Smartphone addiction is increasing across the world: A meta-analysis of 24 countries*

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Abstract

Smartphone ownership and screen time are increasing across the world, but there have been few attempts to quantify smartphone addiction on a global scale. We conducted a meta-analysis of studies published between 2014 and 2020 that used the Smartphone Addiction Scale, the most common measure of problematic smartphone use. We focused on adolescents and young adults (aged 15 to 35) since they tend to have the highest screen time and smartphone ownership rates. Across 24 countries, 83 samples, and 33,831 participants, we demonstrate that problematic smartphone use is increasing across the world. China, Saudi Arabia, and Malaysia had the highest scores while Germany and France had the lowest. We suggest that the clinical interpretation of these scores should be updated given current global trends.

1 Introduction

Smartphone ownership has increased over the past decade, reaching around half or more of the global population (Newzoo, 2021; O'Dea, 2021). In high-income countries across North America and Europe, over 80% of the population owns a smartphone, and rates in low- and middle-income countries continue to rise (Newzoo, 2018, 2019). While several organisations track objective measures such as smartphone ownership and screen time patterns (GlobalWebIndex, 2018; Newzoo, 2021; O'Dea, 2021; Pew Research Center, 2019;

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Rideout & Robb, 2019), few have attempted to quantify the more subjective aspects of smartphone use across the world.

For example, *problematic smartphone use* occurs when smartphones interfere with daily life (Busch & McCarthy, 2021; Panova & Carbonell, 2018). It generally correlates with screen time (e.g., Randjelovic et al., 2020) but is a distinct construct; high screen time alone does not necessarily cause negative effects. For example, some people may benefit from calling their friends for several hours per day, while others who use social networking apps for only a few minutes while trying to study or sleep may experience negative effects (Sohn et al., 2021). Problematic smartphone use has been associated with cognitive impairments (Wilmer et al., 2017), lower sleep quality (Demirci et al., 2015), and depression (Elhai et al., 2017; Geng et al., 2021); limiting smartphone use can reduce depression and improve sleep quality (Hughes & Burke, 2018; Hunt et al., 2018; Olson et al., 2021). However, researchers continue to debate about the precise relationship between smartphone use and various aspects of well-being (Davidson et al., 2020; Przybylski, 2019; Twenge et al., 2020) as well as whether problematic smartphone use constitutes a behavioural addiction (Kardefelt-Winther et al., 2017; Panova & Carbonell, 2018; Satchell et al., 2020). In any case, many people report wanting to reduce their smartphone use (Olson et al., 2021). Almost half of smartphone users in developed countries believe they are over-using their phones (Deloitte, 2019) and many would rather spend their time doing something else (Deloitte, 2018; Lukoff et al., 2018), yet only half of those trying to reduce their phone use report successfully doing so (Deloitte, 2018).

One of the challenges with quantifying problematic smartphone use across the world is the plethora of measures available (Abendroth et al., 2020; Davidson et al., 2020). There are at least 78 different scales (Harris, Regan, et al., 2020), many of which correlate well with each other (Davidson et al., 2020; Harris, McCredie, et al., 2020), assessing similar constructs relevant to behavioural addictions (Sohn et al., 2019). However, these measures vary in their criteria for what constitutes problematic behaviour or risk of addiction (Abendroth et al., 2020; Davidson et al., 2020; Gutiérrez et al., 2016), making it difficult to directly compare scores across studies.

The most-cited measure of problematic smartphone use is the Smartphone Addiction Scale (SAS; Kwon, Lee, et al., 2013) along with its short version (SAS-SV; Kwon, Kim, et al., 2013). As of November 2021, these two measures have over 2,200 combined citations on Google Scholar. The measures were developed in collaboration with clinicians and capture a variety of components related to behavioural addictions: withdrawal, tolerance, loss of control, intense desire to use, neglect of other activities, and continued use despite harm (Sohn et al., 2019). Both measures use items such as: "I have a hard time concentrating in class, while doing assignments, or while working, due to smartphone use". Participants rate their agreement on six-point Likert scales; higher total scores indicate more problematic smartphone use. The full version of the scale captures more shared variance than several other related measures (Davidson et al., 2020) and the short version predicts clinical judgements of smartphone addiction (Kwon, Kim, et al., 2013).

Here, we present a global meta-analysis of these measures. We hypothesised that country, age, and gender, and year would predict problematic smartphone use. To our knowledge, this is the largest meta-analysis of global problematic smartphone use using comparable measures.

2 Methods

2.1 Search strategy

We used Google Scholar to collect the articles, since it returns the most entries compared to other databases (e.g., Wright et al., 2014). Using the "Cited by" function, we collected all of the articles citing either of the two original SAS papers (Kwon, Lee, et al., 2013;

Kwon, Kim, et al., 2013) until July 2020. Figure 1 shows a PRISMA flow chart of the process (Moher et al., 2009).

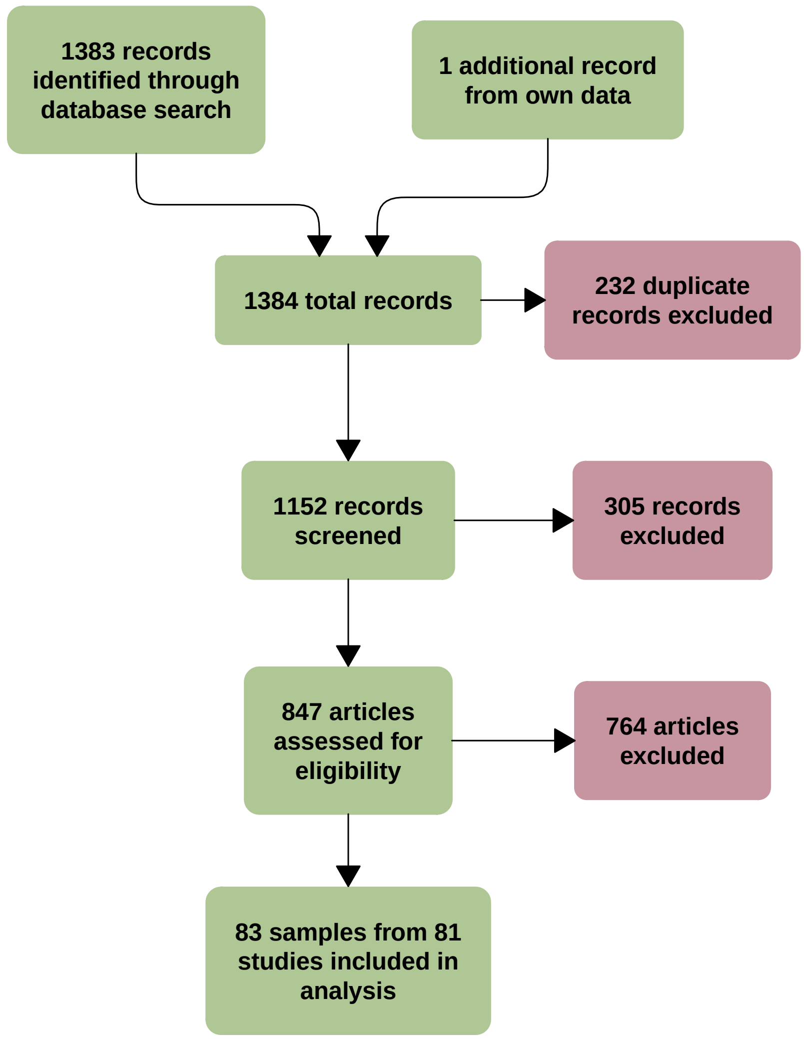

Figure 1: PRISMA flow chart of study inclusion and exclusion.

2.2 Eligibility criteria

We first removed duplicates based on the article title using the *metagear* R package (Lajeunesse, 2015). We then kept articles published in English with the full text available anywhere (e.g., via institutional access, Google Scholar, or Library Genesis); we were able to access all potentially eligible records. After this initial screening, we ensured that each entry:

- was published in a peer-reviewed journal (based on Ulrich's Periodicals Directory or by checking the journal's website),
- studied smartphones (not tablets),
- presented original research (e.g., not a review or re-analysis of existing data),
- recruited a non-clinical population (e.g., not patients),
- had a sample size of at least 20,
- reported the average age or age range of the sample between 15 and 35 (inclusive), since adolescents and young adults tend to have the highest screen time and smartphone ownership rates,
- reported the overall SAS or SAS-SV average or enough information to compute it (e.g., individual item scores).

2.3 Coding procedure

From each article, raters then extracted:

- the publication year,
- the country of the sample,
- the age mean, standard deviation, and range (or, if the average was omitted, we estimated it based on the midpoint of the range),
- the percent of female participants,[1]
- the sample size,

[1] Two studies with otherwise eligible all-male samples (Dey et al., 2019; Enwereuzor et al., 2016) (and thus extreme scores on the percent of female participants) were excluded to meet statistical assumptions and to keep the studies comparable.

- whether there were relevant subsamples (such as two samples from different countries),
- which questionnaire version was used, and
- the SAS or SAS-SV mean, standard deviation, and range.

During the first pass, two raters assessed eligibility and extracted the data before a third rater resolved discrepancies. During the second pass, another rater assessed eligibility and re-extracted the data, agreeing with 97% of the eligibility ratings from the first pass. A final rater resolved the remaining discrepancies.

2.4 Analysis

To ease comparison between the two measures, we translated the 33-item SAS scores into 10-item SAS-SV scores. We used data from Harris and colleagues (2020) who found a strong linear relationship between the measures ($r = .94$, $N = 150$; Figure A1). Using their raw data (https://osf.io/tq3wv/), we translated the SAS scores to *estimated SAS-SV* scores which are the focus of our analysis:

$$\widehat{\text{SAS}_{\text{SV}}} = .3191 \times \text{SAS} - 2.3677$$

To assess variation in problematic smartphone use, we conducted an ANOVA testing for main effects of publication year, country, age, and gender (i.e., percent of female participants). We used the sample sizes as unit weights in the regression (Hunter & Schmidt, 2004); we could not use variance-based weights since some manuscripts omitted measures of variability. All α values were .05 with no family-wise error correction.

3 Results

3.1 Descriptive statistics

In total, we included 83 samples from 81 studies. The median number of participants was 316 (M = 408, SD = 348, range: 40 to 1889) and most were women (60%). The average age of each sample was between 16 and 32. In total, these samples captured 33,831 participants from 24 countries.

The full SAS ranges from 48 to 288, with higher scores indicating more problematic smartphone use. The 30 samples using the SAS showed an average score of 89.96 (SD = 12.93). The SAS-SV ranges from 10 to 60, and the 53 samples using it showed an average of 30.16 (SD = 3.53). Combining the scales by translating the SAS to the SAS-SV, we saw an overall average of 28.78 (SD = 4.16), which is equivalent to weakly disagreeing with each scale item (scoring around 3 out of 6).

3.2 Publication year

Problematic smartphone use increased over time. Figure 2 shows the pooled means increasing by year across most of the countries (unweighted $r(81) = .39$ $[.19, .56]$), which accounted for 11% of the variation in the model (Table 1).

Table 1: ANOVA results. Problematic smartphone use (estimated SAS-SV) varied by publication year and country.

Factor	df	SS	F	p	η^2
Publication year	**1**	**67630.33**	**40.08**	**<0.001**	**.112**
Country	**21**	**449553.26**	**12.69**	**<0.001**	**.742**
Average age	1	1022.25	0.61	0.440	.002
Percent female	1	287.51	0.17	0.681	.000

Factor	df	SS	F	p	η^2
Residuals	52	87753.60			.145

3.3 Country

Problematic smartphone use varied considerably by country (Figure 3), accounting for 74% of the total variation. The highest consistent scores were seen in China and Saudi Arabia, followed by Malaysia, Brazil, South Korea, Iran, Canada, and Turkey. Most of these are collectivist countries which emphasise social hierarchy and conformity (Minkov, 2018). They also show *cultural tightness* with relatively pervasive and closely followed social norms (Uz, 2015). Compared to more culturally loose countries, the more formal social and family obligations may provide a cultural incentive to stay in contact through smartphones more frequently. Indeed, the social uses of phones best predict problematic use (Lopez-Fernandez et al., 2017; van Deursen et al., 2015; Veissière & Stendel, 2018). One study also found a link between collectivism and *nomophobia*, the anxiety due to lacking one's phone (Arpaci, 2017). In contrast, the individualistic and culturally loose countries of Germany and France showed the lowest problematic smartphone use. In an exploratory test, we saw a negative correlation between cultural looseness and problematic use by country (unweighted $r(15) = -.56$ $[-.82, -.10]$; Figure 4A).

In addition to cultural looseness, we explored two other country-level measures. Problematic smartphone use seemed to show non-linear relationships with both country-wide smartphone ownership (Figure 4B) and smartphone internet screen time (Figure 4C). Future meta-analyses with more countries are needed to confirm and explain these potential non-linear relationships.

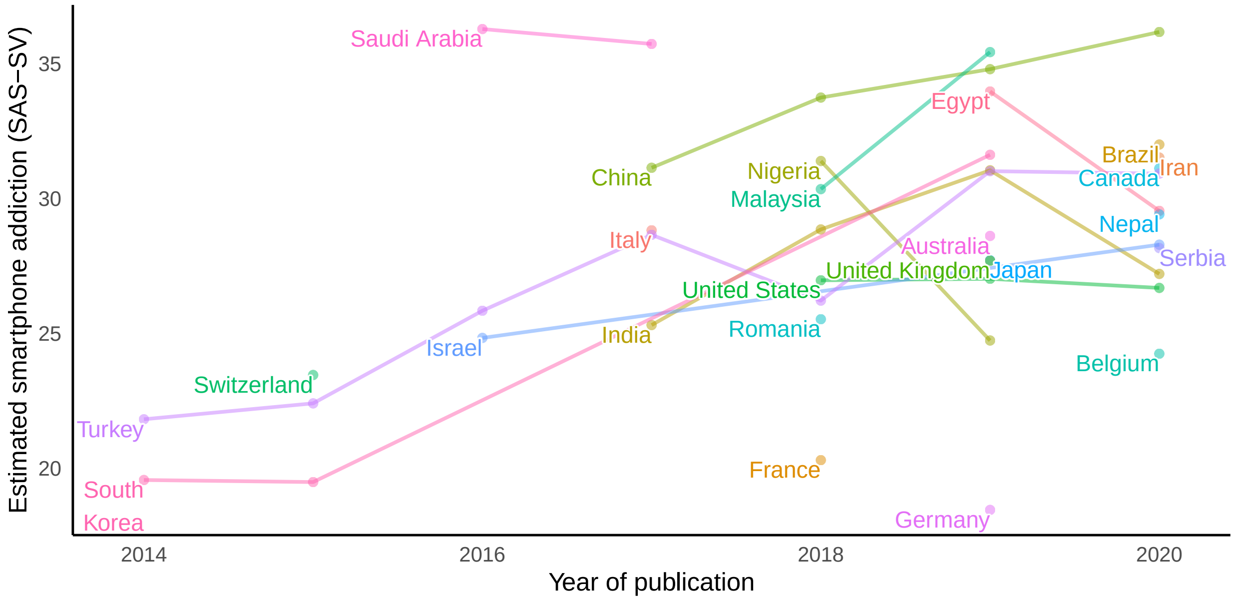

Figure 2: Problematic smartphone use increased over time in most countries. Dots show pooled means and lines show change over time. The total score can range from 10 to 60.

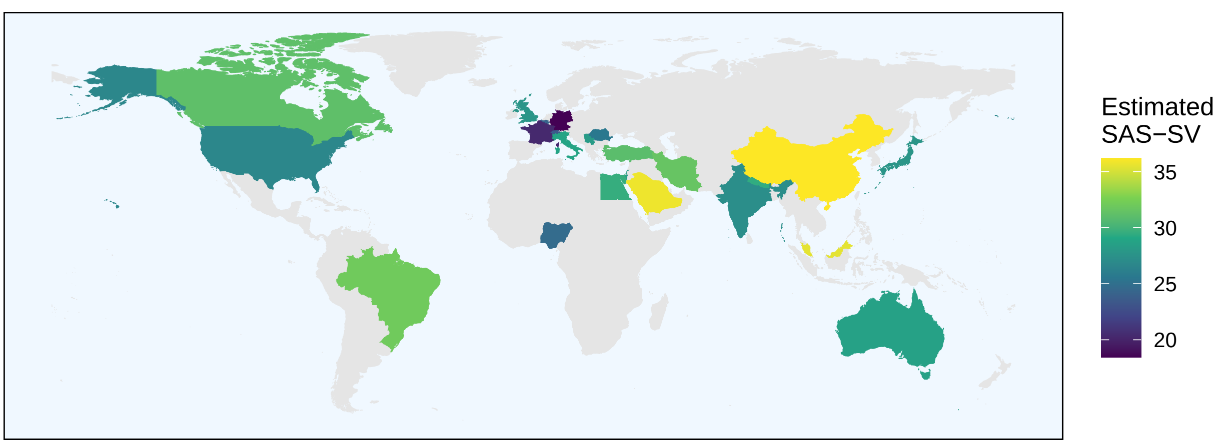

Figure 3: Most recent eligible problematic smartphone use scores by country. SAS scores were translated into estimated SAS-SV scores for a consistent scale; see Figure A2 for maps of each measure.

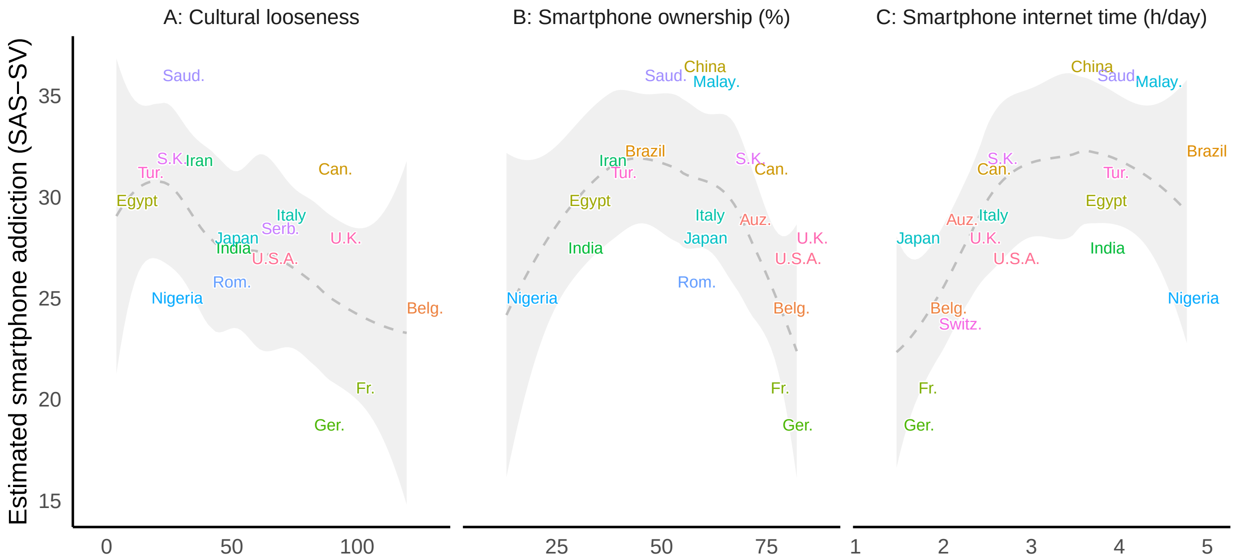

Figure 4: Problematic smartphone use by country-level cultural looseness (Uz, 2015), smartphone ownership (Newzoo, 2018), and smartphone internet time (GlobalWebIndex, 2018). Problematic smartphone use averages show the most recent pooled estimates for each country. Internet time is the average reported time spent on smartphones using the internet (e.g., not during phone calls).

3.4 Age and gender

We did not see comparable effects for age and gender. These variables were taken on the sample level rather than the participant level, which reduced statistical power compared to individual difference studies. Younger and female populations generally have higher problematic smartphone use (Andone et al., 2016; Kwon, Kim, et al., 2013; van Deursen et al., 2015).

4 Discussion

We conducted, to our knowledge, the largest meta-analysis of problematic smartphone use with comparable measures. We focused on the Smartphone Addiction Scale, the most-cited and perhaps most-used measure of the construct. Results showed that problematic smartphone use increased over time and varied considerably by country.

The relevance of these results depends on the validity of the construct measured by the SAS. Although the scale predicts clinical judgements (Kwon, Kim, et al., 2013) and better captures shared variance than several other measures (Davidson et al., 2020), its conceptual clarity remains under debate. Davidson and colleagues (2020) argue that some of the items directly measure facets of mental health, which explains their negative correlations with depression and anxiety. Here, increases in problematic smartphone use scores could partly reflect the growing psychological distress across various countries (Twenge et al., 2019, 2021). They further argue that few technology addiction measures follow the best practices in scale development, though the SAS is among the better ones. We agree that these measures should be interpreted with caution, but if the SAS and SAS-SV are currently the de facto standard scales in the field, our global averages may help interpretation until their conceptual clarity is improved (cf. Satchell et al., 2020; Abendroth et al., 2020).

For more precision in our analysis, we focused on the averages of the SAS rather than their clinical cut-off values. Kwon and colleagues (2013), who developed the SAS-SV, proposed initial criteria for determining the risk of smartphone addiction. With an average score of 25, the authors found that cut-off values of 31 for boys and 33 for girls predicted clinical judgements. However, as the authors pointed out, these cut-offs are based on a single sample of South Korean high school students and may be difficult to generalise beyond that region. Eight years later, these provisional cut-offs remain widely used for interpreting scores across the world. Using these cut-offs, the majority of recent samples from China, Saudi Arabia, and Malaysia would be considered at a high risk of smartphone addiction (Figure 2). If phone use is now more integral to daily life than when the scale was first developed, it may be time to update the cut-off values or their clinical interpretations across countries. Doing so would help avoid pathologising social behaviours which are now seen in the majority of teenagers and young adults in some countries (cf. Kardefelt-Winther et al., 2017; Satchell et al., 2020).

4.1 Limitations

Our study had several limitations. Many of the countries had sparse data, making it difficult to assess regional trends. For example, there may be considerable variation between rural and urban settings or between higher- and lower-income regions within the same country. Still, we saw surprisingly little such variation. In the United States, samples from Ohio, Texas, and Massachusetts varied by only 3.35 points on the SAS-SV scale (which ranges from 10 to 60). Cross-country surveys of problematic smartphone use, similar to those regularly undertaken for objective measures (e.g. GlobalWebIndex, 2018; Newzoo, 2021), would allow for more precise regional estimates (Olson, Sandra, Langer, & Veissière, in progress).

Other limitations of our study relate to generalisation. Excluding clinical samples may have reduced our reported averages, while focusing on a younger population may have increased them (van Deursen et al., 2015). The overall trend over time and the relative differences between the countries may thus be more reliable than our specific effect sizes. Similarly, we are limited in our translation from SAS to SAS-SV scores for our analysis. Although the SAS-SV contains a subset of the SAS items and both scales strongly correlate (Harris, McCredie, et al., 2020), the translation was based on a single American sample which may be difficult to generalise across the world. In any case, avoiding this translation by using only the SAS-SV scores would have changed no hypothesis decisions nor would it have strongly influenced the effect sizes.

4.2 Future directions

We focused on scales measuring problematic smartphone use, but as different types of devices converge, researchers may need more sophisticated measures (Abendroth et al., 2020). The boundary has blurred between problematic use of both smartphones and the internet (Chen et al., 2020), with portable devices now accounting for over half of all website traffic (Clement, 2021). The lines have also blurred between smartphones, tablets, laptops, and even smart watches; virtual and augmented reality devices may further complicate these distinctions. Forward-thinking measures may help prevent the underestimation of problematic technology use when excluding other devices from standardised scales. For example, our study participants regularly ask whether their small tablets should be considered as smartphones in the SAS; the problematic use itself likely matters more than which particular device it involves. More comprehensive measures may also help clarify how much overlap these constructs have with typical behavioural addictions (Abendroth et al., 2020; Satchell et al., 2020).

Finally, the impact of lockdowns and work-from-home trends during the COVID-19 pandemic remains to be seen. None of the eligible studies in our sample collected data during this period, but other studies have shown a recent increase in technology use (e.g., Cellini et al., 2020). Further, it is unclear whether the same scales are as reliable during social isolation, given that several of the SAS items depend on interaction with others (e.g., "People around me tell me that I use my smartphone too much"; Kwon, Kim, et al., 2013). A follow-up meta-analysis conducted years after the current pandemic would reveal any long-term changes in problematic smartphone use.

4.3 Conclusion

Problematic smartphone use increased across the world between 2014 and 2020, and we expect this trend to continue. As organisations track objective measures such as smartphone ownership and screen time, it is also important to assess the subjective aspects and psychological consequences of this proliferation. We hope our results help researchers and policy makers quantify and predict problematic smartphone use across the world.

Data availability

The data table is in the Appendix and online (https://osf.io/tq3wv/). The dataset for the translation from SAS to SAS-SV scores (Harris, McCredie, et al., 2020) is also online.

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A Appendix

Figure A1 shows the translation between the two problematic smartphone use measures, Figure A2 shows world maps for each measure, and Table A1 summarises all of the articles used.

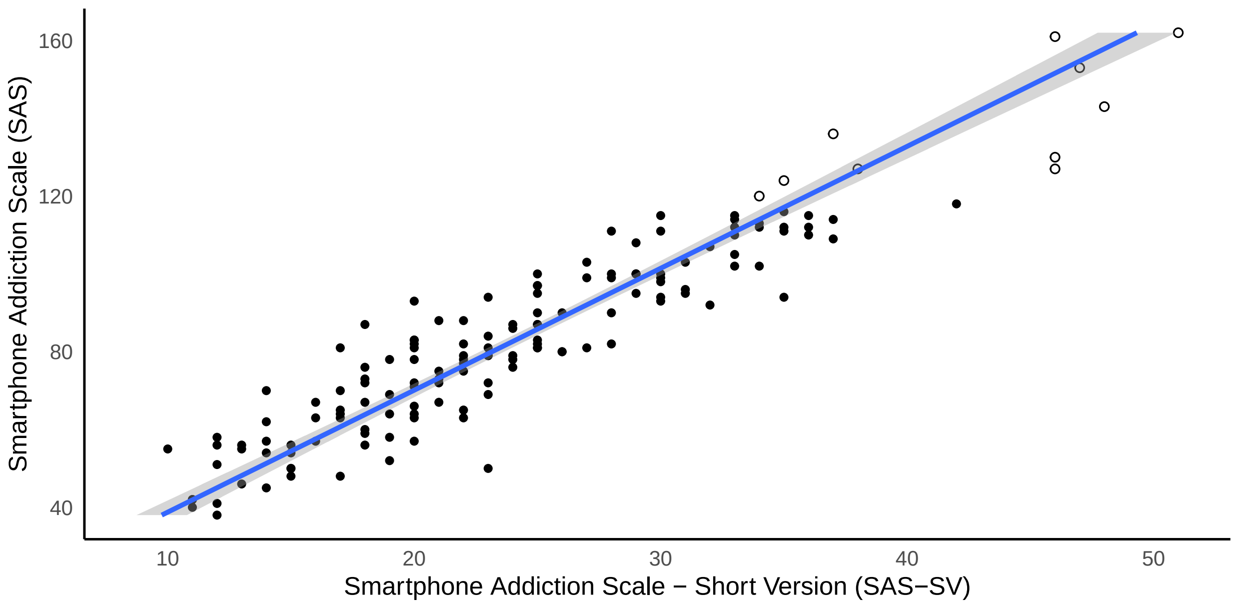

Figure A1: Smartphone Addiction Scale (SAS) and its short version (SAS-SV), based on raw data from Harris and colleagues (2020). The scales showed a strong linear relationship, allowing us to translate SAS scores to estimated SAS-SV scores. Filled dots show data within range of observed SAS averages.

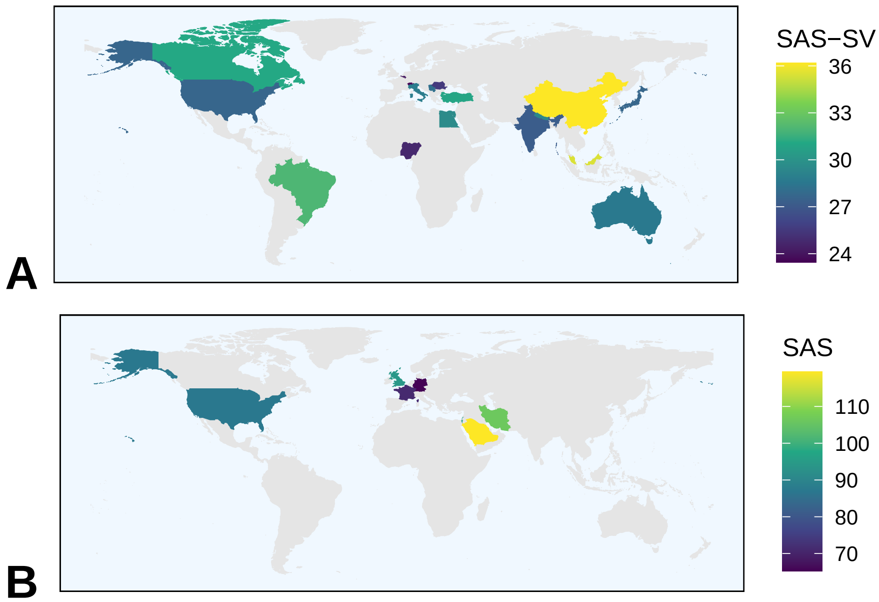

Figure A2: Pooled average of most recent year of eligible problematic smartphone use scores (SAS-SV in A and SAS in B) by country.

Table A1: Studies and subsamples used in meta-analysis. Values show means ± standard deviations, with range in parentheses. Tildes (∼) show averages estimated by the midpoint of the range.

Measure	Country	Citation	*N*	% female	Age	SAS or SAS-SV
SAS-SV	Australia	(Winskel et al., 2019)	270	78	21.26 ± 2.55 (18–26)	28.61 ± 9.32
	Belgium	(Amez et al., 2020)	1889	53	18.78	24.24
	Brazil	(Andrade et al., 2020)	387	—	22.10 ± 5.07	32.00 ± 8.60
	Canada	(Olson et al., 2020)	475	70	21.07 ± 3.12 (18–35)	31.11 ± 8.96 (10–56)
	China	(Elhai, Yang, Fang, et al., 2020)	1034	65	19.34 ± 1.61	34.92 ± 11.39
	China	(Elhai, Yang, Rozgonjuk, et al., 2020)	1097	82	19.38 ± 1.18	37.36 ± 9.54
	China	(Long et al., 2019)	677	41	16.79 ± 0.72 (15–19)	34.10 ± 9.10
	China	(Wang et al., 2019)	724	43	16.79 ± 0.91	34.20 ± 9.10
	China	(Yang et al., 2019)	475	44	19.77 ± 1.11 (16–27)	36.70 ± 7.55 (10–60)
	China	(Lachmann et al., 2018)	612	26	21.55 ± 2.44 (18–32)	34.20 ± 9.30
	China	(Liu & Ma, 2018)	465	69	18.83 ± 1.08 (16–24)	31.13 ± 9.38
	China	(Montag et al., 2018)	61	34	22.34 ± 2.29	34.43 ± 9.01 (14–52)
	China	(Wang, Lei, et al., 2018)	655	45	16.80 ± 0.74 (15–19)	34.70 ± 8.70
	China	(Wang, Nie, et al., 2018)	748	56	16.80 ± 0.73 (15–19)	34.10 ± 9.10
	China	(Wang et al., 2017)	768	56	16.81 ± 0.73 (15–19)	34.00 ± 6.90
	China	(Yuchang et al., 2017)	297	45	20.24 ± 1.08 (17–24)	23.74 ± 7.49
	Egypt	(Elkholy et al., 2020)	200	58	21.23 ± 1.99 (17–27)	29.54 ± 10.92
	Egypt	(Karkusha et al., 2019)	100	—	21.08 ± 1.86 (19–24)	33.97 ± 7.47
	India	(Bhalerao et al., 2020)	178	56	19.28 ± 0.93	27.20 ± 9.65
	India	(Dharmadhikari et al., 2019)	195	51	20.23 ± 1.63 (17–27)	31.59 ± 9.89 (10–57)
	India	(Nowreen & Ahad, 2018)	212	—	19.76 (17–22)	27.16
	Italy	(Pasquale et al., 2017)	633	55	18.00	28.82 ± 8.90
	Japan	(Tateno, Teo, et al., 2019)	487	73	19.60 ± 1.50 (18–28)	29.60 ± 8.80 (10–59)
	Japan	(Tateno, Kim, et al., 2019)	573	69	19.30 ± 1.30	26.10 ± 10.00
	Malaysia	(Tan & Arshat, 2019)	400	67	22.98 ± 1.55	35.43
	Nepal	(Karki et al., 2020)	250	61	19.70 ± 1.68 (18–29)	29.41 ± 8.94
	Nigeria	(Ayandele et al., 2019)	500	52	21.95 ± 2.88 (16–32)	24.73 ± 8.77
	Nigeria	(Akodu et al., 2018)	77	43	21.94 ± 2.40	31.39 ± 7.82
	Romania	(Cocoradă et al., 2018)	717	65	19.80	25.52 ± 9.57
	Saudi Arabia	(Venkatesh et al., 2017)	189	47	23.29	36.29
	Serbia	(Randjelovic et al., 2020)	77	—	∼ 21 (20–22)	28.16 ± 1.69 (10–53)
	South Korea	(Winskel et al., 2019)	119	50	20.64 ± 1.71 (18–26)	31.62 ± 9.69
	Switzerland	(Haug et al., 2015)	1519	52	18.20 ± 3.60 (15–21)	23.45 ± 8.34
	Turkey	(Can & Tuna, 2020)	104	50	20.15 ± 1.32 (18–24)	29.87 ± 10.82 (11–58)
	Turkey	(Celikkalp et al., 2020)	502	71	21.20 ± 1.86	31.89 ± 9.90
	Turkey	(Çevik et al., 2020)	677	74	20.20 ± 2.12	30.62 ± 10.42
	Turkey	(Ozer, 2020)	139	42	19.88 ± 1.59 (18–26)	29.51 ± 10.15
	Turkey	(Satici & Engin Deniz, 2020)	320	52	21.06 ± 1.76 (18–26)	30.46 ± 10.63
	Turkey	(Sönmez et al., 2020)	682	74	20.76 ± 1.72	31.40 ± 10.17
	Turkey	(Yalcinkaya et al., 2020)	63	62	22.84 ± 1.86 (18–25)	28.47 ± 10.43
	Turkey	(Coban, 2019)	325	57	22.38 ± 3.15	32.32 ± 9.80
	Turkey	(Selçuk & Ayhan, 2019)	408	81	20.13 ± 2.43 (18–32)	29.41 ± 10.08 (10–60)
	Turkey	(Soyer, 2019)	1298	48	20.61 ± 1.67 (18–24)	31.19 ± 10.36
	Turkey	(Konan et al., 2018)	330	64	∼ 22 (20–24)	28.22 ± 11.41 (10–60)
	Turkey	(Zencirci et al., 2018)	1492	—	20.40 ± 1.70 (18–24)	26.00 (10–60)
	Turkey	(Aker et al., 2017)	494	76	20.22 ± 1.11	28.91 ± 11.34
	Turkey	(Çizmeci, 2017)	344	70	∼ 24 (18–29)	29.11 ± 8.23
	Turkey	(Sanal & Ozer, 2017)	157	46	18.94 ± 0.96	26.83 ± 12.31
	United States	(Elhai, Gallinari, et al., 2020)	316	67	19.21 ± 1.74 (18–25)	27.41 ± 9.41
	United States	(Elhai, Yang, Dempsey, et al., 2020)	286	63	19.72 ± 2.60 (18–25)	27.88 ± 9.41
	United States	(Elhai, Tiamiyu, et al., 2018b)	296	57	20.00 ± 3.02	27.08 ± 10.15
	United States	(Elhai, Tiamiyu, et al., 2018a)	68	65	19.75 ± 2.03 (18–25)	25.82 ± 10.57

Measure	Country	Citation	N	% female	Age	SAS or SAS-SV
	United States	(Elhai, Levine, et al., 2018)	261	77	19.73 ± 3.52	26.31 ± 10.35
SAS	France	(Rémond & Romo, 2018)	432	51	21.94 ± 5.51	71.01 ± 28.71
	Germany	(Lachmann et al., 2019)	612	71	23.55 ± 5.92	65.22 ± 24.72
	India	(Bhatt & Gaur, 2019)	320	79	21.00	108.00
	India	(Rao et al., 2019)	341	72	18.92 ± 1.65	100.64 ± 28.16
	India	(Sethuraman et al., 2018)	192	67	18.15 ± 0.74 (17–20)	101.26 ± 26.30
	India	(Shah & Sheth, 2018)	100	76	21.80 ± 1.29 (20–25)	102.49 ± 22.15
	India	(Kurugodiyavar et al., 2017)	240	41	19.90 (18–24)	102.93 ± 22.13 (33–166)
	India	(Soni et al., 2017)	511	42	16.50 ± 2.58	79.10 ± 12.44
	Iran	(Mokhtarinia et al., 2020)	100	58	24.46 ± 4.14	106.19 ± 29.25
	Israel	(Turgeman et al., 2020)	140	48	26.33 ± 3.38 (22–35)	96.22 ± 33.56
	Israel	(Turgeman et al., 2020)	60	73	23.83 ± 2.22 (19–30)	95.70 ± 25.89 (38–196)
	Israel	(Ben-Yehuda et al., 2016)	40	50	24.10 ± 1.87 (21–29)	85.22 ± 22.56 (41–140.67)
	Malaysia	(Ithnain et al., 2018)	369	—	19.32 ± 0.98 (19–30)	102.52 ± 21.07
	Saudi Arabia	(AlAbdulwahab et al., 2017)	78	50	21.30 ± 1.70	119.40 ± 20.70
	South Korea	(Choi et al., 2015)	448	60	20.89 ± 3.09	68.46 ± 24.95 (33–198)
	South Korea	(Choi et al., 2014)	448	60	20.94 ± 2.86	68.70 ± 23.84
	Turkey	(Cerit et al., 2018)	214	80	20.39 ± 1.45 (18–26)	86.43 ± 29.66
	Turkey	(Dikeç & Kebapçı, 2018)	265	56	21.04 ± 2.63 (18–24)	84.88 ± 22.96
	Turkey	(Yayan et al., 2018)	788	58	20.80 ± 2.67	90.58 ± 29.44 (33–167)
	Turkey	(Darcin et al., 2016)	367	62	19.50 ± 1.15	88.38
	Turkey	(Demirci et al., 2015)	248	64	20.50 ± 2.45	75.68 ± 22.46
	Turkey	(İnal et al., 2015)	66	76	20.97	84.86 ± 13.07
	Turkey	(Demirci et al., 2014)	301	56	20.59 ± 2.35	75.76
	United Kingdom	(Ellis et al., 2019)	238	52	31.88 ± 11.19	94.20 ± 30.17
	United States	(Elhai, Rozgonjuk, et al., 2020)	295	72	19.70 ± 3.97	88.37 ± 22.95
	United States	(Harris, McCredie, et al., 2020)	150	67	19.20 ± 1.20 (18–24)	84.29 ± 25.03
	United States	(Volungis et al., 2019)	150	83	19.28	93.23 ± 19.00 (38–148)
	United States	(Wolniewicz et al., 2019)	297	72	19.70 ± 3.96	91.52 ± 23.95 (33–157)
	United States	(Elhai, Vasquez, et al., 2018)	298	77	19.45 ± 2.17	93.47 ± 25.30 (34–164.28)
	United States	(Rozgonjuk et al., 2018)	101	76	19.53 ± 4.31	94.00 ± 24.08 (41–146)