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Revealing the Complex Relationship between Social Media use, Social Comparison Orientation and Optimism on Health Outcomes

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Abstract

The study assessed the influence of social media use (SMU), social comparison orientation (SCO) and optimism on wellbeing, mood and sleep quality. SCO is important because of the value of comparative information in SMU. SCO and optimism were tested as mediators between SMU and mood and wellbeing, and optimism as a moderator on the effect of SCO on mood. An online survey and correlational design were used with a convenience sample (n=306). In terms of SMU, only passive Instagram featured as a predictor of anxiety. Optimism was the strongest predictor in enhancing wellbeing, mood and sleep quality. SCO was a predictor of adverse anxiety and wellbeing. Optimism moderated against the impact SCO had on anxiety, and optimism and SCO were mediators between SMU and wellbeing and anxiety. SCO adversely affected mood and wellbeing. Optimism predicted good sleep quality and it functioned by affecting how comparative information was processed. Understanding this better, in relation to SMU, is likely to promote healthier online interactions.

Keywords: Social Media Use; Optimism; Social Comparison Orientation; Sleep Quality; Wellbeing; Mood; Health; Anxiety; Frequency; Psychological Wellbeing; Sleep Quality

Abbreviations: SMU: Social Media Use; SCO: Social Comparison Orientation; Who: World Health Organisation; SME: Social Media Engagement; SMA: Social Media Activity SCOM: Social Comparison Orientation Measure; WEMWBS : Warwick-Edinburgh Mental Well-Being Scale; HADS: Hospital Anxiety and Depression Scale; PSQI: The Pittsburg Sleep Quality Index

Introduction

Wellbeing is a "state of complete physical, mental and social wellbeing and not merely the absence of disease and infirmity" (World Health Organisation 2006, p106) [1]. While critics question the assumption of 'completeness' as integral to wellbeing, the definition highlights the critical role of psychology in wellbeing. Adverse wellbeing effects mood and sleep quality (Linton & Bryngelsson, 2000; Matricciani et al., 2017)[2,3]. Research has explored the frequency and duration that individuals spend on SMU and its association with adverse health outcomes (Przybylski et al., 2013)[4] and time on devices (e.g., smart phones and tablets) has been associated with poor sleep quality (Matricciani et al., 2017) [3]. A review on SMU, sleep and wellbeing, concluded that SMU is better understood as a range of more subtle factors (Scott & Woods, 2019) [5]. Yang (2016)[6] developed a scale to measure these more subtle types of social media activity (SMA), called passive (e.g., checking profiles), active (e.g., sharing information) and interactive (e.g., commenting). In a survey of 208 undergraduate students, Yang (2016)[6] found that each type of interaction was predictive of loneliness. However, the literature on the relationship between loneliness, psychological wellbeing and SMU is mixed. Some found that SMU offered a social connection and lowered loneliness (e.g., Verduyn et al., 2017)[7], while others reported increased loneliness (e.g., Yang, 2016) [6]. A review by Verduyn et al.,(2020)[8] found that active engagement (e.g., commenting/liking content) was predictive of enhanced psychological wellbeing and Kross et al., (2021) [9] found that active SMA increased social support, positive feedback comments and user wellbeing. This suggests measuring more nuanced SMA is important.

Social Comparison Orientation and Optimism

The relationship between SMU and wellbeing, mood and sleep quality are, however, more complex than a simple direct

association. Two important factors affecting this are SCO and optimism. Social comparison theory (Festinger, 1954)[10] describes the tendency for one to make comparisons with others' experiences and accomplishments. Those high in SCO tend to be high in self-consciousness, neuroticism, and low self-esteem, as well as socially oriented and responsive to social signals (Buunk & Gibbons,2006)[11]. The importance of SCO is magnified in SMU where platforms are designed to make visible the lives and experiences of users, enabling instant comparisons (Yang,2016) [6]. Upward comparisons involve comparing oneself with those more accomplished. Downward comparisons involve assessments against others less accomplished. However, as most posts and content are highly selective and positive, the system is set for upward comparisons. While there might be a boost to self-esteem where similarities are found, such comparisons frequently lead to envy, low self-esteem and low mood (Twenge et al., 2018; Vogel, Rose & Roberts, 2014) [12,13].

Park and Baek (2018) [14] argued the effect of SCO on psychological health can be positive and negative from both upward and downward comparisons. Smith (2000)[15] developed a scale to measure these different types of SCO, two upward sub-scales and two downward with positive and negative emotional components in each. Park and Baek (2018) [14] tested these and found that the emotions triggered by such comparisons were the mediator between SCO and satisfaction with life. Tosun and Kasdama (2019) [16] found that SMA, specifically passively engaging on Facebook, was positively associated with depression, but that this was mediated by the nature of the SCO. Specifically, by upward assimilative comparisons (i.e., where one attempts to draw inspiration or optimism through the comparisons made) and upward contrasting emotions (i.e., where one's emotional state contrasts negatively with that of others, inducing envy or sadness) (Park & Baek, 2018) [14]. The evidence suggests that SCO and the nature of the comparisons made, and the subsequent emotions evoked, can mediate between SMU and wellbeing and mood.

Optimism can be interpreted as an explanatory style, a way of interpreting success and failure and attributing outcomes in a way that leaves one feeling positive and in control (Seligman, 2002; 2012) [17,18]. Others conceive it as dispositional (Carver & Scheier, 2014) [19] but researchers in both camps agree that it represents a set of cognitive strategies, such as a tendency to more readily attend to positive events over negative ones (defensive optimism), to more frequently expect positive future outcomes (Liu et al., 2017) [20]; in interpreting disappointment as experiences one can learn from (Gibbons, 2008, 2022a, 2022b; Nes & Segerstrom, 2006) [21-23] and by imagining scenarios much worse (a catastrophizing fantasy) to lessen associated anxiety (Seligman, 2002) [17]. A metanalysis by Qi et al., (2012) [24] found that optimism was negatively associated with anxiety, depression and stress and positively associated with life satisfaction, self-esteem and positive affect. A number of studies also find optimism to be predictive of sleep quality (e.g., Hernandez et al., 2014; Leola et al., 2013; Uchino et al., 2017) [25-27].

Research exploring mediating influences on sleep quality has tested depression (the indirect path), between optimism and sleep (Lau et al., 2015; Uchino et al., 2017) [27,28]. However, Lau et al., (2015) [28]also tested optimism as a mediator between depression and sleep quality and found optimism was a stronger mediator than depression. They concluded that optimism is likely to induce better sleep because of its positive effects in reducing depressive mood, with depressive mood explaining poor sleep quality only insofar as it is associated with pessimism (Lau et al., 2015) [28]. Most of the research exploring the optimism-sleep relationship is cross-sectional. Lau et al., (2017) [28] adopted a longitudinal design following up a sample of 4,245 undergraduate students in Hong Kong across three test periods over two years. The study replicated the findings of cross-sectional research - that optimism mediated between sleep quality and mood and optimism measures taken at the start of the study was the strongest predictor of sleep quality 19 months later.

Liu et al., (2017) [20] found optimism influenced SMU: They maintained that because individuals high in optimism more readily draw favourable comparisons and because it is more readily associated with more positive health outcomes, optimism is likely to act as a mediator between SCO and health outcomes, such as depression. Moreover, because of the cognitive strategies optimists use, in relation to how they process comparative information (Seligman, 2012) [18], it will buffer or moderate the influence of SCO on health-related outcomes. Liu et al., (2017) [20] surveyed 1205 university students and measured their SCO on social media. They found evidence for the moderating role of optimism on depression - those scoring high on optimism reported lower scores on depression and there was little change in depression scores, irrespective of their scores on SCO on social media. For those low in optimism, depression scores were higher and increased as upward social comparison scores increased. They additionally found evidence for optimism as a mediator between SCO on social media and depression, and SCO on social media and self-esteem. The authors concluded that optimistic thinking allows the individual to interpret comparative information in a way that reduces the negative effects of upward comparisons (Liu et al., 2017) [20].

Aims

The study aimed to: test the influence of SME and SMA (e.g., passive, active and interactive engagement on Instagram and Facebook) and SCO and optimism as predictors of sleep quality, mood and wellbeing (Qi et al., 2012; Uchino et al., 2017, Yang, 2016) [6,24,27]; to explore the separate mediating roles of SCO and optimism between SMA, SME and sleep, mood and wellbeing (Lau et al., 2015; Park & Beak, 2018; Tosun & Kasdama, 2019;

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Yang, 2016) [6,14,16,28], and the moderating role of optimism between SCO and mood (Liu et al., 2017) [20].

The following hypotheses were tested:

H_1 - There will be correlations between SME and SMA on wellbeing, mood and sleep quality.

H_2 - There will be correlations between SCO and optimism on wellbeing, mood and sleep quality.

H_3 - Optimism and SCO will mediate between SMU (SME and SMA) and mood, sleep quality and wellbeing.

H_4 - Optimism will have a moderating influence with SCO on mood.

Methodology

Participants, Ethics and Procedures

A convenience and snowball sample were obtained, (n =306), drawing on the researchers social media groups (Facebook, Instagram and WhatsApp). Age ranged from 18-79 years (M = 32.48, SD = 14.23). In terms of gender, 20.3% (n = 62) were male, 67% (n =205) were female. One participant identified as non-binary, and 12.1% (n =37) did not respond. Inclusion criteria were adults aged 18 and over who had and used a social media account. Surveys were completed via Qualtrics, between February-May 2022. The study was approved by the Ethics Committee of the host university. Participants received a brief and contact details for further clarification. Participation was voluntary and anonymous, and all acknowledged informed consent by checking the consent box on the online questionnaire before participating. All ethical considerations and methods were executed in accordance with the Declaration of Helsinki.

Measures

The questionnaire included 86 items. Information on demographics was gathered along with the measures used below. The Cronbach's alphas for all measures ranged from .624 to .924, suggesting all scales offered satisfactory to strong internal reliability:

Mood

The Hospital Anxiety and Depression Scale (HADS), (Zigmond & Snaith, 1983) [29], is a fourteen-item scale measuring mood - anxiety and depression. Each item is scored on a response-scale with four responses ranging between 0-3. An example item is: 'Worrying thoughts go through my head.' High scores indicate an adverse mood.

Wellbeing

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), (Stewart-Brown, 2007), measured wellbeing over the last month. The scale consists of fourteen items on a five-point Likert scale. An example item from this scale is: 'I have been feeling optimistic about the future'. High scores indicate positive mental wellbeing.

Sleep

The Pittsburg Sleep Quality Index (PSQI), (Buysse et al., 1989) [30], measured respondents' quality of sleep. The 0-3 frequency scale consists of nineteen items grouped into different factors, e.g., sleep quality, duration, disturbances. These were totaled. High scores indicate poor sleep quality.

Social Media Engagement (SME)

This measured the frequency and engagement with SMU. The response scales range from 'Not one day' (1) to Every day (7). Higher scores represent a higher level of engagement in activities. A sample item is: 'How often did you use social media when eating breakfast?' (Przybylski et al., 2013) [4].

Social Media Activity (SMA)

Respondents rated 11 items on a five-point Likert scale, measuring passive (e.g., reviewing and checking others' profiles), active (e.g., sharing information) and interactive (e.g., commenting and replying to others) social media use. An example item is: "How often do you comment on or reply to others' posts?" Higher scores indicated higher activity (Yang, 2016) [6].

Optimism

The Values in Action 'Hope' sub-scale was used (Park and Peterson, 2006) [31]. It includes eight items with a five-point Likert scale e.g., 'I always look on the bright side'. These are totaled and high scores indicate greater optimistic thinking.

Social Comparison Orientation

IOWA-Netherlands Comparison Orientation Measure (SCOM), (Gibbons & Buunk,1999) [32]uses a 5-point Likert scale with participants asked to indicate how well each statement applied to them e.g., 'I compare what I have done with others as a way to find out how well I have done something'. High scores indicated high SCO.

Statistical Analyses

Correlations were run to determine linearity, followed by hierarchical multiple regressions between those predictors significant with a given outcome measure. Normality checks (kurtosis, skewness, Q-Q plots and z-score distributions) indicated normality for all outcome measures (Ghasemi & Zahediasl, 2012) [33]. An interaction variable was computed to test the moderating effect of optimism on SCO (called SCOXOptimism). Table 1 tested the linearity assumption for the variables entered into the regression analyses. For mediation analyses, the significant SME or SMA predictors from table 1 were entered and in block two the mediator (SCO or optimism). This allows the direct (block one) and indirect (block two) path to be tested. Those significant were reported.

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Table 1: Correlations between predictors (SCO, optimism, SME, SMA) and anxiety, depression sleep quality and wellbeing.

	Poor Sleep Quality	Wellbeing	Anxiety	Depression
Social Comparison orientation (SCO)	.22***	-.32***	.42***	.15**
Optimism	-.39***	.67***	-.46***	-.51***
Social Media Engage (SME) Social Media Activity (SMA)	0.08	-.13*	.20***	0.07
Interactive Instagram	0.03	0.05	0.07	-0.06
Passive Instagram	0.02	-.14*	.23***	0.08
Active Instagram	-0.03	-0.01	0.04	-0.02
Interactive Facebook	-0.03	0.12	-0.05	-0.12
Passive Facebook	-0.01	0.07	0.03	-0.13
Active Facebook	-0.03	0	-0.02	0

Significance at *p<.1, **p<.05, ***p<.01

Results

Only those results significant or trending towards significance were entered into the regression analyses. Only with the analysis with anxiety was there evidence of moderation (Table 2). The final regression model explained 16.3% of the variance in global sleep or scores measuring poor sleep quality. The results indicated a significant effect between optimism and poor sleep quality, $F(1,168) = 34.001$, $p < .001$, $R^2 = .166$, Adjusted $R^2 = .157$). Optimism, $\beta = -.410$ ($p < .001$) was a significant predictor. The result offers partial support for H_2 (Table 3). The final regression model explained 53.7% of the variance in wellbeing scores. The results indicated there was a collective significant effect between both variables in the model and wellbeing, $F(2, 220) = 129.64$, $p < .001$, $R^2 = .541$, Adjusted $R^2 = .537$). The individual predictors were explored further and indicated that optimism, $\beta = .691$ ($p < .001$); SCO $\beta = -.132$ ($p = .006$) were significant predictors in the model. The results offer support for H_2 only (Table 4).

Table 2: Regression model for Poor sleep quality.

Model	Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta
1	Constant	15.952	1.47	
	Optimism	-0.457	0.078	-0.41

Table 3: Regression model for wellbeing.

Model	Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta
1	Constant	17.119	3.491	
	SCO	-0.155	0.056	-0.132
	Optimism	1.861	0.127	0.691

Table 4: Regression model for anxiety.

Model	Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta
1	Constant	14.31	2.112	
	SCO	0.139	0.035	0.255
	Optimism	-0.619	0.075	-0.502
	Passive instagram	0.209	0.122	0.107
	SCOXOptimism	0.032	0.009	0.207

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The final regression model explained 39.7% of the variance in anxiety scores. The results indicated there was a collective significant effect between the variables in the model and anxiety, F(4, 173) = 30.126, p<.001, R^2 = .411, Adjusted R^2 = .397). The individual predictors were explored further and indicated that optimism, β = -.502 (p <.001); SCO β = .255 (p <.001); passive Instagram β = .107 (p =.088); and SCOXOptimism interaction β = .207 (p <.001) were significant predictors in the model. The results offer partial support for H_1 and H_2 and support H_4 (Figure 1). As SCO increases, scores on anxiety increase for those low, average and high in optimism. Those high in optimism (the bottom line) score lower on anxiety compared to those average or low in optimism. This offers support for H_4 (Table 5). The final regression model explained 31% of the variance in depression scores. The results indicated there was a collective significant effect between optimism and depression, F(1, 230) = 103.34, p <.001, R^2 = .310, Adjusted R^2 = .307). The individual predictor was explored further and indicated that optimism, β = -.557 (p <.001) was significant in the model. The results offer partial support for H_2.

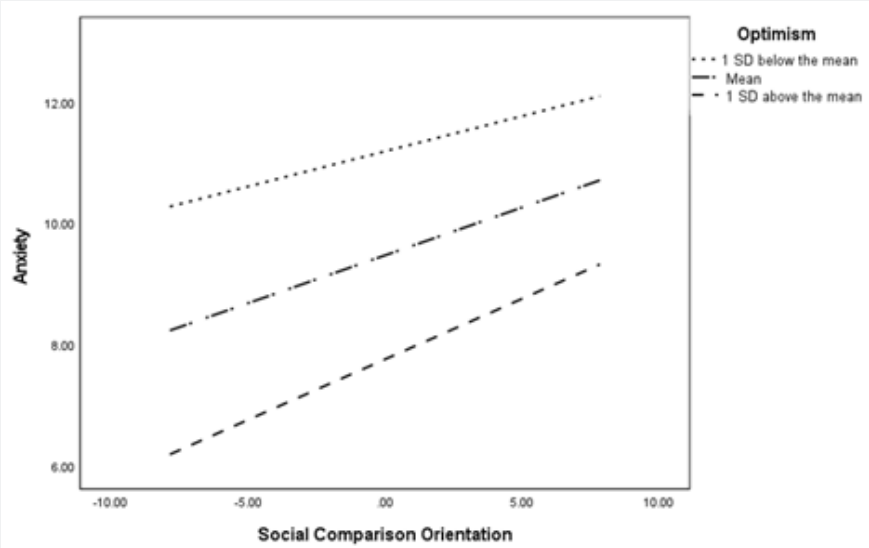

Figure 1: Slope graph testing the interaction between optimism and Social Comparison Orientation on anxiety.

Table 5: Regression model for depression.

Model	Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta
1	Constant	14.191	0.93	
	Optimism	-0.504	0.05	-0.557

Mediation Analyses Social Media Behaviour and Anxiety, and Wellbeing.

To test H3, only those correlations significant or trending to significance, between SME and SMA against anxiety and wellbeing (Table 1), were entered into a multiple regression. In block one the SME or SMA was entered and in block two the mediator (SCO or optimism). This allows the direct (block one) and indirect (block two) path to be tested. Only those significant are reported (Figure 2-4 and Table 6).

The mediation analyses reveal evidence of SCO and optimism as mediators between types of SMU and anxiety and wellbeing. The results offer partial support for H_3.

Discussion

It was expected that SME and the different SMA (passive, active and interaction) would be predictive of wellbeing, mood and sleep quality. The critical role of comparative information-processing online would indicate that SCO would be predictive, as would optimism, given the evidence of its efficacy in relation to in-person and online interactions. For the results with sleep quality (Table 2), only optimism featured - high scores on optimism being predictive of low scores on poor sleep quality. This result is consistent with Hernandez et al., (2014) and Lemola et al., (2013) [34,35]. Where wellbeing was the outcome measure (Table 3), both optimism and SCO were significant. Optimism explained a larger variance in wellbeing. This supports the Qi et al., (2012)[24]

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meta-analysis on the beneficial role of optimism on health and, consistent with Liu et al., (2017)[20]and Festinger's (1954)[10] conception of social comparison theory, a negative relationship was observed between SCO and wellbeing. The result indicated that the type of comparisons respondents made had an adverse impact on wellbeing. Given upward comparisons online are more frequent (Twenge, et al., 2018)[12], this finding suggests it was this type of comparison that accounted for the harmful effect of SCO on wellbeing (Vogel et al., 2015; Tandoc, Ferrucci & Duffy, 2015)[13,36].

For the regression with depression (Table 5), optimism was the only significant predictor and it negatively predicted depression scores. With just one predictor, the variance explained was large, suggesting it was an important coping ingredient and supports Qi et al., (2012) [24]. For the regression with anxiety (Table 4), optimism was the strongest predictor - increases in optimism predicted low anxiety. SCO was predictive and, as with wellbeing, it had an adverse effect on anxiety. This supports Liu et al., (2017)[20]. The only evidence for social media influencing any DV was with passive Instagram predicting anxiety. This is consistent with Yang's (2016)[6] finding in relation to passive Instagram use and loneliness. This model reported evidence of optimism as a moderator between SCO on anxiety (Figure 1). A positive relationship was observed between SCO and anxiety, irrespective of scores on optimism. However, the results revealed that those high on optimism scored lower on anxiety. This suggests that optimism acted as a buffer against the adverse effects of SCO on anxiety. Liu et al., (2017)[20] found the same pattern with depression. The results suggest that optimistic thinking allows the individual to interpret comparative information in a way that reduces its potentially negative effects. The value of comparative information-processing online gives SCO particular potency. This is indicated by its positive association with anxiety and supports Tosun and Kasdarma (2020)[16]. The value of optimism to act as a buffer suggests there is merit in the cognitive strategies, such as defensive optimism, catastrophizing fantasies and reframing, more frequently used by optimists (Gibbons, 2022, 2023a, 2023b) [22,37,38].

While the current study sought to explore the relationship between SCO and SMU, the items on the SCO scale are context free (Gibbons & Buunk,1999)[32]. They make no reference to the comparisons made online as distinguishable from in-person comparisons. The items, in fact, appear to be designed for in-person comparisons e.g. 'I often like to talk with others about mutual opinions and experiences' [item 7]. While most can be interpreted as relevant for virtual as well as in-person comparisons, its lack of specificity to social media may question its validity for this context and the results may reflect the importance of SCO in relation to anxiety for both in-person and virtual comparisons.

Mediation Analysis

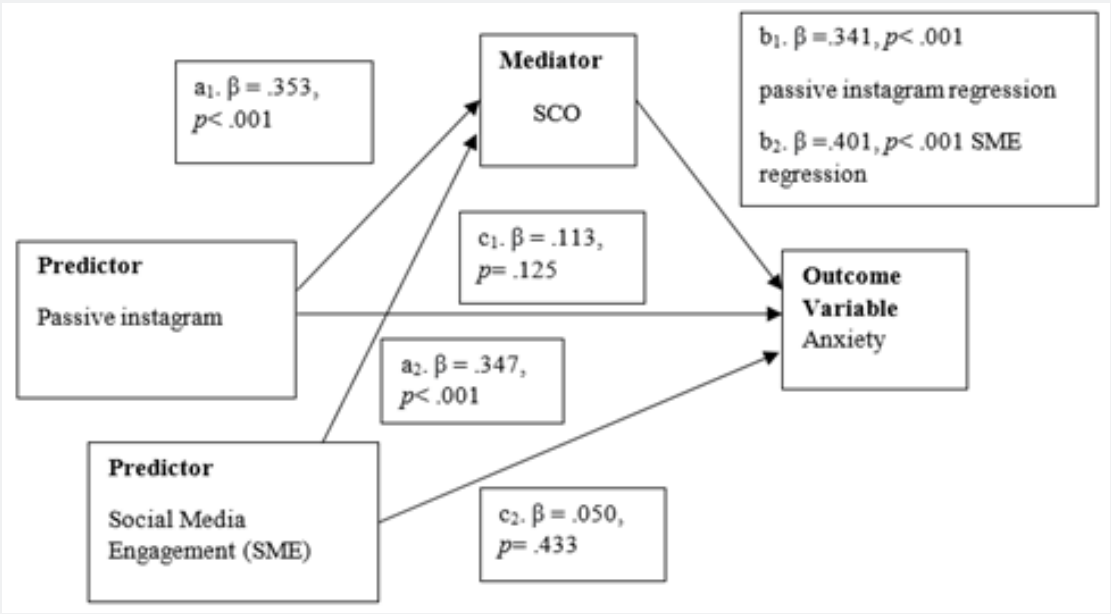

Figure 2: Social Comparison Orientation (SCO) Mediator with passive instagram, SME and anxiety.

Positive relationships were found between the frequency of passive Instagram use and anxiety and SME and anxiety, and similarly for wellbeing in place of anxiety (Figures 2, 3 and Table 6). However, the relationship was no longer significant when SCO

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was added. This suggests that SCO was a mediator - those scoring high on SCO were more likely to engage online and, independently, those scoring high on SCO, more frequently scored high on anxiety. This implies that the attempts to draw comparisons with the lives of others was, for those scoring high on SCO, more disruptive to anxiety and wellbeing. Twenge et al., (2018) [12] drew the same conclusion. Users that drew upward comparisons were more likely to interpret their life as less worthy and interesting. Twenge et al., (2018)[12]argued that while users know that content shared on social media is frequently akin to a 'highlight reel' - showing only the best in others' lives, they struggle to separate their emotional response from this cognitive understanding.

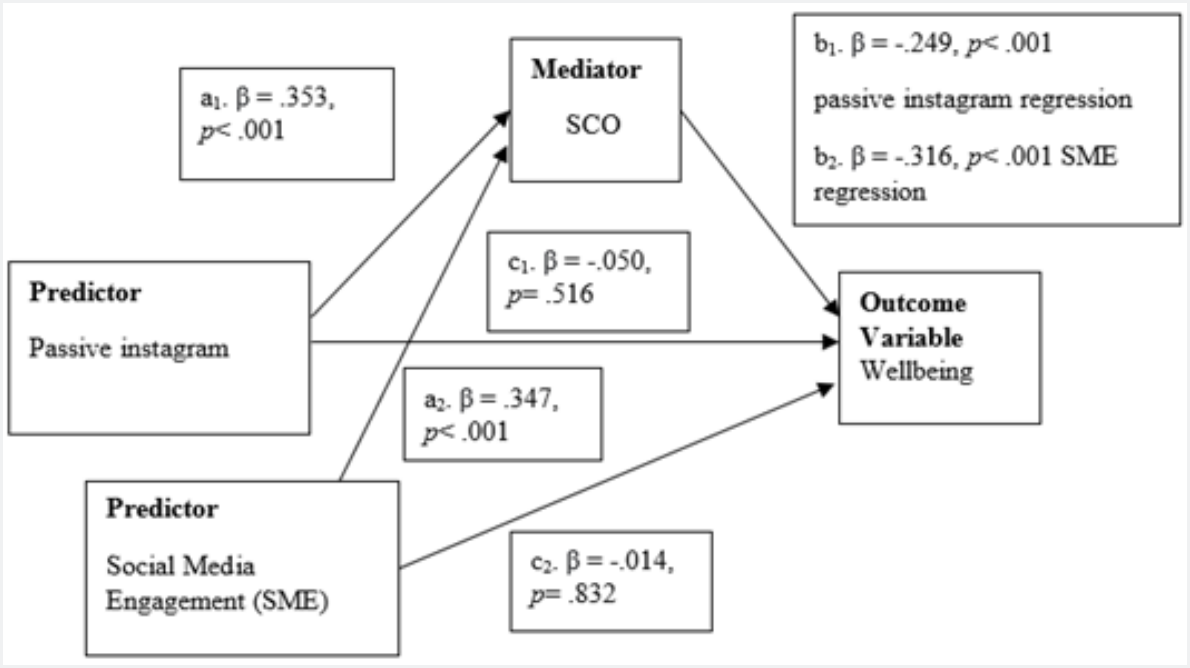

Figure 3: Social Comparison Orientation (SCO) Mediator with passive instagram, SME and wellbeing.

Table 6: Unmediated and mediated values between types of SMU (passive instagram and social media engagement) and anxiety and wellbeing.

Passive Instagram and Anxiety; SME and Anxiety (with Social Comparison Orientation as the Mediator)		
	β value	p value
Passive instagram		
Unmediated path	0.234	0.002
Mediated path	0.113	0.125
SME		
Unmediated path	0.19	0.004
Mediated path	0.05	0.433
Passive Instagram and Wellbeing; SME and Wellbeing (with Social Comparison Orientation as the Mediator)		
	β value	p value
Passive instagram		
Unmediated path	-0.138	0.063
Mediated path	-0.05	0.516
SME		
Unmediated path	-0.124	0.06
Mediated path	-0.014	0.832
SME and Wellbeing (with Optimism as the Mediator)		

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	β value	p value
Unmediated path	-0.133	0.043
Mediated path	-0.016	0.743

Twenge et al., (2018)[12] sampled adolescents and Erikson (1994), in his psycho-social theory of development, argued that striving for identity achievement is critical during adolescence. One's sense of identity is formed through the interactions and responses of others, first with family, then friends and peer groups. As the self-expands, the reactions of one's peer group become increasingly important. This may explain why social comparison with peers and peer pressure are highest during adolescence (Vogel et al., 2014)[13]. The sample in this study was broader than just adolescents (age range 18-79 years). It is possible that this finding suggests the tendency Twenge et al., (2018)[12]demonstrated in adolescents, remains important, to degrees, in older cohorts. Erikson (1994) argued development was not confined to the family or to childhood, but to relationships outside the family and those formed across the lifespan. Using social media, not just daily but frequently throughout the day, is ubiquitous. It offers an opportunity to connect with and see the lives of others (Yang, 2016)[6] and while the lives of those you are viewing may have a particular relevance during adolescence, they can remain important, for different reasons, across the lifespan (Erikson, 1994). This may explain the evidence on SCO mediation found here.

SME and passive instagram use, a particular type of SMA, featured in the direct path with anxiety and with wellbeing (Figure 3, Table 6) but these were no longer significant when SCO was added. Both passive instagram and SME positively correlated with SCO. Passive instagram describes users passively browsing newsfeeds and profiles without leaving comments or engaging (Yang, 2016)[6]. If one is motivated to draw superficial comparisons rather than to understand and connect with others in a meaningful way, then passively scrolling is a logical choice. The most likely outcome from this is a judgement and emotional response to what one's (unedited) life is like compared to the edited highlights of others (Twenge et al., 2018)[12]. It is a type of comparison likely to lead to disappointment (Yang, 2016)[6] and, in this study, to increased anxiety and lower wellbeing. This is consistent with the evidence on the adverse effect of upward social comparisons (Tandoc, Ferrucci & Duffy, 2015; Twenge, et al., 2018)[12,36].

Optimism featured as a mediator between SME and wellbeing (Figure 4, Table 6). SME was negatively associated with wellbeing but was no longer significant when optimism was added. Optimism is negatively related to SME and positively to wellbeing. This suggests that the amount of SME is significant, less is more beneficial and is associated with higher optimism scores and it implies that the nature of that engagement is important. This is consistent with the different impacts that passive, active and interactive engagement have on wellbeing (Smith, 2000; Yang, 2016)[6,15]. While the specifics of this were not measured, it is likely that those more optimistic brought the same thinking patterns used in their in-person life to their online life (Gibbons, 2022, 2023a, 2023b; Liu et al., 2017)[20,22,37,38]. For example, they may look to form more meaningful connections, offer more positive comments, make more compliments and be biased to attend more to positive messages over toxic ones.

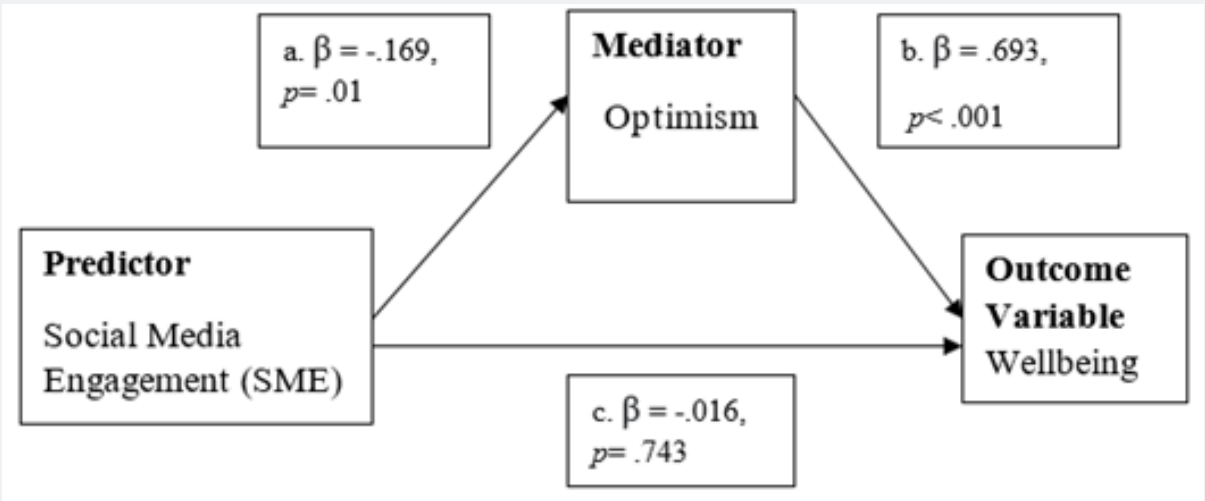

Figure 4: Optimism Mediator with SME and wellbeing.

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Limitations and Improvements

As the sample was convenient and volunteer based and given the non-response rate for some of the measures, validity could be an issue. Order effects and state congruence recall may also have affected the completion rate and response validity. The use of two or three attention-testing items across the questionnaire and excluding respondents who did not accurately answer these is likely to increase validity and could form part of the screening plan. Optimism featured in all the regression models - it is beneficial for sleep, mood and wellbeing. It featured as a moderator with SCO and as a mediator between SME and wellbeing. The results suggest that optimistic strategies appear to be beneficial, not just in face-to-face interactions but in online ones (NB the SCO items were context free). It would be fruitful to explore this further. That is, how those high, compared to low, in optimism engage on SMU. The mediation result reported an inverse relationship - those high in optimism engaged less. However, this study leaves unanswered the nature of that engagement and cognitive strategies used. Exploring this further could inform the current user-guides on healthy tips for SMU. These currently focus on encouraging less time on devices, checking the credibility of sources and encouraging click restraint (Bartolomeo, 2020)[39] but they do not consider such cognitive strategies.

SCO was associated with adverse anxiety and wellbeing. With SMU, increased social comparison tendencies were harmful. Passive engagement, such as scrolling feeds and profiles, is more frequently engaged by those high in SCO. It is more frequently associated with upward comparisons and adverse health (Twenge et al., 2018; Vogel, Rose & Roberts, 2014)[6,12,13]. Optimists engage less frequently on SMU and adopting the strategies employed by optimists, irrespective of one's level of dispositional optimism, is likely to be advantageous to mood, wellbeing and even sleep. It influences how one processes comparative information on social media and in-person. Fredrickson and Losada (2005)[40] took a positive psychology approach to nurture more productive business meetings in the corporate sector. They found a 3:1 ratio of positive to negative comments/statements was the optimal ratio associated with greater economic success. There may be an optimal ratio to time on devices, to time scrolling, posting, commenting etc (Woods HC, Scott H (2016)[41]. The analysis in this study points to the merit of exploring this and the types of cognitive strategies associated with healthy SMU.

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