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Examining Screen Time, Screen Use Experiences, and Well-Being in Adults

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Abstract

Screen technologies have been found to have adverse outcomes on people's well-being and mental health if used excessively however findings have varied depending on the screen type being assessed. The impact of prolonged TV-watching on mental health has been well established, whereas the influence of computers, the internet, and mobile phones is still being debated. Research exploring total screen use in adults is surprisingly lacking. The current study examined the relationship between Screen Time and well-being in adults, including positive relationships, meaning, and loneliness. The study is possibly the first to investigate how much pleasure and meaning people feel during screen use and their mediating effects. Using a correlational study design, participants ($N = 139$) reported their hours spent on all screen devices per day, how much pleasure and meaning they experience during screen use on average, and their general well-being levels. Screen Time was not found to be significantly correlated with well-being; and screen use experiences did not mediate any of the screen time and well-being relationships. However, screen use meaning was positively associated with overall well-being and positive relationships. This finding prompts a review of the importance of screen time for well-being, suggesting that this may be a limited approach. Other factors related to screen quality may be equal if not more important for well-being. Limitations and implications for maintaining or enhancing well-being while using screen devices are discussed.

Keywords

Screen Time, Screen Use Experiences, Well-Being, PERMA, Relationships, Loneliness

1. Introduction

Media screens are an integral part of life for so many people. According to the

Australian Multi-Screen Report Quarter 4, 2015 [1], on average across all age groups, Australians spend over 85 hours watching television (TV) in the home and over 31 hours online per month [1]. This points to the importance of studying the influence of multiple screen technologies on mental health and well-being.

Screen time is defined as "time spent using an electronic screen, such as a TV, computer, or a mobile device" [2] (p. 45) and "anything else that requires watching a screen" [3] (p. 4). However, most previous studies have examined different screen types separately rather than in combination. Also most screen use studies have focused on psychopathological symptoms such as depression, anxiety and psychological distress [4] [5] [6], whereas well-being and psychological flourishing, which focus on positive emotions and meaning, are seldom researched. In the past few decades, psychologists have increasingly focused on flourishing, although when it comes to its association with screen use, there is still a bias towards examining mental illness rather than well-being [7] [8]. Hence this study will adopt a measure based on a contemporary well-being theory—the PERMA model of flourishing, when assessing individuals' well-being [9]. This model posits that well-being consists of: Positive Emotions (P), Engagement (E), Relationships (R), Meaning (M), and Accomplishment (A). These aspects have each been identified as important in various theories of well-being, including three commonly referred to well-being approaches—hedonic well-being, eudaimonic well-being, and social well-being [10] [11] [12] [13].

As the emergence of multiple screen types has been gradual, researchers initially examined their influence on well-being separately. Studies have generally found an hourly increment in TV-viewing is correlated with more adverse mental health outcomes, such as anxiety, depression, and attention deficits and problems in cognition in children [5] [14] [15]; whereas the effects of computer and internet use are still unclear. Some have found correlations between internet use and increased likelihood of depression in both adults and 6th-grade students [16] [17]; some found the opposite effects [18]; and others have found null relationships [19]. Therefore, more research is needed to firmly establish the association between internet use and well-being. Finally, as the use of mobile phones is rapidly increasing, researchers from Sweden, Korea, and Malaysia have studied mobile phone use and mental health and have found positive associations between extensive use of mobile phones and poor mental health [20] [21] [22]. However, these studies were conducted when mobile phones first appeared, where the adverse outcomes could be due to the sudden emergence of a new technology.

After investigating the influence of separate screen types on well-being, some researchers started examining total screen use. Researchers from China and Australia found positive associations between screen time and depressive symptoms, anxiety symptoms, or higher school life dissatisfaction among children, adolescents, or college students [23] [24] [25] [26]. As these studies either fo-

cused exclusively on mental illness or on young people the current study aim is to explore the relationship between screen time and well-being in an adult sample.

Although positive relationships are important for well-being, not many studies have focused on this aspect of well-being in relation to screen time and the few that have done so have yielded mixed results [16] [27] [28] [29]. Furthermore, these studies did not measure positive relationships directly, but have for example asked for time spent with family and friends instead [30]. Therefore, more direct measures of positive relationships are needed in screen use research. Closely related to positive relationships is loneliness. People who have more positive relationships and perceive more social support are less lonely [31]. Since the Internet Paradox Study [16] found internet use to predict loneliness at follow-up, extensive literature has focused on the internet and loneliness specifically, but much less on general screen use, which indicates that this effect cannot be generalized to other screen types and warrants further investigation.

This study aims to overcome gaps and limits in the previous literature firstly by using the PERMA-Profiler to focus on psychological flourishing instead of mental illness [32]; secondly by looking more specifically and more directly into positive relationships; and lastly by measuring the total hours per day of people's total screen use in an adult sample. Furthermore, as previous research has sometimes demonstrated gender differences for the PERMA-Profiler and UCLA Loneliness Scale used in the current study [32] [33], any gender differences will be controlled.

The present study also explores Screen Use Experiences. Pleasure and positive emotion form one aspect of well-being referred to as hedonia, and meaning forms another aspect of well-being referred to as eudaimonia; both are different but important aspects of well-being. It is possible that the level of pleasure and meaning experienced during screen use could mediate the relationship between screen time and well-being. In addition, although the PERMA model includes positive emotions and meaning as two factors of overall well-being, it is not clear to what extent pleasure and meaning experiences *during* screen use are related to general levels of positive emotions and meaning, as well as overall well-being in everyday life. Hence, this study will also examine this novel interconnection.

As the previous findings on screen use and well-being have been mixed, the current study will adopt an exploratory approach. Research questions include:

1) Is screen time associated with well-being, positive relationships, and loneliness;

2) Is screen time related to any of the other PERMA factors;

3) Is pleasure felt during screen use associated with general levels of PERMA-Profiler Positive Emotions;

4) Is meaning felt during screen use associated with general levels of PERMA-Profiler Meaning;

5) Do pleasure and meaning felt during screen use mediate the relationships in question 1;

6) Do pleasure and meaning felt during screen use relate to overall well-being to the same degree?

2. Method

2.1. Participants

Participants (N = 161) were recruited online, through the snowballing technique and through public and community noticeboards in Melbourne, Australia. Of the initial 161 participants, 23 were excluded due to incomplete or ambiguous responses leaving 139 participants (99 females), aged between 18 and 60, (M_{age} = 25.29 years, SD_{age} = 8.33). Most participants were students (N = 118, 84.9%).

2.2. Measures

The online questionnaire was made available on Qualtrics.com and consisted of four sections as part of a larger study: the PERMA-Profiler, the UCLA Loneliness Scale, demographics, and a short questionnaire on general screen use. See Table 1 for more specific details on measures.

Table 1. Details of measures used in the survey.

Constructs	Measure	Reference	Subscales/questions (number of items)	Score	Reliability
Well-being and relationships	PERMA-Profiler	Butler & Kern, 2015	Positive Emotion (3), Engagement (3), Relationships (3), Meaning (3), Accomplishment (3), Negative Emotion (3), Health (1), Loneliness (1), Overall Happiness (1)	11-point ranging from 0 to 10	Overall reliability α = 0.94; reliability of subscales range from 0.72 to 0.92
Loneliness	UCLA Loneliness Scale	Russell, Peplau, & Ferguson, 1978	N/A (20)	Never (0) Rarely (1) Sometimes (2) Often (3)	High internal consistency (coefficient α ranging from 0.89 to 0.94); high test-retest reliability over a one-year period (r = 0.73)
Screen time	N/A	N/A	How long the participants spend on all types of screens every day	In hours and minutes	N/A
			How long the participants spend on different types of screens every day	In hours and minutes	
			How pleasurable they rate their screen use on average	10-point ranging from 1 to 10	
			How meaningful they rate their screen use on average	10-point ranging from 1 to 10	
Demographics	N/A	N/A	Age, gender, marital status, highest level of education, occupation, employment status, work hours	N/A	N/A

2.3. Procedure

The project was approved by the Human Research Ethics Committee at the University of Melbourne (Ethics ID: 1646835.1). A number of recruitment strategies were used, including snowballing, online forums and placing flyers in public places. Participants were offered a chance to win one of five AUD$50 gift cards upon completion of the survey.

3. Results

Data were screened and checked for assumptions prior to statistical analysis. No substantial violations of the normality assumption or conspicuous cases were found. Descriptive statistics for all variables are presented in Table 2.

Pearson's correlations were conducted to explore relationships between all constructs measured. The correlation matrix is reported in Table 3.

Table 3 shows that Screen Time is not correlated with Overall Well-being, Positive Relationships, Loneliness, or any of the other PERMA factors. The non-significant correlations ranged from −0.061 to 0.073. Table 3 also shows that Screen Time Pleasure is positively correlated with participants' general levels of Positive Emotions (8.4% shared variance); and Screen Time Meaning is positively correlated with participants' general levels of Meaning in life (7.3% shared variance). Moreover, both Screen Time Pleasure and Meaning are positively correlated with Overall Well-being, Positive Emotions, Engagement, and Accomplishment; whereas only Screen Time Meaning, but not Screen Time Pleasure, was positively correlated with Relationships and Meaning. However, neither Screen Time Pleasure nor Meaning was significantly correlated with Loneliness. The significant correlations ranged from 0.20 to 0.30 (4% to 9% shared variance).

Independent samples t-tests were conducted to compare all variables between males and females. Females scored higher on the PERMA domains of Positive

Table 2. Minimum, Maximum, Mean and Standard Deviation of All Variables.

Variable	Minimum	Maximum	Mean	SD
Screen Time (hours per day)	2.00	18.00	7.90	3.10
PERMA-Overall	2.94	9.56	6.73	1.31
PERMA-Positive Emotion	1.67	9.67	6.56	1.71
PERMA-Engagement	3.33	9.67	6.76	1.40
PERMA-Relationships	2.00	10.00	6.57	1.70
PERMA-Meaning	2.33	10.00	6.66	1.62
PERMA-Accomplishment	2.33	9.67	6.86	1.68
UCLA Loneliness Scale	0.00	59.00	23.37	13.38
Screen Time Pleasure	2.00	10.00	6.49	1.56
Screen Time Meaning	1.00	10.00	5.79	1.80

Note. $N = 139$

Table 3. Correlations between All Variables.

Variables	1	2	3	4	5	6	7	8	9	10
Screen Time (h/day)	-									
Well-being (PERMA) and Loneliness (UCLA)										
Overall	−0.033	-								
Positive Emotion	−0.041	0.88***	-							
Engagement	−0.061	0.65***	0.50***	-						
Relationships	−0.005	0.85***	0.69***	0.45***	-					
Meaning	−0.047	0.89***	0.71***	0.42***	0.80***	-				
Accomplishment	−0.037	0.75***	0.60***	0.33***	0.46***	0.61***	-			
UCLA	0.073	−0.62***	−0.55***	−0.24**	−0.59***	−0.65***	−0.39***	-		
Screen Use Experiences										
Screen Pleasure	0.13	0.25**	0.29**	0.25**	0.13	0.16	0.21*	−0.054	-	
Screen Meaning	0.16	0.30**	0.28**	0.29***	0.20*	0.27**	0.24**	−0.141	0.50***	-

Note. $N = 139$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

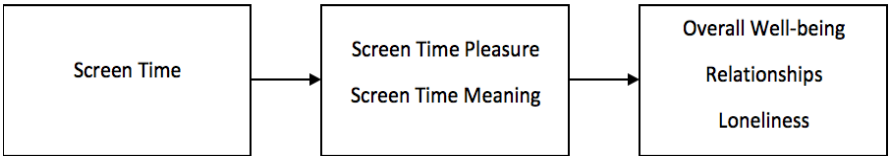

Figure 1. Hypothesised mediation model between Screen Time, Screen Use Experiences, and various aspects of Well-being.

Emotions ($M_{female} = 6.82$, $M_{male} = 5.91$, $t(137) = -2.66$, $p = 0.009$), Engagement ($M_{female} = 6.94$, $M_{male} = 6.30$, $t(137) = -2.49$, $p = 0.014$), Relationships ($M_{female} = 6.82$, $M_{male} = 5.97$, $t(137) = -2.73$, $p = 0.007$) and Overall Well-being ($M_{female} = 6.92$, $M_{male} = 6.28$, $t(137) = -2.66$, $p = 0.009$), but not on Meaning, Accomplishment, or Loneliness.

According to Shrout and Bolger [34], although there was no significant correlation between Screen Time and various aspects of Well-being, it was still meaningful to test the mediation model between Screen Time, Screen Use Experiences, and various aspects of Well-being. Preacher and Hayes' [35] multiple mediation model was adopted to examine the mediating relationships. Analyses were conducted using Hayes' [36] PROCESS macro for SPSS (v.2.16.2), controlling for gender differences. The hypothesized model is presented in **Figure 1**. Screen Time Pleasure and Meaning were each hypothesized to mediate the relationships between Screen Time and Overall Well-being, between Screen Time and Relationships, and between Screen Time and Loneliness.

The mediation coefficients for Overall Well-being are presented in **Table 4**.

As shown in **Table 4**, Screen Use Experiences do not mediate the relationship between Screen Time and Overall Well-being. Screen Time Pleasure and Screen

Table 4. Mediators of the Relation between Screen Time and Overall Well-being.

Mediating variables	IV → M (*a* path)	M → DV (*b* path)	Direct effect (*c*'path)	Indirect effect (*a* × *b* path)	95% CI of indirect effect
Model 1					
Screen Time Pleasure	0.065	0.21**	−0.017	0.014	[−0.086, 0.052]
Model 2					
Screen Time Meaning	0.091	0.24**	−0.024	0.022	[−0.0023, 0.059]
Model 3					
Screen Time Pleasure	0.065	0.10	−0.27	0.0067	[−0.0014, 0.033]
Screen Time Meaning	0.091	0.19**		0.018	[−0.0022, 0.054]

Note. $N = 139$, $^{**}p < 0.01$

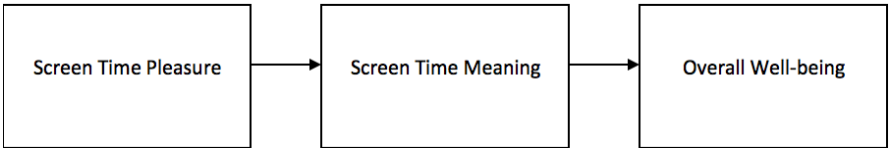

Figure 2. Hypothesised mediation model between Screen Time Pleasure, Screen Time Meaning, and Overall Well-being.

Table 5. Mediator of the relation between Screen Time Pleasure and Overall Well-being.

Mediating variable	IV → M (*a* path)	M → DV (*b* path)	Direct effect (*c*'path)	Indirect effect (*a* × *b* path)	95% CI of indirect effect
Model 10					
Screen Time Meaning	0.58***	0.19**	0.098	0.11**	[0.027, 0.20]

Time Meaning were significant predictors of Overall Well-being (as shown in Model 1 and Model 2). However, when entered together as simultaneous mediators (Model 3), Screen Time Pleasure was no longer a significant predictor of Overall Well-being. This leads to the possibility that Screen Time Meaning mediates the relationship between Screen Time Pleasure and Overall Well-being, therefore an additional simple mediation model as shown in **Figure 2** was tested and results are shown in **Table 5**.

As shown in **Table 5**, there is complete mediation for the relationship between Screen Time Pleasure and Overall Well-being, with Screen Time Meaning as the single mediator. This shows that the relationship between Screen Time Pleasure and Overall Well-being only exists because of the relationship between Screen Time Pleasure and Screen Time Meaning, which consequently, is the key factor in the relationship between screen use and well-being.

The mediation coefficients for Relationship are presented in **Table 6**.

As shown in **Table 6**, Screen Use Experiences do not mediate the relationship between Screen Time and Relationships. However, Screen Time Meaning significantly predicts Relationships whereas Screen Time Pleasure does not, which further demonstrates that Screen Time Meaning is the most important factor.

Table 6. Mediator of the Relation between Screen Time and Relationships.

Mediating variables	IV → M (*a* path)	M → DV (*b* path)	Direct effect (*c*'path)	Indirect effect ($a \times b$ path)	95% CI of indirect effect
Model 4					
Screen Time Pleasure	0.065	0.14	0.0086	0.0089	[−0.0025, 0.047]
Model 5					
Screen Time Meaning	0.091	0.20*	0.00040	0.018	[−0.0015, 0.056]
Model 6					
Screen Time Pleasure	0.065	0.034	−0.00060	0.0022	[−0.0092, 0.027]
Screen Time Meaning	0.091	0.18*		0.017	[−0.0027, 0.055]

Table 7. Mediator of the Relation between Screen Time and Loneliness.

Mediating variables	IV → M (*a* path)	M → DV (*b* path)	Direct effect (*c*'path)	Indirect effect ($a \times b$ path)	95% CI of indirect effect
Model 7					
Screen Time Pleasure	0.065	−0.54	0.30	−0.035	[−0.24, 0.036]
Model 8					
Screen Time Meaning	0.091	−1.20	0.37	−0.11	[−0.41, 0.013]
Model 9					
Screen Time Pleasure	0.065	0.19	0.36	0.012	[−0.080, 0.20]
Screen Time Meaning	0.091	−1.28		−0.12	[−0.46, 0.018]

The mediation coefficients for Loneliness are presented in Table 7.

As shown in Table 7, Screen Use Experiences do not mediate the relationship between Screen Time and Loneliness. Moreover, neither Screen Time Pleasure nor Screen Time Meaning significantly predicts Loneliness.

Finally, Fisher's r-to-z transformation was used to compare the correlations between Screen Time Pleasure and Overall Well-being, and Screen Time Meaning and Overall Well-being. Results show that the two correlations are not significantly different ($z = -0.45$, $p = 0.65$).

4. Discussion

The present study investigated the relationship between collective screen use and various aspects of well-being, including overall well-being, positive relationships, and loneliness. The study was also possibly the first to examine the effects of a novel element of screen use experiences as a mediator. It was found that Screen Time did not correlate with any of the PERMA dimensions or Loneliness; Screen Time Meaning was related to general meaning in life; Screen Time Pleasure was related to general Positive Emotions; and Screen Time Meaning and Pleasure did not associate with well-being differently. These findings provide a different perspective on the debate about whether screen technology has negative impacts on people's well-being. The findings emphasize the need to investigate screen

use experiences, in addition to the amount of screen time, when investigating screen use and well-being.

Many researchers have found negative consequences of different screen devices on people's mental health [5] [14] [15] [17] [21]-[26]. Subsequently, it is important to discuss any differences that exist between the current study and the previous ones that could have resulted in the null association found in the current study.

Firstly, most studies either investigated different screen types separately [5] [14] [15] [17] [22] [25], or focused on children and adolescents, who were still physically and psychologically developing, rather than adults [5] [15] [17] [22] [23] [25]. They also measured mental health symptoms rather than well-being. Moreover, the few studies that measured total screen use in adults either measured screen time to operationalize sedentary behaviour, instead of investigating screen use per se [37]; or used a categorical approach to compare low screen time versus high screen time [24] [26]. These studies categorized low screen time as less than or equal to two hours per day and high screen time as more than two hours per day. Such a broad division of screen time categories was not possible for the current sample, where the minimum value for screen time is two hours per day. On the other hand, it is also plausible that in samples like the current one, with a mean screen time as high as 7.9 hours per day, various screen technology has become so prevalent and embedded in daily life that it replaces other information sources such as reading newspapers and listening to the radio, and these activities may not be detrimental to well-being. Hence, based on the current sample characteristics, screen time was not found to be negatively associated with well-being levels in a limited sample of Australian adults.

4.1. The Neglected Aspect—Screen Use Experiences

Consequently, the null relationship between screen time and well-being prompts another question—is there something else about screen use that is influencing people's well-being? One possibility is subjective experiences. The levels of pleasure and meaning that people experience during screen use were found to be positively correlated with overall well-being to the same degree; however, the complete mediation between Screen Time Pleasure and overall well-being suggests that the effects of Screen Time Pleasure only existed because of its correspondence with Screen Time Meaning. Consequently, it is how much meaning people feel during screen use that is the most influential factor in this complex and dynamic relationship.

In addition, positive relationships were also only related to Screen Time Meaning, but not Screen Time Pleasure. Taken together with the null relationship between screen time and social relationships, it is possible that extensive use of screen devices does not compromise people's social relationships, as long as they find meaning in their use. On the other hand, it was found that neither Screen Time Meaning nor Screen Time Pleasure was associated with loneliness,

which suggests that loneliness might be influenced by other factors during screen use, such as whether they were alone or with others, and whether their use of screens helped their social connections or decreased their time spent with others [29] [31] [38]. Thus, these factors should be included in future studies, in addition to the newly revealed screen use experiences element.

One might argue that Screen Time Meaning and Pleasure and the general factors Meaning and Positive Emotions respectively, in the PERMA-Profiler; are the same thing. However, the shared variance between Screen Time Pleasure and Positive Emotions, and between Screen Time Meaning and Meaning were only 4% and 9%, respectively. Therefore, these constructs are substantially unique. Many other factors may also be at play, such as purpose and engagement of screen use that may be part of the complex dynamic interrelationship, which future researchers may want to explore.

4.2. Limitations and Strengths

The current study has some limitations. Firstly, information on whether the participants were alone or not during screen activities was not collected. This may influence the association between Screen Time and Relationships, as well as Loneliness. If participants were mostly with other people during screen use and their time spent on social interactions was not decreased due to screen use, then screen use might not adversely affect positive relationships or increase feelings of loneliness. On the other hand, if participants were alone during screen use, but were using screens for online social interactions, then this could have had positive implications on social relationships and loneliness. However, if participants were with other people during screen use, but the quality of their interactions was diminished due to distractions from screen devices, then this might have led to reduced social relationships and higher loneliness. Taken together, these three possibilities might have counterbalanced each other and led to a null relationship in the current study.

The current study also had a limited sample comprising largely of female students aged primarily between 18 and 29 years. Future studies should have larger samples that consist of a variety of age groups and include more balanced proportions of males and females from diverse occupations. It would be worthwhile examining if the current study findings are consistent across diverse groups of participants or whether there are unique findings relevant to specific groups.

A strength of the study is that it explores the level of pleasure and meaning users ascribe to their screen use time, in other words, it focuses not only on screen time but screen quality. This is novel and sparks new discussion about the contributions of hedonic and eudaimonic aspects of well-being during screen time. Furthermore, the use of the PERMA-Profiler, also identifies that screen use might have very different effects on well-being, compared with traditional mental health symptoms.

5. Conclusion and Implications

A key message from this study is that it might be more beneficial to increase meaningful use of screen devices, rather than merely decrease the amount of time spent on screens. A next step would be to explore *how* screen time could be more meaningful for users and to invite users to think about the value they will be gaining from future screen use. It is also time to examine more thoroughly whether meaning is more important than pleasure, and whether meaning leads to pleasure, at least in the context of time spent using a screen.

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