

Subjective Well-being and Social Media Use in Emerging Adulthood: Findings from two UK University Millennial Cohorts

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Abstract

The notion that engagement with social media platform reduces adolescents' and young adults' well-being has become a recurring feature in public and scientific discourses. The actual level of psychological and behavioural evidence, however, is in stark contrast with the certainty voiced by many commentators. There is little clear-cut evidence that social media engagement reduces adolescents' & young adults' wellbeing, and most conclusions are drawn from exploratory studies mainly focusing on the Facebook microblogging usage, a 15 years' old functionality that British adolescents and young adults (18-25 years' old) have, to date, abandoned en masse. The present research independently collected two nationally large-scale data sets from the British Isles (total N = 600 after data exclusions) and included detailed self-reports of social media use on numerous platforms. We used measures of subjective wellbeing and life satisfaction drawn from OECD surveys and assessed social cognitive dimensions (e.g., social comparison). The research makes use of both data mining tools and confirmatory designs to bring analytical improvements to a growing research area. We found robust evidence for several negative associations between social media engagement and adolescents' and young adults' well-being. Those findings on the behavioural consequences of social media usage raise further issues relevant to many actors in the community: for the academic researchers, for the technology industry, and also for the community organizers as any society has to understand how it is shaped by technological change. The present results are particularly relevant for making the most effective use of citizens' engagement in future e-government systems.

Keywords: Well-being, Life satisfaction, Social media.

JEL classification: M30, I31.

1. Introduction

Throughout human history, the introduction of new communication technologies has had a repeated radical effect on human behaviour, and has triggered numerous adaptations. For instance, in Plato's *Phaedrus*, Socrates sounded the alarm at the impending societal crash that would be caused by a literate society whose memory would be weakened by the ability to read, write, and always on the pursuit of information. Two millennia later, similar fear was also present in inquisition defenders' belief that the printing press was a threat to culture, social order and morality. Nowadays, such concerns may still influence current deliberation on the

effects of social media engagement on human behavior, but also substantiate the present research efforts.

Currently, we are still in a relatively early stage of a continuous digital transformation of society hence the impacts of such innovation are difficult to grasp. Since the turn of the century, social media platforms have become the primary vector of communication for adolescent and young adults in the UK and elsewhere (Anderson & Jiang, 2018). Undoubtedly, the usage of social media can lead to positive outcomes in terms of social support or access to knowledge, and has created a radical new way for young people to meet, share information, and entertain themselves. However, a mounting body of evidence suggests an association between social media use and poor mental health among young people (Verduyn *et al.*, 2017; Kelly *et al.*, 2018), as well as a gender imbalance in these adverse outcomes, with girls being more affected than boys (Booker *et al.*, 2018). What could be the potential roots of this association? Here, we propose an interaction of multiple pathways at the individual, interpersonal and cultural levels.

At the *individual level*, a brain imaging study by Sherman *et al.* (2016) has revealed that the number of “likes” an Instagram post has gathered automatically changes its attractiveness to adolescent viewers. This effect relies on a mechanism deeply rooted in the brain. Functional MRI showed that when participants saw a highly rated image, neural reward circuitries (the *nucleus accumbens* in the Basal Ganglia) were more active, which would suggest that the picture was associated with being better irrespectively of the content. Here, brain research suggests that a simple constraint on neurocognitive processing can explain why teenagers react so strongly to what they consider “endorsement” of content.

At the *interpersonal level*, Sherlock & Wagstaff (2018) showed that excessive Instagram use might lead to adverse psychological outcomes and poor appearance-related self-perception; these effects would be mediated by an idiosyncratic propensity to engage in social comparison. In other words, over-usage of Instagram would lead to self-perception issues because it would increase one’s tendency to compare themselves with others. It is difficult to imagine how the founders of Instagram, Snapchat or Facebook could have predicted that their creation would hedge on cognitive and socio-cognitive processes that can facilitate the development of poor subjective well-being at a critical age when emerging adults are particularly vulnerable (McLaughlin & King, 2015). However, developmentally speaking, it wouldn’t be hard to guess why teenage and young adult users of such platforms would be more at risk for adverse effects than others. Moreover, the fact that depressed young people tend to carry this fragility with a higher risk of developing mental health problems throughout their lives (de Girolamo *et al.* 2007) poses a global challenge to population wellbeing and calls for robust scientific investigations.

Finally, at a *cultural/societal level*, there is a need to understand the potential intervening pathways that relate young people’s wellbeing to social media usage to plan for remedial or educational interventions, to inform policy-making with evidence-based data, and to shape the way marketers can sustainably and ethically use these media in order to promote products and services. Two thousand five hundred years ago, Aristotle argued that the ultimate goal of democracy is to maximize people’s wellbeing. In contemporary times, the scientific measurement of one’s wellbeing is considered a useful metric to assess society’s response to social, economic & technological changes. This information can be used by policymakers and economists to appraise the effects of interventions and stimuli (Dolan & Metcalfe, 2012), and by innovators or marketers when forecasting new products. In order to make our measurement of well-being domain-independent and more relevant to the study of the psychological impact of social media usage, we concentrate on an original dimension of well-being: Eudaimonia, the worthwhileness of things in life (Dolan & Metcalfe, 2012). Eudaimonic theories understand humans as having complex, high-level psychological needs (control, meaning, autonomy, need

for connection) that contribute to well-being independently of the pleasure they can bring (Ryff, 1989; Ryff & Keyes, 1995).

We collected data from two cohorts of emerging adults (age 18-24), students in the UK, to assess whether social media and online engagements are associated with decreased subjective wellbeing (in its experiential, evaluatory and eudaimonic aspects). Additionally, we explored the potential explanatory pathways for the observed association, such as self-esteem, online harassment, sleep quality, and social comparison.

2. Methods

Data from two samples of 300 emerging adults (59% female, age 18-24, students, resident in the British Isles) were collected. Independent data collections allowed assessing results' robustness through internal replication, a routine methodological procedure in biomedical research for correlational design (Boy *et al.*, 2010a, Boy *et al.*, 2010b, Boy *et al.*, 2011). Participants were selected from Prolific Academic (PA) crowdsourcing participant pool. Unlike alternative providers, PA applies *higher* and more stringent standards when vetting potential subjects that reduce the likelihood of Bots-generated responses (Bradley, 2018). The present dataset was collected between 29/05/2019 and 10/06/2019. We analyzed data from 600 participants answering 58 questions described in Table 1.



Figure 1. Respondents' IP address approximate geolocation. These geolocations are generally considered accurate at the city level. The present datasets were collected between 29/05/2019 and 10/06/2019

Table 1. Measures used in analysis

Measure	Questionnaire items	Analysis variable
Subjective Well-being (SWB)	Evaluation measures: 9 questions about general life satisfaction plus domain satisfaction (e.g., personal relationships, physical health, mental WB, work situation, financial situation, are, free time, finances) Experience measures: Affect over a short period "Overall, how happy did you feel yesterday?"; "Overall, how worried did you feel yesterday?" Eudaimonic measures: Worthwhileness of thing in life "Overall, how worthwhile are the things you do in life?" (All measures adapted from Dolan & Metcalfe, 2012)	* 1-10 Likert scales slider (Strongly Agree/Strongly Disagree)
Social Media & General Online Engagements	Respondents were asked (example questions): "On a normal weekday during term time, how many hours do you spend on social networking apps online, such as Facebook, Twitter, Whatsapp?"** "On a typical day/week, list all the social networking apps where you post pictures, photos or messages on?"***; "How many hours do you spend online on a typical week/weekend day" **;	* 1-10 Likert scales slider (Strongly Ag./Strongly Dis.) ** Numeric, open-ended *** Transformed into the number of social app used
Social comparison Orientation	Social comparison SC is defined as the extent to which individuals pay attention to and base their behaviour on the way others behave. The present research used the Social Comparison Orientation scale (Gibbons & Buunk, 1999)	* 1-5 Likert scales slider (Strongly Agree/Strongly Disagree)
Online harassment	As Receptor: "How often have you received unwanted or nasty e-mails, text, pictures or messages?" (Adapted from Kelly <i>et al.</i> , 2018) As Perpetrator: "How often have you sent/posted unwanted or nasty e-mails, text, pictures or messages?" (Adapted from Fahy <i>et al.</i> , 2016)	Two 5-category variables were created: all/most of the time; often; a little of the time; and none of the time.
Self-esteem	We calculated a Self-esteem index through the summation (signed) of the scores at the items of the Rosenberg scale: "On the whole, I am satisfied with myself."	* 1-5 Likert scales slider (Very much so/Not at all)
Sleep Quality	A sleep quality index was constructed from answers to question pertaining to sleep duration, sleep latency, number of sleep interruptions over the last week (Adapted from Kelly <i>et al.</i> , 2018)	* 1-5 Likert scales slider (Most of the time/None of the time)

To examine how much markers of social comparison, online harassment, sleep quality, body image and self-esteem explain the strength of association between social media engagement and subjective well-being we ran a correlation analysis and modelling of the intervening pathways with a structural equation. Analyses were carried out in R and SPSS/AMOS.

3. Results

3.1. Is social media engagement robustly associated with lower wellbeing in emerging adulthood?

The negative association between social media engagement during weekdays (WD) or at weekends (WE) and the eudemonic dimension of well-being (worthwhileness of life) was strong ($r_{WD-EU} = -.32$, $t_{598} = 5.84$, $p < 1.76e^{-8}$; $r_{WE-EU} = -.29$, $t_{598} = 5.15$, $p < 5.66e^{-7}$). We assessed the robustness of those relationships by computing them separately for each of the two independent cohorts ($r_{S1:EU-WD} = -.30$, $r_{S2:EU-WD} = -.33$). Interestingly, decreases in sleep quality (SLQ) and self-esteem (SEI) indexes were also associated with higher social media engagement (WD & WE; all $r_s > .14$, all $p_s < .05$). Rather surprisingly, no negative associations were found between online engagement measures and a global satisfaction with mental well-being ($r_{MW-WD} = .02$, $p = NS$; $r_{MW-WE} = .04$, $p = NS$).

Table 2. Intercorrelation table between the primary variables of interest (for readability only the Eudaimonic dimension (EU) of wellbeing is presented, other measures will be included in forthcoming PCA and Structural Equation Modelling analyses. Significant correlations ($|r|_{(598)} = .1040$, $p < .05$, 2-tailed & Bonferroni corrected) are highlighted in red and blue. EU: Eudaimonia; SC: Confidence in using social media; WD: Weekdays social media engagement; WE: Weekend social media engagement; SLQ: Sleep Quality Index; BWS: Body weigh satisfaction; AGS: Age at which participants started going online; AGD: Age at which participants owned their first internet-capable device; SLQ: Sleep quality index; SEI: Self-esteem index; SCI: Social comparison Index; EXIN: Experience with the internet (in years); EXDE: Experience with connected devices (in years); SEI: Index of self-esteem (from Rosemberg scale); SCI Index of social comparison; HER: Frequency of online harassment (as perpetrator); HER: Frequency of online harassment (as victim); EXAM: number of SM platform used to post content over the course of a day

	MW	SC	WD	WE	EXA	PPW	EXI	EXD	AG	GEN	BWS	SLQ	SEI	SCI	HED	HER
EU	.01	.07	-.32	.29	.08	-.02	-.11	-.02	.03	.05	.12	-.26	.45	.40	-.09	-.05
MW		.02	.02	.04	-.04	-.05	.04	.05	.02	.00	.07	.00	.04	.08	-.02	-.05
SC			.08	.06	.10	.07	.07	.07	.00	.02	-.01	-.07	.10	.09	.05	.05
WD				.70	-.03	-.02	.10	.07	.03	-.16	-.03	.14	.15	.10	.02	.02
WE					-.08	.04	.08	.03	.10	-.15	-.03	.16	.19	.10	.04	.04
EXA						-.06	.17	.09	.17	.03	.05	-.07	.08	.02	-.04	-.01
PPW							-.15	-.14	.24	.11	-.12	.05	.04	.01	.09	.03
EXI								.62	.63	-.04	.04	.03	.03	.18	-.06	-.02
EXD									.65	.03	.13	-.07	.05	.04	-.03	.00
AG										.03	.12	-.04	.06	.26	-.10	-.09
GEN											.17	-.06	.01	.02	-.04	-.07
BWS												.02	.01	.49	.02	-.05
SLQ													.28	.33	.08	.00
SEI														.73	.16	.02
SCI															.17	.01
HED																.36

3.2 Are markers of social comparison, sleep quality, body image and self-esteem actors in the pathways from social media engagement to well-being?

A multiple regression was run to predict Eudaimonic well-being from social media engagement, the number of social media used, the age at which the participant started to use social media, and the number of image posted per week. These variables, except for the number of pictures posted per week, significantly predicted well-being, $F(4, 595) = 21.818, p < .001, R^2 = .128$. All variables added statistically significantly to the prediction, $p < .05$.

The matrices of covariance from sample 1 and sample 2 were separately modelled in a structural equation (SEM); Fig. 2 gives a graphical indication of the overall strength of the pathways (Dataset 1: $N = 300, RMSEA = .074$, Dataset 2: $N = 300, RMSEA = .085$). Both path models obtain acceptable standardized root mean square residual (sRMR) indices: Sample 1: $sRMR = .076$, Sample 2: $sRMR = .081$ (Hu and Bentler, 1999). Even though those measures of fit are not exceptionally good, the reasonable general path structure of the SEM found for sample 1 is replicated in that modelled for sample 2.

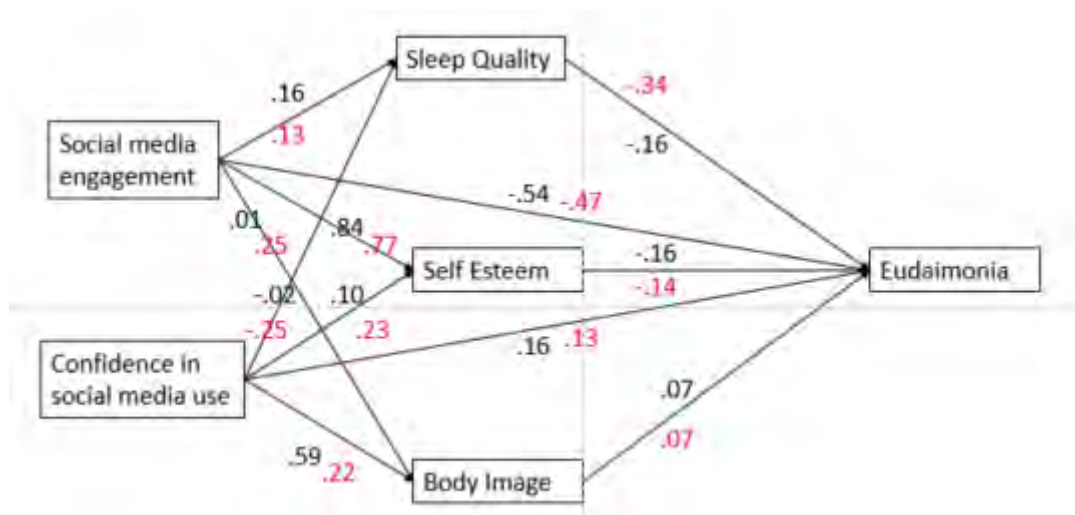


Figure 2. Social media engagement and confidence and Eudaimonic well-being – summary of path analyses and internal replication (coefficients of correlation, black: sample 1, red: sample 2, black).

4. Discussion

Among a cohort of 18-24-year old living in the United Kingdom, we found a negative association between social media engagement and the Eudaimonic aspect of wellbeing, a judgement of the worthwhileness of things in life. Data from two samples/cohorts showed that the higher their social media engagement, the lower their judgment that, overall, things they do in life were worthwhile. What implications does this result have on one's engagement with day-to-day life, planning for the future, and motivation to achieve the plans made? The present findings are relevant to two contemporary and timely issues: the discussion on the profound adverse effects of social media engagement on psychological wellbeing, and a more general debate around the sustainable development of digital technology and its societal effects.

Digital technology is transforming our lives at an accelerating pace. This feels at the same time both wildly liberating and terrifying, as cyberspace is disorienting and can trigger changes in the way humans process and interpret sociocognitive signals. The associations between social media use and life satisfaction, mental health or well-being are more complex and nuanced than initially thought: they are inconsistent, possibly dependent on gender and the methodology employed to study them. The conclusion might also be affected by underpowered

research designs and publication bias. Where the best research practices are respected, most effects size are small and are not significant in more than half of papers (Orben et al., 2019). That understood, some effects are worthy of further investigations.

We have found a robust relation between social media engagement and eudaimonic well-being, and that pleads for further work. We are currently addressing this issue while looking at individual differences in gender and personality. Of particular interest is the mediating effect of social comparison on the relationship between Instagram usage and a range of indicators related to mental well-being (Sherlock & Wagstaff, 2018). This effect is not a novelty, and the detrimental effects of Facebook-induced social comparison on mental health had already been documented at a relatively early stage in the development of social media (Kramer, Ingledew & Iphofen, 2007). More recently, Nesi & Prinstein (2015) found that such Facebook and Instagram-induced social comparison had a carry-over effect on the intensity of depressive symptoms observed one year later. The mechanism by which Instagram “likes” are interpreted as rewarding/reinforcing stimuli by the brain (Sherman *et al.*, 2016) is potentially a driver of effects observed at the social and individual levels.

Routinely, the social media industry claims that it is taking these issues on-board, but it is difficult to gauge their seriousness and their actual understanding of the pervasive effects on mental well-being. Recently interrogated about a highly-publicized case of an adolescent girl suicide, where distressing material about depression and self-harm was found in her Instagram feed, Facebook’s vice-president of global affairs assured that a technical solution physically blurring such content was now implemented (BBC.co.uk, 2019). However, this reassuring declaration was somewhat tarnished, rapidly moving on to accusation of a rampant “tech-phobia” in society and an appeal to individual responsibility when handling social media platforms. It is apparent that the industry has more work to do before being trusted.

Conclusion

As knowledge accumulates, the effects of social media are better characterised, but there are still many unknowns, and the fast development cycle of social apps and technology make it challenging to define the problems and strategically tackle them. When facing this complexity, it is critical that independent academics, policymakers, and industry scientists collaborate more closely. It is solely with the researchers’ circumspection, methodology and transparency that the global community can provide social media companies, marketers and policymakers with the reliable insights they need on a matter most often characterized by media hysteria. As suggested by Bell *et al.* (2015), the field needs less shock and more substance. The fair scientific appraisal of the evidence will only be possible if social media companies and large commercial organizations using them, come to support independent, large-scale, open science by allowing access to users’ data. Only then will we be able to understand the forces shaping the young generation in the digital age, and therefore become a source of evidence for improving the internet and its (self-) regulation.

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