werner et al. (2012) found that participants diagnosed with social anxiety disorder had lower self-compassion scores than healthy controls.

Of further relevance is the empirically-demonstrated relationship between self-compassion and attachment styles. Adults with anxious attachment styles tend to have lower levels of self-compassion, whereas those with secure attachment styles tend to show greater self-acceptance (Neff, Kirkpatrick, & Rude, 2007). Furthermore, Homan (2018) showed that self-compassion mediated the relationship between parental attachment and overall psychological wellbeing. This data pattern suggests that people learn to treat themselves (i.e., are, or are not, self-compassionate) in similar ways to which their primary childhood attachment figure(s) treated them.

Rationale and Hypotheses

No published study has focused specifically on relations between self-compassion, trait anxiety, and smartphone attachment. Although Arpaci, Baloglu, Ozteke Kozan, and Kesici (2017) found that mindfulness (a component of, but not the entire construct of, self-compassion) mediated the relationship between nomophobia (i.e., fear of being without one's phone) and attachment style in 450 undergraduates, they (a) did not measure self-compassion and smartphone attachment directly, (b) did not investigate trait anxiety, and (c) only analyzed data from a student sample.

Furthermore, previous smartphone research has focused almost entirely on these devices' negative effects on stress and anxiety (see, e.g., Hussain et al., 2017; Samaha & Hawi, 2016). The implication of such research is that banishing the smartphone will lead to improved mental health. This abstinence approach is not practical, however. There is no possibility that smartphones will simply disappear, or that individuals will voluntarily cease using them. Instead, these devices are only becoming more ubiquitous in everyday life. Hence, a more useful approach might be one that tries to understand patterns of smartphone attachment, the consequences of that attachment (e.g., anxiety), and psychological factors

(e.g., self-compassion) that potentially buffer against negative consequences of unhealthy attachment.

This research took such a balanced approach, and attempted to fill the knowledge gap surrounding the nature of relations between self-compassion, trait anxiety, and smartphone attachment. I used samples of both young and middle-aged adults, thus also filling the knowledge gap involving smartphone attachment among digital immigrants.

I tested the specific hypotheses that:

(1) Digital natives will show significantly greater levels of smartphone attachment than digital immigrants, and

(2) self-compassion will mediate the relationship between trait anxiety and smartphone attachment in both digital natives and digital immigrants.

Methods

Design and Setting

The research adopted a cross-sectional, intra-individual design. Data were collected via standardized self-report questionnaires measuring self-compassion, trait anxiety, and smartphone attachment. All procedures were conducted in a classroom in the UCT Psychology Department and via online survey. This study was granted ethical clearance by the UCT Department of Psychology's Ethics Committee, reference number PSY2018-023 (Appendix A).

Participants

Recruitment.

Digital natives. Students (N = 104, 80 women) were recruited from the UCT undergraduate population using convenience sampling. All individuals registered for a 2018 second-semester Psychology course were invited to participate via an email on the Department of Psychology's Student Research Participation Program (SRPP) Vula site.

Digital immigrants. Non-student adults older than 30 years (N = 117, 62 women) were recruited using snowball sampling. I distributed an email and/or message containing a link to an online questionnaire to family, friends, and corporations across South Africa.

Eligibility criteria. All participants needed to be smartphone owners. Student participants needed to be aged between 18 and 25 years to limit this portion of the sample to digital natives. In the older sample, participants needed to be aged between 30 and 60 years to limit this portion of the sample to digital immigrants.

Power analysis. A power analysis using G*Power 3.0.10 software suggested that a sample size of 104, with type of analysis set to linear regression modelling, and statistical

parameters of Cohen's $f = 0.10$ (a small effect size; a conservative approach as no appropriately similar research has been published), $\alpha = .05$, and number of predictors = 2, generates a statistical power of .94 (Faul, Erdfelder, Buchner, & Lang, 2009). Therefore, with $n = 104$ for the digital native sample and $n = 117$ for the digital immigrant sample, the study was adequately powered.

Measures

Sociodemographic questionnaire. This study-specific questionnaire (Appendix B) gathered basic biographic information (e.g., age, sex, and highest level of education). The version used for digital immigrants was slightly more detailed to account for the generational differences (e.g., it asked their ages when they got their first smartphone, and what their current job was; Appendix C).

Self-Compassion Scale (SCS). This questionnaire (Neff, 2003a; Appendix D) is the most widely used instrument to assess self-compassion. Each of the scale's 26 items is a statement to which the respondent must reply, using a 5-point Likert-type scale (with 1 indicating "almost never" and 5 indicating "almost always"), indicating how applicable it is to him/herself.

The developer suggests that each item contributes its score to one of six subscales, each of which is an index of a key aspect of self-compassion: (a) self-kindness, (b) self-judgement, (c) common humanity, (d) isolation, (e) mindfulness, and (f) over-identification. A total score across all 26 items is calculated, with negatively worded items being reverse scored. Higher SCS scores indicate higher levels of self-compassion.

Although the psychometric properties of this instrument have not been explored in detail, the developer reports it has good test-retest reliability ($r = .93$ over a 3-week interval) and promising construct validity when tested on American undergraduate students (Neff, 2003a). A recent independent study suggested the SCS had impressive internal consistency (Cronbach's $\alpha = .92$ at time 1 and .95 at time 2) and high test-retest reliability ($r = .87$ over a 2.5-month interval) when tested on 332 Scottish students (Cleare, Gumley, Cleare, & O'Connor, 2018).

Mobile Attachment Questionnaire (MAQ). This self-report instrument (Kornok et al., 2017; Appendix E) is designed to measure individual attachment to mobile devices. Each of the scale's 15 items is a statement to which the respondent must reply, using a 5-point Likert-type scale (with 1 indicating "not characteristic at all" and 5 indicating "very characteristic"), indicating how applicable it is to him/herself.

The developers suggest that each item contributes its score to one of four subscales, each of which is an index of a key aspect of mobile attachment: (a) separation insecurity, (b) separation anxiety, (c) safe haven, and (d) secure base. A total score across all 15 items is calculated, with negatively worded items being reverse scored. Higher MAQ scores indicate higher levels of smartphone attachment.

Because the MAQ is a newly-developed instrument, its psychometric properties have not been explored in detail. The developers reported excellent construct validity (Cronbach's α = .91) in a sample of 93 Hungarian university students (Konok et al., 2017).

In the current study, I supplemented the MAQ with another measure used by Konok et al. (2016) to track smartphone usage. This latter questionnaire listed seven potential smartphone uses and asked participants to rate, using a 5-point Likert-type scale (with 1 indicating "not often" and 5 indicating "very often"), how often they engaged in each. I changed one item on this scale, from MMS to instant messaging, because individuals tend use the latter (e.g., WhatsApp platforms) rather than the outmoded former (Montag et al., 2015).

State-Trait Anxiety Inventory (STAI-Trait) – Form Y-2. This 20-item questionnaire (Spielberger et al., 1983; Appendix F) is the most commonly-used self-report measure of trait anxiety. Each item is a statement to which the respondent must reply, using a 4-point Likert-type scale (with 1 indicating "not at all" and 4 indicating "almost always"), indicating how applicable it is to him/herself. Negatively worded items are reverse scored to reduce the influence of response sets. Higher scores indicate greater levels of trait anxiety (Julian, 2011).

The instrument's developers reported that STAI-Trait had high internal consistency (α = .92 and .88) when tested on two large samples of psychology students (Spielberger & Vagg, 1984). An independent study reported high test-retest reliability (r =.84 over a 2-4 week period) in a sample of elderly adults (Stanley, Gayle Beck, & Zebb, 1996). Additionally, the instrument has been used successfully to measure trait anxiety in South African samples (see, e.g., Suliman, Stein, & Seedat, 2014; van Wijk, 2014).

Procedure

Digital natives. Interested students responded to the advertisement by selecting a participation slot using the Vula tab. At the appointed time, I welcomed a group of maximum 10 participants to the classroom. I then gave them a detailed explanation about the study's purposes and procedures and ensured that they were aware of their rights to confidentiality

and withdrawal. After reading and signing the consent form (Appendix G), the participants completed the four paper-and-pencil questionnaires in this order: sociodemographic questionnaire, SCS, MAQ, and STAI-Trait. This procedure took approximately 20 minutes.

After completing the questionnaires, participants were encouraged to ask questions about the study. They were then thanked for participating, debriefed, given a debriefing form (Appendix H), and dismissed.

Digital immigrants. Interested individuals responded to the advertising email/message by opening an embedded link (https://www.surveymonkey.com/r/UCTsmartphonestudy). Once the link opened, an online survey presented the participant with a consent form (Appendix I) that outlined the purpose of the study and explained voluntary participation and the right to withdrawal and confidentiality. After agreeing to the terms of participation, the participant was presented with the same questionnaires, in the same order, as the student group. After completing the questionnaires, participants were directed to a debriefing form (Appendix J) that explained the study's hypotheses and thanked them for participating.

Data Management and Statistical Analyses

I used SPSS (version 25.0) to compute all statistical analyses. Following convention, α was set at .05 for all decisions regarding statistical significance. I scored the MAQ, SCS, and STAI-Trait following standard protocols.

Descriptive statistics. I generated a set of descriptive statistics for each questionnaire's data set to identify outliers, potential trends, and confounders, and to test assumptions underlying parametric statistical tests. Unless stated otherwise in the Results section, all assumptions were upheld.

Factor analyses. Because the SCS and MAQ are relatively new measures that have not been used before in South African-based research, I ran exploratory principal component factor analyses to assess their factor structure in the current samples of digital natives and digital immigrants. In each case, I used orthogonal (varimax) rotation because this rotation maximizes the dispersion of the factor loadings.

Between-group differences. A series of independent sample *t*-tests assessed the magnitude of between-group differences regarding SCS, MAQ, mobile phone usage, and STAI-Trait scores.

Mediational analysis. Regression-based analyses tested a model specifying that self-compassion (as measured by the SCS) mediated the relationship between trait anxiety (as measured by the STAI-Trait) and smartphone attachment (as measured by the MAQ). Figure

1 depicts this hypothesized relationship, which was tested separately in the digital native and digital immigrant samples. Specifically, I used these three separate linear regression models for data from each of the digital native and digital immigrant samples: First, I regressed STAI-Trait scores on MAQ scores; second, I regressed STAI-Trait scores on SCS scores; and third, I regressed MAQ scores on both STAI-Trait and SCS scores. To demonstrate the presence of a significant mediating effect, (a) both the first and second regression models need to show a significant effect, and (b) in the third model, the effect of the predictor variable (STAI-Trait scores) on the outcome variable (MAQ scores) must be significantly lower than it is in the second model. Complete mediation will be present if there is no relationship between the predictor and outcome variables in this third model (Baron & Kenny, 1986). To complete this modeling, I used the Sobel (1982) test to examine the statistical significance of any observed mediating effect.

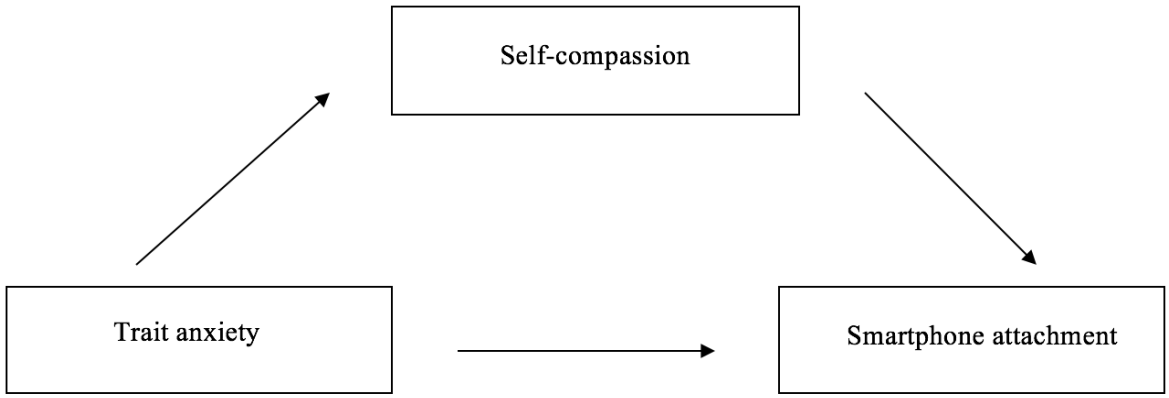

Figure 1. The hypothesized mediating role of self-compassion in the relationship between trait anxiety and smartphone attachment.

Results

Sample Characteristics

Table 1 summarizes the groups' sociodemographic characteristics. Analyses detected significant between-group differences with regard to age (expected, because by design digital natives were aged between 18 and 25 years, whereas digital immigrants were aged between 30 and 60 years), highest level of education (although all participants had completed at least 12 years of education [i.e., they had a matric certificate], the digital immigrants group contained several individuals with postgraduate [including doctoral] degrees), sex distribution (there were significantly more women in the digital natives group, likely because most students within the UCT Department of Psychology are women), and mobile use

(unexpectedly, digital immigrants reported higher and more varied smartphone use). On average, digital immigrants engaged in more standardized and basic uses of their smartphones (e.g., calls and SMS), whereas digital natives tended to use social media, chat forums, and Internet-based applications more frequently.

I estimated socioeconomic status (SES) using participant self-report regarding their own (digital immigrants) and their parents' (digital natives) current occupation and the Hollingshead 9-point scale (Hollingshead, 1975). Analyses detected no significant between-group differences regarding SES, with the families of both samples falling within the range conventionally described as middle- to upper-class. The iPhone was the most commonly reported smartphone owned by both digital natives and digital immigrants.

Table 1
Sample Sociodemographic Characteristics (N = 221)

	Group					95% CI	
Variable	Digital Natives (*n* = 104)	Digital Immigrants (*n* = 117)	t / χ^2	*p*	ESE	LL	UL
Age (years)			37.25	< .001***	4.75	-28.25	-25.40
M (*SD*)	20.16 (1.35)	46.99 (7.66)					
Range	18-25	30-60					
HLOE			7.88	< .001***	1.05	-2.11	-1.27
M (*SD*)	13.19 (1.22)	14.88 (1.88)					
Range	12-15	12-20					
Sex			13.73	< .001***	.25	.0E0	.0005
Female	80 (76.92%)	62 (52.99%)					
Male	24 (23.08%)	55 (47.00%)					
SES			1.03	.308	.01	-.59	.19
M (SD)	7.28 (1.55)[a]	7.48 (1.29)[b]					
Range	1-9	3-9					
Smartphone use	23.83 (3.91)	43.95 (13.98)	14.93	< .001***	1.91	-22.79	-12.46
Calls	3.08 (1.11)	4.30 (1.04)					
SMS	1.89 (1.02)	2.98 (1.51)					
Instant messaging	4.50 (1.04)	4.17 (1.24)					
Internet	4.44 (0.80)	3.97 (1.17)					
Social networking	4.38 (1.17)	3.20 (1.52)					
Chat	3.71 (1.44)	2.64 (1.60)					
Games	1.82 (1.16)	2.05 (1.50)					

Note. For the variable *Smartphone use*, means are presented with standard deviations in parentheses. CI = confidence interval; LL = lower limit; UL = upper limit; ESE = effect size estimate (in this case, Cohen's *d* for *t*-tests and Cramer's *V* for chi-squared tests of contingency); HLOE = highest level of education (in years); SES = socioeconomic status.
[a]Based on *n* = 103; one participant in this group did not provide an answer to the relevant question.
[b]Based on *n* = 112; five participants in this group did not provide an answer to the relevant question.
*p < .05. **p < .01. ***p < .001. All listed p-values are two-tailed.

Factor Analyses

SCS. The Kaiser-Meyer-Olkin (KMO) coefficients for both samples (.83, in both cases) suggested that sampling adequacy was excellent. Additionally, Bartlett's tests of sphericity were significant (digital natives: $\chi^2(325) = 1187.11$, $p < .001$; digital immigrants: $\chi^2(325) = 1516.36$, $p < .001$), suggesting that factor analysis is appropriate for the study's data. The scale's constructors suggest the SCS measures six latent factors: self-kindness, common humanity, mindfulness, self-judgement, isolation, and over-identification (Neff, 2003a).

Digital natives. The current analysis produced seven factors with eigenvalues over 1. Certain factors in this analysis only had one or two items loading on them, and of those some of the loadings were below .30. Hence, it ran counter to principles of parsimony to include seven factors. The scree plot (Figure 2) and Horne's parallel analysis suggested a four-factor solution would be most reliable.

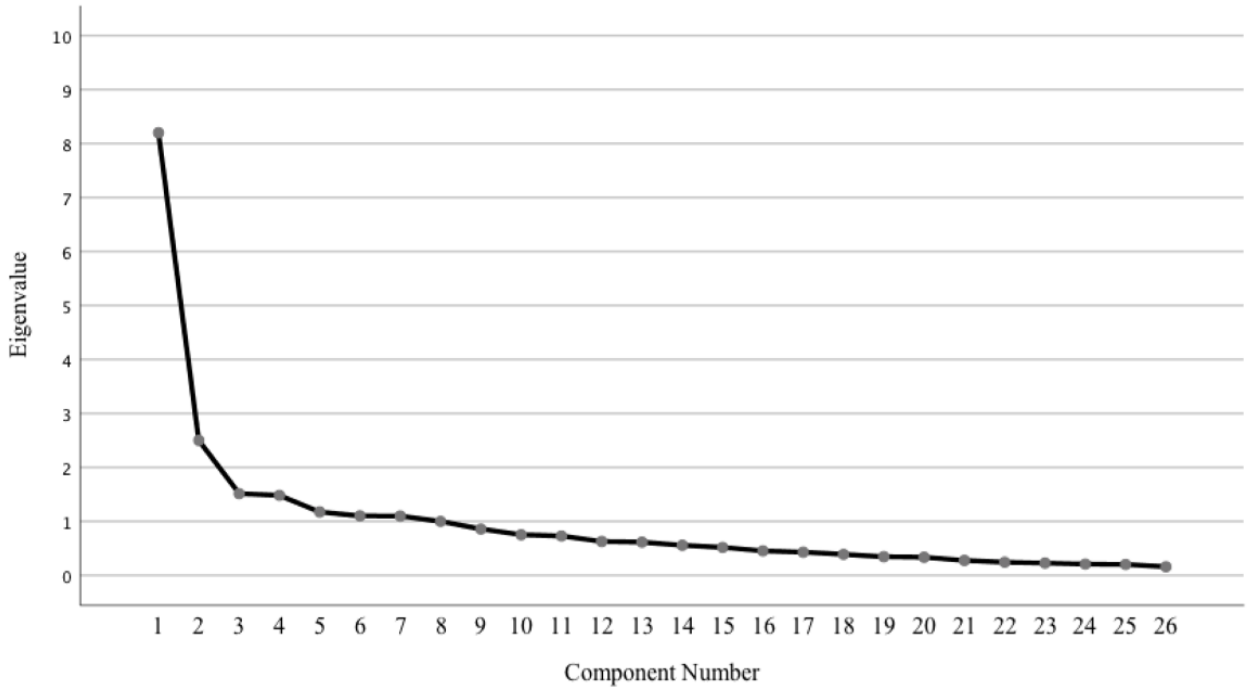

Figure 2. The scree plot for the Self-Compassion Scale in the digital native sample ($N = 104$)

Table 2 presents the four-factor solution, with eigenvalues of 8.20, 2.50, 1.51, and 1.48. Factor 1 appeared to combine mindfulness and its counterpart factor of over-identification. Factor 2 appeared to combine self-kindness and its counterpart self-judgement. Factor 3 appeared to be isolation. And, lastly Factor 4 appeared to be common humanity. Cumulatively, these four factors explained for 62.69% of the variance.

Table 2
Factor Analysis I: Factor loadings for the Self-Compassion Scale in the digital native sample (N = 104)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Communalities
1	.46	**.40**			.45
2	**.62**				.47
3				**.46**	.28
4			**.51**		.41
5		**.60**		.34	.48
6	**.52**	.33	.39		.56
7				**.81**	.68
8		**.33**	.45		.39
9	**.51**				.33
10				**.77**	.62
11		**.59**	.35		.54
12	.33	**.44**		.32	.40
13			**.78**		.68
14	**.58**			.40	.54
15	.30			**.68**	.60
16		**.59**	.37		.53
17	**.52**			.41	.52
18			**.79**		.65
19	.32	**.62**		.37	.64
20	**.80**				.72
21	.54	**.37**	.33		.55
22	**.52**	.32		.33	.50
23		**.68**			.55
24	**.41**		.59		.51
25			**.70**		.56
26		**.66**			.54

Note. Factor loadings < .30 have been suppressed. Items loading onto the separate factors are indicated in boldface font.

Digital immigrants. The current analysis produced six factors with eigenvalues over 1. However, in this 6-factor solution only 2 items loaded onto the sixth factor; hence it ran counter to principles of parsimony to include this sixth factor. Horne's parallel analysis suggested a 3-factor solution. However, an analysis of the scree plot (Figure 3) suggested that the most appropriate solution would be 5 factors.

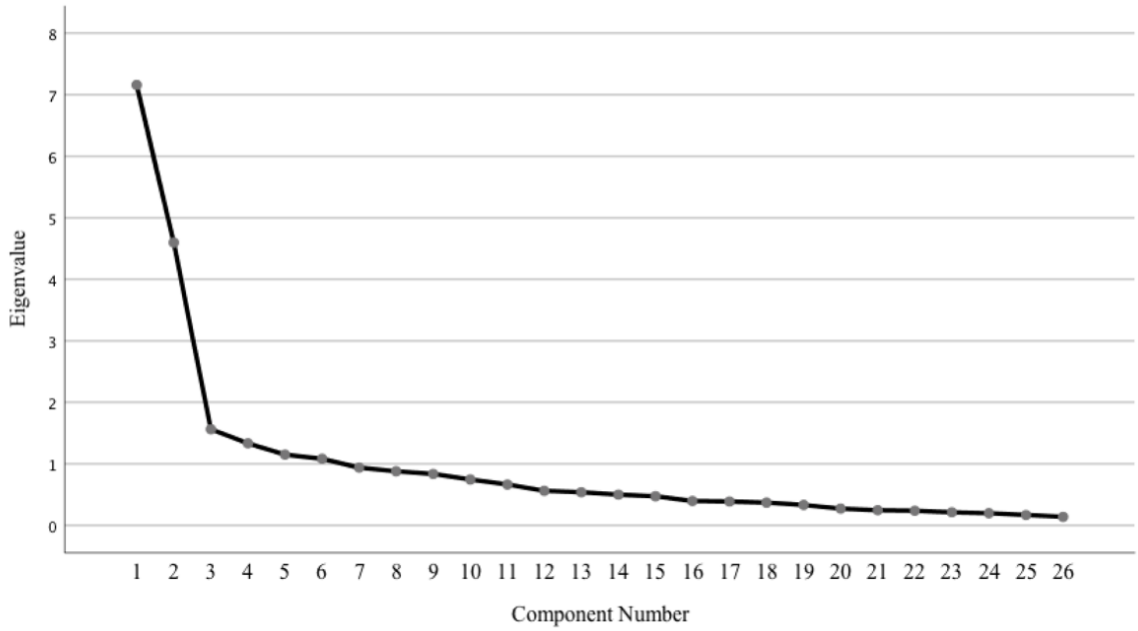

Figure 3. The scree plot for the Self-Compassion Scale in the digital immigrant sample (N = 117)

Table 3 presents the five-factor solution, with eigenvalues of 7.16, 4.60, 1.56, 1.33, and 1.15. Factor 1 appeared to combine over-identification and self-judgement, except for item 8 (which states "when times are really difficult, I tend to be tough on myself" and which loaded on factor 3 in this dataset). Factor 2 appeared to be self-kindness with the inclusion of item 22 (which states "when I'm feeling down I try approach my feelings with curiosity and openness"; originally considered a mindfulness item, it does, however, address self-kindness). Factor 3 appeared to be isolation, with the inclusion of item 8. Factor 4 appeared to be mindfulness with the addition of item 15 (which states "I try see my failings as part of the human condition"; originally considered part of common humanity, but understandably addresses mindfulness). Lastly, factor 5 appeared to be common humanity. Cumulatively, these five factors explained 60.78% of the total variance.

Table 3. *Factor Analysis II: Factor loadings for the Self-Compassion Scale in the digital immigrant sample (N = 117)*

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communalities
1	**.64**					.51
2	**.75**					.59
3				.56	**.40**	.57
4	.76		**.32**			.68
5		**.46**			.47	.48
6	**.73**		.32			.67
7					**.84**	.78
8			**.63**			.58
9				**.64**		.53
10		.34			**.77**	.73
11	**.56**					.44
12		**.84**				.74
13	.76		**.74**			.70
14		.40		**.73**		.73
15		.42		**.60**		.64
16	**.44**		.70			.72
17		.44		**.72**		.73
18			**.79**			.69
19		**.76**				.64
20	**.64**		.40			.58
21	**.42**		.49			.49
22		**.60**				.50
23		**.56**				.35
24	**.55**		.38			.50
25	.40		**.58**			.59
26		**.74**				.65

Note. Factor loadings < .30 have been suppressed. Items loading onto the separate factors are indicated in boldface font.

MAQ. Again, the KMO coefficients (digital natives: .87; digital immigrants: .89) suggested sampling adequacy was excellent. Bartlett's tests of sphericity were significant (digital natives: $\chi^2(105) = 926.46$, $p < .001$; digital immigrants: $\chi^2(105) = 1309.71$, $p < .001$), suggesting that factor analysis is appropriate for the study's data. The scale's constructors suggest the MAQ measures four latent factors: separation insecurity, separation anxiety, safe haven, and secure base (Konok et al., 2017).

Digital natives. The current analysis produced two factors with eigenvalues over 1 (Figure 4), and Horne's parallel analysis produced the same solution. Hence, I explored a two-factor solution.

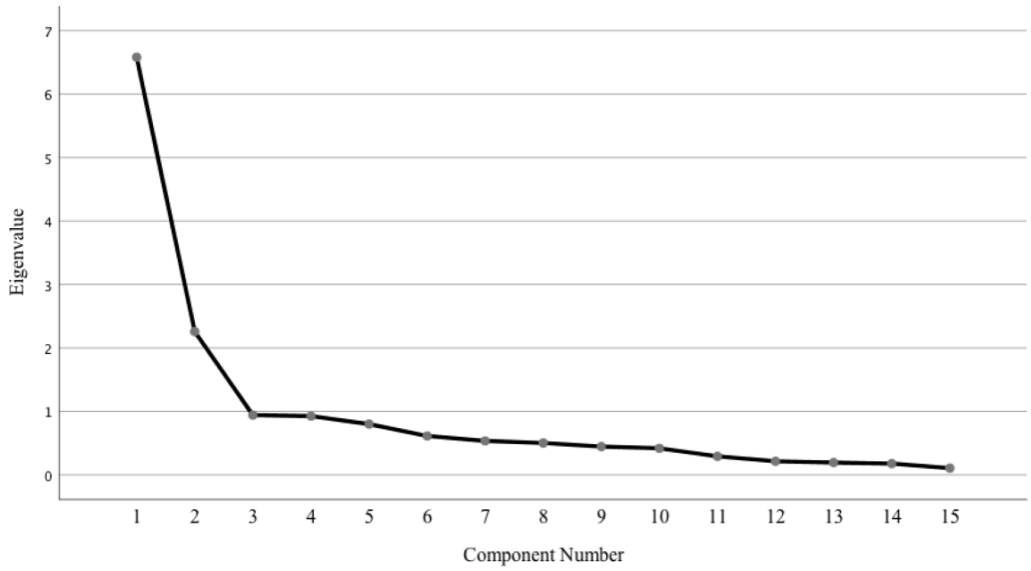

Figure 4. The scree plot for the Mobile Attachment Questionnaire in the digital native sample ($N = 104$).

Table 4 presents the two-factor solution, with eigenvalues of 6.58, and 2.26. An analysis of the individual loading values suggested the following latent factors were apparent: Factor 1 appeared to combine separation anxiety and insecurity, which is understandable as these two concepts (originally considered separate) are almost synonymous. In the originally proposed factor structure, items 1-9 load onto these factors. This prediction was confirmed, apart from item 5. Factor 2 appeared to combine the proposed factors of safe haven and secure base, which again is understandable as these two constructs are very similar. Items 10-15, as originally proposed, loaded onto this factor, with the addition of item 5. Analysis of item 5 (which states "If I am stressed I take out my phone") suggests that this loading is understandable as this item does address the sense of security that one's smartphone provides. Cumulatively, these two factors explained 58.91% of the total variance.

Table 4
Factor Analysis III: Factor loadings for the Self-Compassion Scale in the digital native sample (N = 104)

Item	Factor 1	Factor 2	Communalities
1	**.87**		.76
2	**.88**		.80
3	**.92**		.85
4	**.84**		.72
5		**.64**	.53
6	.51		.35
7	**.77**		.68
8	**.70**		.55
9	**.70**		.58
10		**.76**	.58
11		**.84**	.70
12		**.67**	.52
13		**.42**	.20
14		**.70**	.52
15	.47	**.53**	.73

Note. Factor loadings < .40 have been suppressed. Items loading onto the separate factors are indicated in boldface font.

Digital immigrants. The current analysis produced four factors with eigenvalues over 1 (Figure 5), and Horne's parallel analysis produced the same solution. Hence, I explored this four-factor solution.

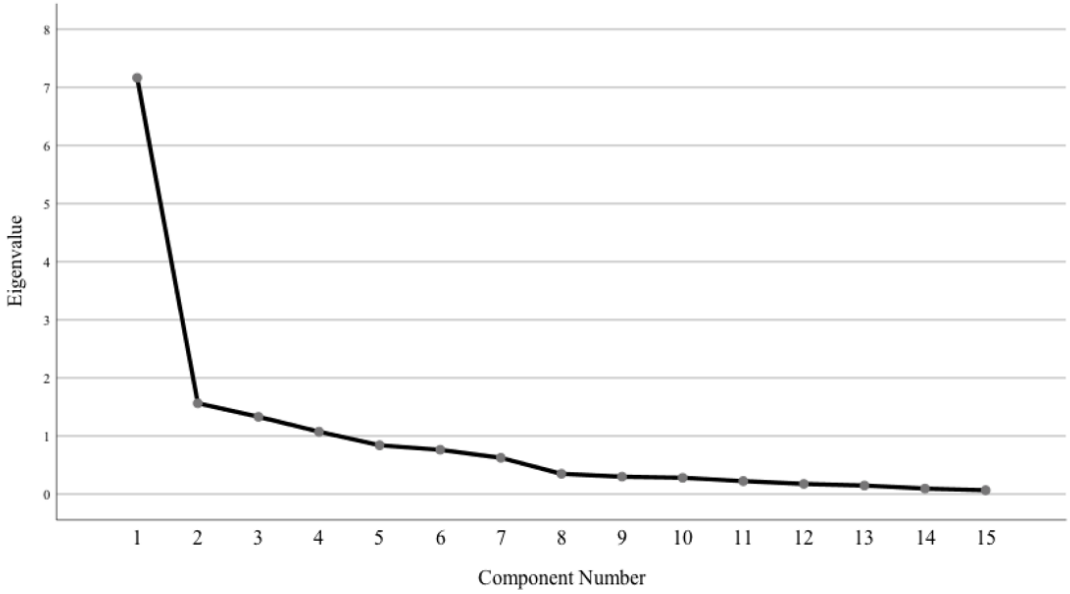

Figure 5. The scree plot for the Mobile Attachment Questionnaire in the digital immigrant sample (*N* = 117).

Table 5 shows the four-factor solution, with eigenvalues of 7.17, 1.56, 1.33 and 1.07. The item loadings did not produce the same factors as proposed by the scale constructors. Factor 1 appeared to combine safe-haven and secure base. This combination is understandable because these concepts (originally considered separate) are almost synonymous. In the original scale, items 10-15 load onto this factor, but in this analysis items 5, 10, 11, 13 and 15 loaded onto this factor. The loading of item 5 ("If I am stressed I take out my phone"; originally part of separation insecurity) on factor 1 is understandable, as this item does address the sense of safety smartphones provide. Factor 2 appeared to be separation insecurity. All the proposed items loaded onto this factor, except for the aforementioned item 5. Factor 3 appeared to be separation anxiety, with all the proposed items loading onto this factor, except item 8 ("It does not bother me when I leave my phone at home/it runs out of battery"; more likely to be part of a factor 4 in this dataset). Factor 4 included all the negatively-worded items on the scale. This factor, then, appears to address the sense of security respondents have without their phones (e.g., item 14 reads "I am not more confident/easy-going if I have my phone with me). Cumulatively, these three factors explained 74.23% of the total variance.

Table 5
Factor Analysis IV: Factor loadings for the Self-Compassion Scale in the digital immigrant sample (N = 117)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Communalities
1	.34	**.84**			.82
2		**.88**			.90
3		**.87**			.91
4	.30	**.81**			.81
5	**.75**				.66
6		.33	**.73**		.70
7	.40	.40	**.68**		.79
8			.61	**.37**	.52
9	.37	.49	**.54**		.68
10	**.85**				.78
11	**.86**				.85
12				**.77**	.66
13	**.75**	.36			.72
14				**.73**	.61
15	**.79**	.32			.73

Note. Factor loadings < .30 have been suppressed. Items loading onto the separate factors are indicated in boldface font.

Between-group Differences: SCS, MAQ, and STAI-Trait

Analyses detected significant between-group differences regarding MAQ scores (digital natives reported higher levels of attachment), and STAI-Trait scores (digital natives reported higher levels of trait anxiety; Table 6). There were no significant between-group differences with regard to SCS scores, however.

Table 6
Between-group Differences: Measures of self-compassion, smartphone attachment, and trait anxiety (N = 221)

	Group					95% CI	
Variable	Digital Natives (n = 104)	Digital Immigrants (n = 117)	t	p	ESE	LL	UL
SCS	78.12 (15.54)	82.01 (15.26)	1.88	.062	0.25	-8.00	0.19
MAQ	48.17 (13.69)	23.31 (5.44)	17.35	< .001***	2.43	22.03	27.70
STAI-Trait	44.02 (10.79)	39.28 (8.60)	3.58	< .001***	0.49	2.13	7.35

Note. Means are presented, with standard deviations in parentheses. ESE = effect size estimate (Cohen's *d*); CI = confidence interval; LL = lower limit; UL = upper limit; SCS = Self-Compassion Scale; MAQ = Mobile Attachment Questionnaire; STAI = State-Trait Anxiety Inventory.
*p < .05. **p < .01. ***p < .001. All listed p-values are two-tailed.

Mediational Analyses

Digital natives. All three regression models were significant (Table 7). Together with the results of Sobel's test (z = 1.96, SE = .11, p = .050), this suggests that, in this sample, SCS scores mediated the association between STAI-Trait and MAQ scores. Moreover, in the third regression equation the effect of MAQ scores on STAI-Trait scores was no longer significant when SCS was added to the model, suggesting there was complete mediation.

Digital immigrants. All three regression models were significant (Table 8). However, in the third regression model SCS score was not a significant predictor of the outcome, which suggests it did not act as a mediator. Together with the results of Sobel's test (z = -.09, SE = .12, p = 0.928), this suggests that, in this sample, SCS scores did not mediate the relationship between STAI-Trait and MAQ scores.

Table 7

Digital Natives: Regression models testing for mediating effect of self-compassion on association between smartphone attachment and trait anxiety (N = 104)

												95% CI	
Model	Predictor(s)	Outcome	R^2	*F*	*p*	*df1*	*df2*	Unstandardized	SE	Standardized	*t*	*p*	LL	UL
1			.09	9.65	.002**	1	102							
	STAI-Trait	MAQ						.37	.12	.29	3.11	.002**	.14	.61
2			.48	93.0	< .001***	1	102							
	STAI-Trait	SCS						-.995	.10	-.69	-9.65	< .001***	-1.20	-.79
3			.12	6.85	.002**	2	101							
	STAI-Trait	MAQ						.15	.16	.12	0.93	.35	-.17	.48
	SCS							-.22	.11	-.25	-1.95	.05*	-.45	.004

Note. Each row summarizes a regression model that helped test the mediational hypothesis. SE = standard error of estimate; CI = confidence interval; LL = lower limit; UL = upper limit; STAI = State-Trait Anxiety Inventory; MAQ = Mobile Attachment Questionnaire; SCS = Self-Compassion Scale.

*p < .05. **p < .01. ***p < .001.

Table 8

Digital Immigrants: Regression models testing for mediating effect of self-compassion on association between smartphone attachment and trait anxiety (N = 117)

													95% CI	
Model	Predictor(s)	Outcome	R^2	*F*	*p*	*df1*	*df2*	Unstandardized	SE	Standardized	*t*	*p*	LL	UL
1			.05	6.45	.012*	1	115							
	STAI-Trait	MAQ						.37	.15	.23	2.54	.012*	.08	.67
2			.39	73.4	< .001***	1	115							
	STAI-Trait	SCS						-1.11	.13	-.62	-8.57	< .001***	-1.37	-.85
3			.05	3.20	.044*	2	114							
	STAI-Trait	MAQ						.38	.19	.23	2.00	.047*	.004	.76
	SCS							.01	.11	.01	.05	.964	-.21	.22

Note. Each row summarizes a regression model that helped test the mediational hypothesis. SE = standard error of estimate; CI = confidence interval; LL = lower limit; UL = upper limit; STAI = State-Trait Anxiety Inventory; MAQ = Mobile Attachment Questionnaire; SCS = Self-Compassion Scale.

*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

The main aim of the current research was to investigate whether self-compassion mediates the relationship between trait anxiety and smartphone attachment in two different age cohorts (digital natives, defined as individuals born into the technological world, and digital immigrants, defined as individuals not born into that world). To accomplish this aim, I tested two specific hypotheses: (1) digital natives will show significantly greater smartphone attachment than digital immigrants, and (2) in both digital natives and digital immigrants, self-compassion will mediate the relationship between trait anxiety and smartphone attachment. Below, I discuss the findings relating to each hypothesis in the context of relevant and recently-published literature. Then, I address the current study's limitations and make recommendations for future research based on the findings described here.

Smartphone Attachment in Digital Natives and Digital Immigrants

The hypothesis that digital natives will show significantly greater smartphone attachment than digital immigrants was confirmed. Analyses suggested that digital natives reported significantly greater attachment to their smartphones than digital immigrants.

The construct of smartphone attachment includes components related to feelings of separation insecurity and separation anxiety, and of having a safe haven and a secure base. (Konok et al., 2017; Meschtscherjakov, Wilfinger, & Tscheligi, 2014). These components mirror some of the main themes identified in the infant attachment literature (Bowlby, 1988). Hence, smartphone, or caregiver, attachment manifests as either a healthy form where separation does not cause distress, or an unhealthy form where separation causes anxiety (Bowlby, 1958; Konok et al., 2016). Within the current sample, digital natives reported less healthy patterns of smartphone attachment (i.e., higher scores on the Mobile Attachment Questionnaire) than digital immigrants. These results are consistent with previous research suggesting that age is a key predictor of smartphone attachment (Asante, 2018; Forgays et al., 2014).

Moreover, the observation of these age differences reinforces Prensky's (2001) assertion that fundamental generational differences separate digital natives and digital immigrants. Digital natives were born into the digital world, grew up using smartphones, and are accustomed to their constant presence and assistance in daily life (i.e., smartphones facilitate communication, and provide access to encyclopedic mountains of information). Hence, many digital natives develop a strong enough attachment that absence of their device causes anxiety. In contrast, digital immigrants were introduced to smartphones later in their lives, and so they have experience of a life without the constant presence and assistance of

handheld devices. Hence, separation from their devices is less likely to cause them significant distress, likely because they can draw on those early-life experiences and invoke appropriate coping strategies.

Self-compassion: Mediator of relations between anxiety and smartphone attachment?

A series of regression models, applied to the two samples separately, tested the hypothesis that self-compassion will mediate the relationship between trait anxiety and smartphone attachment.

For digital natives and digital immigrants, the first regression model suggested trait anxiety was positively associated with smartphone attachment. This finding is consistent with a substantial body of literature indicating that individuals with higher levels of trait anxiety tend to show higher levels of attachment to their mobile devices (Boumosleh & Jaalouk, 2017; Konok et al., 2017).

For both samples, the second regression model suggested trait anxiety was negatively associated with self-compassion. This finding is consistent with previous studies indicating that individuals with higher levels of self-compassion (i.e., who are kind and non-judgmental to themselves) tend to experience lower levels of trait anxiety (Bergen-Cico & Cheon, 2013; Werner et al., 2012).

The overall mediation analysis suggested that self-compassion completely mediated the association between trait anxiety and smartphone attachment in digital natives, but not in digital immigrants. The first part of this finding is consistent with data presented by Arpaci et al. (2017), who concluded that mindfulness (a component of self-compassion) mediated the relationship between nomophobia and attachment style in digital natives. The implication of complete mediation here is that, in these digital natives, the way that they relate to themselves affects their attachment to their smartphones (i.e., their relationship with their smartphones is directly influenced by their relationship with themselves).

This latter finding is novel. Although Iskender and Akin (2011) reported that Internet addiction is associated with lower levels of self-compassion, no published study has specifically explored the relationship between smartphone attachment and self-compassion. For clinicians, the fact that self-compassion appears to mediate the relationship between trait anxiety and smartphone attachment suggests that higher levels of self-compassion can potentially buffer against the negative consequences of an unhealthy smartphone attachment. Hence, programmatic interventions to improve digital natives' levels of self-compassion could be a powerful and effective way to overcome the anxiety associated with an unhealthy smartphone attachment.

In contrast, self-compassion did not mediate the relationship between trait anxiety and smartphone attachment in the digital immigrant sample. One possible explanation for this discrepancy could be the generational differences described above, which included significant differences in smartphone attachment and levels of trait anxiety. In this study, digital immigrants reported lower levels of trait anxiety. If they are less prone to being anxious, then being without their phone may not provoke such a distressing response, and self-compassion is not needed to mediate that relationship.

Another explanation for why self-compassion was only a significant mediator in digital natives could be because smartphones represent an integral part of the self for those individuals (Oosthuizen & Young, 2015). This integration is signaled by, for instance, personalizing one's smartphone (e.g., with idiosyncratic screensavers) to reflect a part of oneself, or by carefully curating an online social media profile to reflect aspects of one's desired personality (Fullwood, James, & Chen-Wilson, 2016; Fullwood, Quinn, Kaye, & Redding, 2017; Michikyan & Suárez-Orozco, 2016). Perhaps, then, it is not surprising that the digital natives showed this association between self-compassion and mobile attachment because a key part of their identity development was mediated by smartphones (i.e., much of their social development and social interactions during adolescence occurred via smartphone). In contrast, it seems plausible that an adolescence free of smartphones means that these devices did not become embedded within digital immigrants' sense of self. Consistent with this reasoning is the current observation that, on average, digital natives had greater engagement with social networking sites than digital immigrants.

Generational Differences in Patterns of Smartphone Use

Data from the mobile use questions suggested that, on average, digital immigrants used their smartphones to make more phone calls and to send more SMS's than did digital immigrants. This finding is consistent with previous reports suggesting age differences in the preference for calling to contact others (Forgays et al., 2014). In contrast, digital natives tended to engage more in chat forums and on social networking sites (i.e., newer forms of interpersonal communication). This finding is consistent with previous studies suggesting that digital natives embrace social network sites more than digital immigrants (Raj, Bhattacherjee, & Mukherjee, 2018; Raju, Valsaraj, & Noronha, 2015).

Overall, digital immigrants reported that they used their devices significantly more heavily than did digital natives. Not only did immigrants engage in more varied use of their devices (e.g., they used it to make phone calls, send SMS's, and play games), but they also used them more frequently. This result is inconsistent with previous findings suggesting that

younger people tend to embrace the varying uses of their devices to a greater degree, and to spend more time using them (Anshari et al., 2016). One possible explanation for this discrepancy is to note that there are data indicating that, among digital natives, actual use is often not reliably estimated by self-reported use. Specifically, digital natives appear to underestimate the amount of time that they spend on their smartphones as they are accustomed to these devices' pervasive presence (Duncan, Hoekstra, & Wilcox, 2012; Felisoni & Godoi, 2018). It remains an open question, however, whether digital immigrants might overestimate the amount of time they spend on smartphones because they are foreign to the digital world (i.e. it is not a norm for them).

From a conceptual point of view, digital immigrants reporting significantly higher smartphone use but weaker smartphone attachment suggests that the amount of time spent engaged with a smartphone is not a direct proxy for the closeness and attachment one feels toward the device, or the anxiety one might feel when it is not within reach. For digital immigrants who are part of the workforce, smartphones offer many practical benefits, such as facilitating widespread communication, or simplifying daily tasks (see, e.g., Ahn & Jung, 2014). Frequent engagement in these uses does not suggest that one is emotionally attached to the smartphone or to its contents; it could simply mean that individuals are simplifying work-related demands by using the external aid provided by smartphones. Hence, these individuals could spend long periods of times using their devices, but they would not necessarily feel anxious without it nearby. This interpretation suggests that the *ways* in which people use their smartphones (e.g., the self-control they exercise against dependence, and the sense of reassurance they have when the devices are close by), rather than the amount of *time* spent using the device, may be a more realistic indication of attachment.

Finally, regarding the questionnaires used in this study, the factor structures observed for the SCS and MAQ did not match their predicted factor models. Here, the most reliable factor solutions for the SCS were four factors for the digital native sample and five factors for the digital immigrant sample, even though the developers suggest a six-factor solution. Cleare et al. (2018) also found a five-factor solution for the SCS, but their factor loadings differed to those found in this study. Similarly, for the MAQ I found a two-factor solution for the digital native sample and a four-factor solution for the digital immigrant sample. Moreover, the loadings of the four-factor solution differed to those suggested by the developers. No other independent studies have published results regarding the factor structure of this questionnaire.

These results suggest that the factor structures of the SCS and MAQ may be unreliable, or that they may operate differently cross-culturally and/or in samples with different demographic characteristics than that upon which the original psychometric properties were established. Hence, future large-scale studies should undertake extensive investigation of the psychometric properties of these instruments.

Limitations and Directions for Future Research

Inferences from this study's findings must be drawn carefully, especially considering the following methodological limitations. First, recruitment and administration differed across the two groups. Whereas digital natives were recruited via convenience sampling, digital immigrants were recruited via snowball sampling. The latter, in particular, may have resulted in an unrepresentative sample of digital immigrants. Regarding measure administration, digital natives completed pen-and-paper questionnaires whereas digital immigrants completed an online survey. This administration difference could have implications for the validity of cross-sample comparisons. For example, previous research assessing administration differences suggests that online administration using snowball sampling results in representativeness biases. Conversely, in-person administration using quota sampling results in more representative and reliable results (see, e.g., Szolnoki & Hoffmann, 2013). The use of different modes of administration was due to accessibility demands and time constraints for data collection. Future studies should, therefore, administer the surveys to the different samples in identical ways and employ more representative recruitment strategies.

Second, the socioeconomic status of both samples appeared to be quite homogenous in that most participants were from middle- to upper-class economic backgrounds. Previous research on social media use in South Africa has shown that there is no 'digital divide,' with individuals from different socioeconomic brackets showing equal participation (Swanepoel & Thomas, 2012). Hence, these sectors of the South African population were considered an appropriate sample. However, future studies should employ more diverse samples to clarify whether the characteristics of smartphone attachment, and personality-based associations with it, differ across different samples. There are cross-cultural differences, often associated with environmental influences, in classical infant attachment (see, e.g., Aviezer, Sagi-Schwartz, & Koren-Karie, 2003; van IJzendooorn & Kroonenberg, 1988). Hence, it may be interesting for future studies to explore whether socioeconomic and cultural factors influence smartphone attachment.

Finally, the MAQ is a newly-developed measure that focuses on individual smartphone attachment. However, certain questions (e.g., "I am nervous/tense when I leave my phone at home") fail to account for daily situational factors. For example, certain medical conditions result in individuals needing to constantly have their phone accessible; for these individuals, being without their phone could cause distress. Or, some individuals need to constantly have their phone near due to job demands, hence being without their phone could cause anxiety. Future studies should potentially include a separate measure to assess if there are certain reasons why individuals need to keep their phones nearby.

Summary and Conclusion

This is the first study to investigate the relationship between smartphone attachment, self-compassion, and trait anxiety in digital natives and digital immigrants. Previous research on the relationship between trait anxiety and smartphone attachment has suggested that this relationship is not straightforward and has attempted to quantify third factors that might mediate it. Findings suggested that an innate psychological factor, self-compassion, mediated the relationship between trait anxiety and smartphone attachment in the digital native, but not the digital immigrant, sample. This mediational role of self-compassion suggests that the way that young adults relate to and understand themselves can affect their emotional attachment to their smartphones.

Moreover, the results suggested that smartphone use is not synonymous with smartphone attachment: Digital immigrants reported more smartphone use but less smartphone attachment. Because smartphones are becoming ever more advanced and integral to our everyday activities, focusing on analyzing heavy smartphone use as part of an addiction rhetoric is impractical. The current finding reinforces the need to shift from an addiction-based framework to one that has as an implicit understanding of the increasingly prevalent human-smartphone interaction.

In conclusion, this study adds to the cyberpsychological literature on the human-smartphone interaction by enhancing understanding of the differences between healthy and unhealthy smartphone attachment and reiterating the power of being self-compassionate. In particular, the results might suggest that the way we relate to ourselves (and, especially, how compassionate we are to ourselves) matters more than the frequency of our smartphone use.

Acknowledgements

I would thank my supervisor Associate Professor Kevin Thomas for his assistance and guidance through this project. His continuous support, thorough feedback and meticulous attention to detail has ensured this project is what it is. I would also like to thank my co-supervisor Jessica Oosthuizen for introducing me to the cyberpsychological research.

I would also like to thank the ACSENT Laboratory and team for allowing me to conduct my research and for their assistance over the year

Lastly, I would like to thank my support system through this Honours year, for their support and encouragement.

References

Ahn, J., & Jung, Y. (2014). The common sense of dependence on smartphone: A comparison between digital natives and digital immigrants. *New Media & Society, 18*, 1236-1256. doi:10.1177/1461444814554902

Ainsworth, M. (1989). Attachments beyond infancy. *American Psychologist, 44*, 709-716. doi:10.1037//0003-066x.44.4.709

Ammaniti, M., Van Ijzendoorn, M., Speranza, A. M., & Tambelli, R. (2000). Internal working models of attachment during late childhood and early adolescence: An exploration of stability and change. *Attachment & Human Development, 2*, 328-346. doi:10.1080/14616730010001587

Anshari, M., Alas, Y., Hardaker, G., Jaidin, J. H., Smith, M., & Ahad, A. D. (2016). Smartphone habit and behavior in Brunei: Personalization, gender, and generation gap. *Computers in Human Behavior, 64*, 719-727. doi:10.1016/j.chb.2016.07.063

Arpaci, I., Baloglu, M., Ozteke Kozan, H. I., & Kesici, S. (2017). Individual differences in the relationship between attachment and nomophobia among college students: The mediating role of mindfulness. *Journal of Medical Internet Research, 19*(12), 1-12. doi:10.2196/jmir.8847

Asante, R. K. B. (2018). Exploration of the forms of mobile phone attachment among traders in Ghana. *Mobile Media & Communication*, 1-17. doi:10.1177/2050157918764015

Aviezer, O., Sagi-Schwartz, A., & Koren-Karie, N. (2003). Ecological constraints on the formation of infant–mother attachment relations: When maternal sensitivity becomes ineffective. *Infant Behavior and Development, 26*, 285-299. doi:10.1016/s0163-6383(03)00032-8

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182. doi:10.1037//0022-3514.51.6.1173

Bartholomew, K., & Horowits, L. (1991). Attachment styles among young adults: A test of a four-category model. *Journal of Personality and Social Psychology, 61*(2), 226-244. doi:10.1037//0022-3514.61.2.226

Bell, T., & Spikins, P. (2018). The object of my affection: Attachment security and material culture. *Time and Mind, 11*(1), 23-39. doi:10.1080/1751696x.2018.1433355

Bergen-Cico, D., & Cheon, S. (2013). The mediating effects of mindfulness and self-compassion on trait anxiety. *Mindfulness, 5*(5), 505-519. doi:10.1007/s12671-013-0205-y

Boumosleh, J. M., & Jaalouk, D. (2017). Depression, anxiety, and smartphone addiction in university students: A cross sectional study. *PLoS One, 12*(8), 1-14. doi:10.1371/journal.pone.0182239

Bowlby, J. (1958). The nature of the child's ties to his mother. *International Journal of Psycho-Analysis, 39*, 350-373.

Bowlby, J. (1988). *A secure base: Parent-child attachment and healthy development* Great Britain: Routledge.

Cleare, S., Gumley, A., Cleare, C. J., & O'Connor, R. C. (2018). An investigation of the factor structure of the self-compassion scale. *Mindfulness, 9*, 618-628. doi:10.1007/s12671-017-0803-1

Duncan, D. K., Hoekstra, A. R., & Wilcox, B. R. (2012). Digital devices, distraction, and student performance: Does in-class cell phone use reduce learning? *Astronomy Education Review, 11*, 1-4. doi:10.3847/aer2012011

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behaviour Research Methods, 41*, 1149-1160. doi:10.3758/BRM.41.4.1149

Felisoni, D. D., & Godoi, A. S. (2018). Cell phone usage and academic performance: An experiment. *Computers & Education, 117*, 175-187. doi:10.1016/j.compedu.2017.10.006

Forgays, D. K., Hyman, I., & Schreiber, J. (2014). Texting everywhere for everything: Gender and age differences in cell phone etiquette and use. *Computers in Human Behavior, 31*, 314-321. doi:10.1016/j.chb.2013.10.053

Fullwood, C., James, B. M., & Chen-Wilson, C. J. (2016). Self-concept clarity and online self-presentation in adolescents. *Cyberpsychology, Behavior and Social Networking, 19*, 716-720. doi:10.1089/cyber.2015.0623

Fullwood, C., Quinn, S., Kaye, L. K., & Redding, C. (2017). My virtual friend: A qualitative analysis of the attitudes and experiences of smartphone users: Implications for smartphone attachment. *Computers in Human Behavior, 75*, 347-355. doi:10.1016/j.chb.2017.05.029

Gjersoe, N. L., Hall, E. L., & Hood, B. (2015). Children attribute mental lives to toys when they are emotionally attached to them. *Cognitive Development, 34*, 28-38. doi:10.1016/j.cogdev.2014.12.002

Hollingshead, A. B. (1975). "Four Factor Index of Social Status." Unpublished working paper, Department of Sociology, Yale University.

Homan, K. J. (2018). Secure attachment and eudaimonic well-being in late adulthood: The mediating role of self-compassion. *Aging & Mental Health, 22*, 363-370. doi:10.1080/13607863.2016.1254597

Hong, F., Chiu, S., & Huang, D. (2012). A model of the relationship between psychological characteristics, mobile phone addiction and use of mobile phones by Taiwanese university female students. *Computers in Human Behavior, 28*, 2152-2159. doi:10.1016/j.chb.2012.06.020

Hussain, Z., Griffiths, M. D., & Sheffield, D. (2017). An investigation into problematic smartphone use: The role of narcissism, anxiety, and personality factors. *Journal of Behavioral Addictions, 6*, 378-386. doi:10.1556/2006.6.2017.052

Iskender, M., & Akin, A. (2011). Self-compassion and internet addiction. *The Turkish Online Journal of Education Technology, 10*, 215-221.

Julian, L. J. (2011). Measures of anxiety: State-Trait Anxiety Inventory (STAI), Beck Anxiety Inventory (BAI), and Hospital Anxiety and Depression Scale-Anxiety (HADS-A). *Arthritis Care and Research, 63*, 467-472. doi:10.1002/acr.20561

Konok, V., Gigler, D., Bereczky, B. M., & Miklósi, Á. (2016). Humans' attachment to their mobile phones and its relationship with interpersonal attachment style. *Computers in Human Behavior, 61*, 537-547. doi:10.1016/j.chb.2016.03.062

Konok, V., Pogány, Á., & Miklósi, Á. (2017). Mobile attachment: Separation from the mobile phone induces physiological and behavioural stress and attentional bias to separation-related stimuli. *Computers in Human Behavior, 71*, 228-239. doi:10.1016/j.chb.2017.02.002

Kornok, V., Pogány, Á., & Miklósi, Á. (2017). Mobile attachement questionnaire. [PsycTests]. doi:10.1037/t61593-000

Meschtscherjakov, A., Wilfinger, D., & Tscheligi, M. (2014). Mobile attachment causes and consequences for emotional bonding with mobile phones [Press release]

Michikyan, M., & Suárez-Orozco, C. (2016). Adolescent media and social media use: Implications for development. *Journal of Adolescent Research, 31*, 411-414. doi:10.1177/0743558416643801

Montag, C., Blaszkiewicz, K., Sariyska, R., Lachmann, B., Andone, I., Trendafilov, B., . . . Markowetz, A. (2015). Smartphone usage in the 21st century: Who is active on WhatsApp? *BMC Research Notes, 8*, 1-6. doi:10.1186/s13104-015-1280-z

Neff, K. D. (2003a). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*, 223-250. doi:10.1080/15298860390209035

Neff, K. D. (2003b). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*, 85-101. doi:10.1080/15298860390129863

Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*, 139-154. doi:10.1016/j.jrp.2006.03.004

Oosthuizen, J., & Young, C. (2015). *How students' relationships with their cellphones inform their experience of socialising online and offline.* Paper presented at the African Cyber Citizenship Conference 2015, Port Elizabeth: Nelson Mandela Metropolitan University. Retrieved from http://accconference.nmmu.ac.za

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6. doi:10.1108/10748120110424816

Raj, M., Bhattacherjee, S., & Mukherjee, A. (2018). Usage of online social networking sites among school students of Siliguri, West Bengal, India. *Indian Journal of Psychological Medicine, 40*, 452-457. doi:10.4103/IJPSYM.IJPSYM_70_18

Raju, N. J., Valsaraj, B. P., & Noronha, J. (2015). Online social networking: Usage in adolescents. *Journal of Education and Practice, 6*(22), 80-85.

Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior, 57*, 321-325. doi:10.1016/j.chb.2015.12.045

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociology Methodology, 13*, 290-312. doi:10.2307/270723

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State–Trait Anxiety Inventory*. Palto Alto, CA: Consulting Psychologists Press.

Spielberger, C. D., & Vagg, P. R. (1984). Psychometric properties of the STAI: A reply to Ramanaiah, Franzen, and Schill. *Journal of Personality Assessment, 48*, 95-97. doi:10.1207/s15327752jpa4801_16

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder. *Archives of Internal Medicine, 166*, 1092-1097. doi:10.1001/archinte.166.10.1092

Stanley, M. A., Gayle Beck, J., & Zebb, B. J. (1996). Psychometric properties of four anxiety measures in older adults. *Behaviour Research and Therapy, 34*, 827-838. doi:10.1016/0005-7967(96)00064-2

Stern, S. R., & Burke Odland, S. (2017). Constructing dysfunction: News coverage of teenagers and social media. *Mass Communication and Society, 20*, 505-525. doi:10.1080/15205436.2016.1274765

Suliman, S., Stein, D. J., & Seedat, S. (2014). Clinical and neuropsychological predictors of posttraumatic stress disorder. *Medicine (Baltimore), 93*(22), 1-9. doi:10.1097/MD.0000000000000113

Swanepoel, T. L., & Thomas, K. G. (2012). Malicious MXit? South African adolescents' use of mobile-based communication applications. *Journal of Child & Adolescent Mental Health, 24*, 117-132. doi:10.2989/17280583.2012.735499

Szolnoki, G., & Hoffmann, D. (2013). Online, face-to-face and telephone surveys—Comparing different sampling methods in wine consumer research. *Wine Economics and Policy, 2*, 57-66. doi:10.1016/j.wep.2013.10.001

van IJzendooorn, M. H., & Kroonenberg, P. M. (1988). Cross-cultural patterns of attachment: A meta-analysis of the strange situation. *Child Development, 58*, 147-156. doi:10.1111/j.1467-8624.1988.tb03202.x

van Wijk, C. H. (2014). The use of Spielberger's State-Trait Personality Inventory (trait anxiety subscale) with naval subaquatic specialists. *International Journal of Occupational Medicine and Environmental Health, 27*, 959-966. doi:10.2478/s13382-014-0321-5

Wang, P., Zhao, M., Wang, X., Xie, X., Wang, Y., & Lei, L. (2017). Peer relationship and adolescent smartphone addiction: The mediating role of self-esteem and the moderating role of the need to belong. *Journal of Behavioral Addictions, 6*, 708-717. doi:110.1556/2006.6.2017.079

Werner, K. H., Jazaieri, H., Goldin, P. R., Ziv, M., Heimberg, R. G., & Gross, J. J. (2012). Self-compassion and social anxiety disorder. *Anxiety Stress Coping, 25*, 543-558. doi:10.1080/10615806.2011.608842

Appendix A:
Letter of Ethical clearance

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3417
Fax No. (021) 650 4104

29 May 2018

Leora Hodes
Department of Psychology
University of Cape Town
Rondebosch 7701

Dear Leora

I am pleased to inform you that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *Does self-compassion mediate the relationship between smartphone attachment and trait anxiety?* The reference number is PSY 2018-023.

I wish you all the best for your study.

Yours sincerely

Lauren Wild (PhD)
Associate Professor
Chair: Ethics Review Committee

University of Cape Town
PSYCHOLOGY DEPARTMENT
Upper Campus
Rondebosch

Appendix B:

Digital Native Sociodemographic Questionnaire

Please answer the following:

Age:

Sex:

Current highest level of education:

What are your parent's professions:

How old were you when you got your first cell phone?

What smartphone do you currently own?

Appendix C:

Digital Immigrant Sociodemographic Questionnaire

Please answer the following:

Age:

Sex:

Race:

Current highest level of education:

What are your current profession:

How old were you when you got your first cell phone?

How old were you when you got your first cell phone? (e.g. iPhone, android or any other smartphone

What smartphone do you currently own?

Appendix D:
The Self-Compassion Scale

Note that items 1, 2, 4, 6, 8, 11, 13, 16, 18, 20, 21, 24 and 25 are reverse scored. The Self-Compassion Scale contains the following 6 subscales (the subscale items are indicated in parentheses next to each item in the scale): Self-kindness (SK); Self-judgement (SJ); Common humanity (CH); Isolation (I); Mindfulness (M); and Over-identification (OI).

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. Indicate how often you behave in the stated manner, using the following scale:

Almost never **Almost always**

1 **2** **3** **4** **5**

1. I'm disapproving and judgmental about my own flaws and inadequacies. (SJ)

1 2 3 4 5

2. When I'm feeling down I tend to obsess and fixate on everything that's wrong. (OI)

1 2 3 4 5

3.When things are going badly for me, I see the difficulties as part of life that everyone goes through. (CH)

1 2 3 4 5

4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world. (I)

1 2 3 4 5

5. I try to be loving towards myself when I’m feeling emotional pain. (SK)

1 2 3 4 5

6. When I fail at something important to me I become consumed by feelings of inadequacy. (OI)

1 2 3 4 5

7. When I'm down and out, I remind myself that there are lots of other people in the world feeling like I am. (CH)

1 2 3 4 5

8. When times are really difficult, I tend to be tough on myself. (SJ)

1 2 3 4 5

9. When something upsets me I try to keep my emotions in balance. (M)

1 2 3 4 5

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people. (CH)

1 2 3 4 5

11. I’m intolerant and impatient towards those aspects of my personality I don't like. (SJ)

1 2 3 4 5

12. When I’m going through a very hard time, I give myself the caring and tenderness I need. (SK)

1 2 3 4 5

13. When I’m feeling down, I tend to feel like most other people are probably happier than I am. (I)

1 2 3 4 5

14. When something painful happens I try to take a balanced view of the situation. (M)

1 2 3 4 5

15. I try to see my failings as part of the human condition. (CH)

1 2 3 4 5

16. When I see aspects of myself that I don’t like, I get down on myself. (SJ)

1 2 3 4 5

17. When I fail at something important to me I try to keep things in perspective. (M)

1 2 3 4 5

18. When I’m really struggling, I tend to feel like other people must be having an easier time of it. (I)

1 2 3 4 5

19. I’m kind to myself when I’m experiencing suffering. (SK)

1 2 3 4 5

20. When something upsets me I get carried away with my feelings. (OI)

1 2 3 4 5

21. I can be a bit cold-hearted towards myself when I'm experiencing suffering. (SJ)

1 2 3 4 5

22. When I'm feeling down I try to approach my feelings with curiosity and openness. (M)

1 2 3 4 5

23. I’m tolerant of my own flaws and inadequacies. (SK)

1 2 3 4 5

24. When something painful happens I tend to blow the incident out of proportion. (OI)

1 2 3 4 5

25. When I fail at something that's important to me, I tend to feel alone in my failure. (I)

1 2 3 4 5

26. I try to be understanding and patient towards those aspects of my personality I don't like. (SK)

1 2 3 4 5

Appendix E:
Mobile Attachment Questionnaire

Note that items 8, 12 and 14 are reverse scored. The Mobile Attachment Questionnaire contains the following 4 subscales (the subscale items are indicated in parentheses next to each item in the scale): Separation insecurity (SI); Separation anxiety (SA); Safe haven (SH); and Secure base (SB)

How often do you use your phone for the following functions?

1- very rarely 5- very often

Calls 1----------2----------3----------4----------5

SMS 1----------2----------3----------4----------5

Instant messaging 1----------2----------3----------4----------5

Browsing the internet 1----------2----------3----------4----------5

Social networking sites 1----------2----------3----------4----------5

Chat 1----------2----------3----------4----------5

(such as Facebook chat or Instagram direct messages)

Games 1----------2----------3----------4----------5

To what extent are the following statements characteristic of you?

1----------2----------3----------4----------5

1- not at all characteristic of me 5- Very characteristic of me

1. If my phone runs out of battery, I do not feel safe. （SI)
   1----------2----------3----------4----------5
2. If I do not have my phone on me, I do not feel safe. （SI)
   1----------2----------3----------4----------5

3. If I leave my phone at home, I do not feel safe. （SI)

   1----------2----------3----------4----------5

4. If I lost my phone, I would not feel really safe for long. （SI)

   1----------2----------3----------4----------5

5. If I am stressed I take out my phone to calm down. （SI)

   1----------2----------3----------4----------5

6. If I left my phone at home, I would be willing to go home for it even from a distance (more than 5 min away from home). （SA)

   1----------2----------3----------4----------5

7. I am nervous/tense when I leave my phone at home. (SA)

   1----------2----------3----------4----------5

8. It does not bother me when I leave my phone at home/it runs out of battery. (SA)

   1----------2----------3----------4----------5

9. I am nervous/tense when my phone runs out of battery. (SA)

   1----------2----------3----------4----------5

10. If I feel uneasy/tense in company, I take out my phone. (SH)

    1----------2----------3----------4----------5

11. In a tense situation I take out my phone. (SH)

    1----------2----------3----------4----------5

12. If I am nervous, dealing with my phone does not calm me down. (SH)

    1----------2----------3----------4----------5

13. If my phone is in my hand, I feel more confident. （SB)

    1----------2----------3----------4----------5

14. I am not more confident/easy-going if I have my phone with me. (SB)

    1----------2----------3----------4----------5

15. If my phone is in my hand, I can behave more easily/unreserved. （SB)

    1----------2----------3----------4----------5

Appendix F:

State-Trait Anxiety Inventory

A number of statements which people use to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you ***generally*** feel. There are no right or wrong answer. Do not spend too much time one any one statement but give the answer which seems to describe how you generally feel.

	Almost never	Sometimes	Often	Almost always
1. I feel pleasant	1	2	3	4
2. I feel nervous and restless	1	2	3	4
3. I feel satisfied with myself	1	2	3	4
4. I wish I could be as happy as others seem to be	1	2	3	4
5. I feel like a failure	1	2	3	4
6. I feel rested	1	2	3	4
7. I am “calm, cool and collected”	1	2	3	4
8. I feel that difficulties are piling up so that I cannot overcome them	1	2	3	4
9. I worry too much over something that really doesn’t matter	1	2	3	4
10. I am happy	1	2	3	4
11. I have disturbing thoughts	1	2	3	4
12. I lack self-confidence	1	2	3	4
13. I feel secure	1	2	3	4

14. I make decisions easily	1	2	3	4
15. I feel inadequate	1	2	3	4
16. I am content	1	2	3	4
17. Some unimportant thought runs through my mind and bothers me	1	2	3	4
18. I take disappointments so keenly that I can't put them out of my mind	1	2	3	4
19. I am a steady person	1	2	3	4
20. I get in a state of tension or turmoil as I think over my recent concern and interests	1	2	3	4

Appendix G:
Student Consent Form

Consent to Participate in a Research Study

ACSENT Laboratory

University of Cape Town

Dear Student:

Thank you for making time to participate in this study. This study is focused on smartphone use. This study is being performed as part of an Honour's degree in the Department of Psychology at the University of Cape Town. Before you agree to take part, please carefully read this page, and email the researcher about any questions you might have.

Study Purpose

The purpose of this study is look at smartphone use in undergraduate students. This research will be used to address a gap in the research regarding smartphone use and personality characteristics.

Study Procedures

If you decide to participate in this study, you will be asked to complete 4 different paper-and-pencil questionnaires. The entire testing procedure will take a maximum of 30 minutes and will take place in a single session.

Possible Risks and Benefits

There are no identified risks for participating in this study. Your responses and scores on all questionnaires will remain confidential under all circumstances, with no one besides the researchers having access to them, and even the researcher will not be able to identify you from your answers.

A possible benefit of participating in this study is being made aware of any interesting findings from this research. You will also be awarded 1 SRPP point for your participation.

Alternatives

You may choose not to participate in this study. Your decision will not affect your relationship with the University of Cape Town or the Department of Psychology in any way, academic or personal.

Voluntary Participation

Participation in this study is completely voluntary. You are free to change your mind and discontinue participation at any time without any effect on your relationship with the University of Cape Town or the Department of Psychology. No-one aside from the researchers will know that you have decided to not participate. Please noted that if you decide to cease participation, you will not receive the SRPP point.

Confidentiality

Information about you collected for this study will be kept completely confidential and anonymous. Your consent forms will be kept in a secure location with access only available to the researcher. The information obtained will not be disclosed to anyone not involved in the research. Any reports or publications about this study will not identify you or any other study participant. Your test scores will not be able to identify you at all.

Informed Consent

I, _____, have read and understood what is written in this document, and by signing here, I agree to take part in this study.

Participant's signature: _____ *Date:* _____

Name and student number of Participant (for SRPP purposes): _____

Course code and title (for which you would like these points): _____

Researcher's signature: _____ *Date:* _____

Should you have any further questions or concerns, please feel free to contact me, Leora Hodes, at HDSLEO001@myuct.ac.za, or my supervisor, Dr. Kevin Thomas, at kevin.thomas@uct.ac.za. If you would like to contact a representative of the Department of Psychology, please telephone or email Ms Rosalind Adams: 021 650 3417 or rosalind.adams@uct.ac.za.

Appendix H:
Student Debriefing Form

Debriefing Form

ACSENT Laboratory

University of Cape Town

Self-compassion as a mediator of the relationship between smartphone attachment and trait anxiety

Dear participant:

Thank you for your participation in this study. The aim of this research project is to assess if self-compassion mediates the link between smartphone attachment and anxiety.

Initially you were told that this study was only on smartphone use as I did not want social desirability to influence your scores. Self-compassion is an Eastern concept that entails self-kindness, mindfulness, and common humanity. Please do bear in mind that this research is still happening, and therefore we would appreciate if you do not share these details about this study with fellow students who might still participate.

Remember the fact that your responses will be treated anonymously, and confidentially; this means that nobody, not even I, can find out what responses you gave on any of the questionnaires you completed.

Please feel free to ask any further questions you might have right now, or email them to me, Leora Hodes HDSLEO001@myuct.ac.za. If you have any questions or concerns about the study procedures in general, you may also contact the UCT Department of Psychology: Ms Rosalind Adams, rosalind.adams@uct.ac.za.

Appendix I:
Digital Immigrant Consent Form

Consent to Participate in a Research Study

ACSENT Laboratory

University of Cape Town

Dear Participant:

Thank you for making time to participate in this study. This study is focused on smartphone use. This study is being performed as part of an Honour's degree in the Department of Psychology at the University of Cape Town. Before you agree to take part, please carefully read this page, and email the researcher about any questions you might have.

Study Purpose

The purpose of this study is look at smartphone use in adults. This research will be used to address a gap in the research regarding smartphone use and personality characteristics.

Study Procedures

If you decide to participate in this study, you will be asked to complete 4 different questionnaires. The entire testing procedure will take a maximum of 30 minutes and you will only be able to submit your response once you have completed all the questionnaires.

Possible Risks and Benefits

There are no identified risks for participating in this study. Your responses and scores on all questionnaires will remain confidential under all circumstances, with no one besides the researchers having access to them, and even the researcher will not be able to identify you from your answers.

A possible benefit of participating in this study is being made aware of any interesting findings from this research You will have the option to choose to receive a one-page summary of the results once this study has been completed.

Alternatives

You may choose not to participate in this study. Your decision will not affect your relationship with the University of Cape Town or the Department of Psychology or the researcher in any way.

Voluntary Participation

Participation in this study is completely voluntary. You are free to change your mind and discontinue participation at any time without any effect on your relationship with the University of Cape Town or the Department of Psychology. No-one aside from the researchers will know that you have decided to not participate.

Confidentiality

Information about you collected for this study will be kept completely confidential and anonymous. The information obtained will not be disclosed to anyone not involved in the research. Any reports or publications about this study will not identify you or any other study participant. Your test scores will not be able to identify you at all.

Informed Consent

I, have read and understood what is written in this document, and by signing here, I agree to take part in this study.

Date:

Name and email address (in order to track you have only participated once):

Please select if you would like to be sent a one page summary of this study's findings

Should you have any further questions or concerns, please feel free to contact me, Leora Hodes, at HDSLEO001@myuct.ac.za, or my supervisor, Dr. Kevin Thomas, at kevin.thomas@uct.ac.za. If you have any concerns or complaints about the study and would like to contact a representative of the Department of Psychology Ethics Counsel, please telephone or email Ms Rosalind Adams: 021 650 3417 or rosalind.adams@uct.ac.za.

Appendix J:

Digital Native Debriefing Form

ACSENT Laboratory

University of Cape Town

Self-compassion as a mediator of the relationship

between smartphone attachment and trait anxiety

Dear participant:

Thank you for your participation in this study. The aim of this research project is to assess if self-compassion is responsible for the link between smartphone attachment and anxiety.

Initially you were told that this study was only on smartphone use as I did not want the desire to answer questions in a socially desirable way to influence your scores. Self-compassion is an Eastern concept that entails self-kindness (i.e. being kind and loving towards yourself), mindfulness (i.e. to be able to control distressing thoughts without being consumed by them), and common humanity (i.e. viewing your experiences as part of a greater human experience and not simply isolating events that only happen to yourself). Please do bear in mind that this research is still happening, and therefore we would appreciate if you do not share these details about this study with individuals who may still participate.

Remember that your responses will be treated anonymously, and confidentially; this means that nobody, not even I, can find out what responses you gave on any of the questionnaires you completed.

Please feel free to ask any further questions you might have by emailing them to me, Leora Hodes HDSLEO001@myuct.ac.za. If you have any concerns about the study procedures, you may also contact the UCT Department of Psychology's Research Ethics committee representative: Ms Rosalind Adams, rosalind.adams@uct.ac.za.

Thank you again for taking the time to participate,

Leora Hodes