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Sick of Social Media Scrolling?

A Behavioural Intervention to Reduce Problematic Social Media Use Via Smartphone Device

submitted in partial fulfilment

of the requirements for the degree

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Abstract

Excessive social media use can be problematic, with risks for individuals including compromised health and wellbeing and disruptions to work and personal relationships. Currently there is a lack of empirically supported treatments for reducing problematic social media use. Stinson and Dallery (2023) recently demonstrated the success of a behavioural intervention in reducing social media use with nine university students in Florida. I aimed to conduct an approximate replication of their intervention with university students in New Zealand. I initially administered a modified Internet Addiction Test to 148 participants. Of these, 38 qualified and three completed the behavioural intervention study. Social media use was tracked through the screen time function of each participant's smartphone. Once a stable baseline was established, participants began an intervention phase. The intervention was contingency management with automated notifications and the selection of three alternative activities. Results of this intervention indicate success in the reduction of social media use for two of three participants. However, a lack of evidence to suggest any increase in the duration of time spent in chosen alternative activities replaced social media use. These results raise further questions regarding the effects of environmental changes on the strength of contingency management reinforcement for participants during this intervention. Identifying key variables in the reinforcement of contingency management that successfully reduces social media use for participants could be beneficial to many groups, particularly students who may use social media to escape academic demands.

Keywords: concurrent multiple baseline design, contingency management, smartphone, social media addiction.

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Sick of Social Media Scrolling?

A Behavioural Intervention to Reduce Problematic Social Media Use Via Smartphone Device

The prevalence of problematic smartphone use (PSU) and respective smartphone related problematic social media use (PSMU), also known as social media addiction (SMA), has increased since the development of social media applications in 2008/2009. Acknowledgment of the negative consequences associated with PSMU were recognised around 2010, when the first PSMU paper was presented (Arora & Mehta, 2023, p. 147). The number of research papers on this topic has rapidly increased annually to 221 published papers in 2021, at a total of 712 published documents until July 2022. Advancements in smartphone technology have provided immediate access for a number of social and business communication functions. Email, banking, shopping, instant messaging, video calling, and accessing social media (SM) platforms, can now occur quickly and effortlessly. The technological development of smartphone use that sets it apart from generic mobile phone use, is permanent access to the internet through the function of these mobile phone devices (Panova & Carbonell, 2018). The main social networking function commonly used by smartphone users is internet-based SM applications. A definition of social media is a category in the genre of communications media which enables social interaction (through images, video, and text), among groups of individuals, whether known or unknown, dispersed across geographical locations (Oxford Reference, 2024).

Social Media Platforms

Though there are differences in platforms around the world, some of the most frequently used are run by American companies, Facebook, What's App, and Instagram owned by Meta, and YouTube owned by Google. Access to SM for work demands is legitimate and for some professionally essential. As a stable form of marketing and

communication, employers have adapted to using instant messaging (IM) or SM groups to contact staff, schools use SM for communication with students and community, family and friends regularly use SM for social connectivity, and individuals use SM for personal enjoyment. Due to an ease of access and convenience, there has been a substantial increase in the use of smartphone devices to access SM, which can blur the lines between work and social communication functions, contributing to revisiting SM platforms and staying longer online. These patterns of use have been monitored by SM platform developers and utilized in platform development to promote advertising. This is known as the use of attention economy (Bhargava & Velasquez, 2021). Developers use variable reinforcement techniques to maintain attention and rates of responding by offering the reward of new content through the variable timing of high contrast visual displays, combined with algorithms programmed to monitor individual users' preferences, to 'like' content as well as the frequency and duration of viewed content. Platforms are then programmed to provide more of the same content to reinforce attention and extend the duration of platform use. The most common technique used is variable ratio schedule of reinforcement (also known as the slot machine effect), to distribute rewarding content intermittently and maintain responding. This technique is combined with a structural layout that uses social reciprocity (responding to comments/content), social validation (hitting a 'like' icon), and the deliberate erosion of natural stopping cues that encourages infinite scrolling of content (Bhargava & Velasquez, 2021). Though these techniques are used as a deliberate act to encourage use, arguably the benefits of social media use (SMU) are a freedom to explore and engage in communication with a global audience, where learning new information and gaining experiences can occur. Additional benefits of SM are an environment where teenagers can connect and strengthen bonds formed in existing friendships and create new friendships, which can help to reduce social isolation and loneliness (Keles et al., 2020). However, there are many caveats to

teenagers' use of SM, including the impact of social comparison which is vastly influential during the developmental growth years of adolescents and teenagers. A recent Pew research study reported 97% of teenagers are almost constantly online, with 95% reporting they have used or currently use YouTube and regularly use other common platforms like TikTok (67%), Instagram (62%), and Snapchat (59%) (Pew, (2022). Potential future risks associated with adolescents' current problematic smartphone and SMU, including copying common behaviour trends (e.g., frequent selfie pictures), that hazard a risk to personal and social development, vulnerability to peer pressure, that with a lowered capacity for self-regulation than adults, poses a greater risk for the potential to develop mental disorders (Keles et al., 2020).

Tertiary Students' Social Media Use

In a study by Aljomaa et al., (2016) of 416 male and female university students, 48% of participants met the criteria for smartphone addiction based on durations of excessive smartphone use, psychological-social dimensions, health dimension, and preoccupations towards the use of smartphone devices. Kim et al. (2019) similarly reported a recognised daily overuse of smartphones by tertiary students, at an average of 6 hours per day. Higher usage of smartphones may be explained by the time that students spend online researching and networking (Salari et al., 2023). However, PSU can be attributed the regular occurrence of 'off task' multitasking whilst attending to learning demands, (e.g., texting and SMU), which may interfere with information processing while learning, therefore lowering the ability to learn content and reducing academic performance (Kim et al., 2019). There are potential cultural considerations (cultural norms) for some individuals, specifically students from Asian countries. Researchers report higher percentages of internet addiction per student population, with 18% of Chinese high school students, 12 % of Chinese college students and 20% of Taiwanese adolescents, as opposed to 4.4% of European adolescents and 9.8% of US

college students (Bhargava & Velasquez, 2021). This research suggests that an increase in time spent alone, and a lack of social interaction has contributed to higher percentages of internet addiction. Socio-cultural context and environment are dependent on social, professional, work and study pressure, and should be taken into consideration during research studies to better understand the influence of pressures around problematic use (Panova & Carbonell (2018).

Potential Risks Associated with Problematic Social Media Use

For the adult population, as well as known negative health consequences of elevated stress levels, poor sleep quality, and symptoms of anxiety and depression that have been associated with PSMU (Stanley et al. (2022), the risks associated with excessive SMU include difficulty maintaining personal and professional relationships, that can affect work and academic performance. Online risks include vulnerability to online bullying, cyber-crimes such as risks to personal safety, and third-party data privacy risks (Santini et al., 2024). The risks associated with prioritising the use of smartphones to access SM whilst performing other tasks (i.e. walking alongside traffic), driving and operating machinery, carries a far greater risk to personal safety than using SM whilst stationary. This is an increasingly common form of visual distraction with not only a personal safety risk to the individual, but the potential to compromise the safety of others, contributing to an environmental hazard. Hashash et al. (2019), conducted an experiment to measure the effects of SMU whilst driving and concluded that distracted driving, whilst scrolling SM, text messaging through associated instant messaging services or voice calling, causes physical, visual, and cognitive distraction that impairs driving ability. Their results indicate that SM scrolling negatively affects driving performance, though text messaging carries a more dangerous risk with a greater level of distraction recorded. Younger drivers that are more

inexperienced than older drivers pose a greater potential risk if they are heavy users of SM and are more likely to access SM whilst driving.

What is Social Media Addiction vs Problematic Social Media Use?

PSMU has been defined as addiction-like symptoms (Di Blasi et al., 2022), and though there are numerous ongoing debates surrounding the classification of the overuse of technical devices as addictive, the following studies contend that PSMU may be associated with negative consequences, including disruptions to personal health and wellbeing (Bai et al., 2021), contributing to low self-esteem, anxiety, and depression symptoms (Jahagirdar et al., 2024) and psychological distress (Nikolinakou et al., 2024). In relation to the use of technology that could be considered potentially addictive, (Moretta et al., 2022) define excessive use functionally as interaction where the user perceives their experience as rewarding, though the consequence of prolonged use can result in diminished control over their engagement and potentially lead to negative consequences. Terms other than problematic that are associated with excessive use of SM include, "pathological use, compulsive use, use disorder, dependence, and addiction disorder" (Varona et al., 2022, p.1). The increase of PSMU associated with SMU on smartphone devices has developed as an emerging trend. What was once heavily researched as internet addiction has now largely been replaced by PSU and PSMU. It is of importance to consider an increase of publications after 2019, as an escalation of use at this time was greatly influenced by the Covid-19 pandemic. At the time of the pandemic, a significant increase in internet and SMU was recorded (Arora & Mehta, 2023). This coincided with forced sedentary lifestyle and social isolation which increased social networking in online social communities. As a result of these periods of social isolation, working and studying from home increased. Although an increase in use was recognised at this time, recent research by Casale et al, (2023) concludes that the excessive use of SM recorded during Covid-19 has not increased for higher income countries, however,

did increase in lower income countries in the last 7 years. The results of these studies indicate that overall environmental conditions (i.e. Covid-19 pandemic) low income, and cultural differences are all factors that may contribute to low mental health related PSMU. Though the language used to describe excessive use of the internet and SM is broadly termed 'addiction', there is controversy surrounding the analysis and definition of behaviours associated with the repetitive overuse of technological devices, when the term addiction is clinically associated with substances such as nicotine, heroine, marijuana, and alcohol consumption (Bhargava & Velasquez, 2021). Though addiction behaviours such as pathological gambling are listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), the only technological based problematic behaviour to be added is problematic internet use (online gaming), which has been listed as a condition requiring further clinical research. The World Health Organisation's 11th International Classification of Diseases has also listed online gaming disorder as an identified as a health condition. At this stage, PSMU has not been mentioned in either health classification manual (Arora & Mehta, 2023; Varona et al., 2022), largely due to debates surrounding how addiction, in relation to technology should be defined (Bhargava & Velasquez, 2021).

How is Problematic Social Media Behaviour Measured?

There is a distinct lack of research studies that have explored the use of CM interventions to decrease PSMU on smartphone devices (Stinson & Dallery, 2023; Stanley et al., 2022). As this is a relatively new area of PSMU research, this variation of study is still developing. Researchers that have conducted these pioneer studies include Stinson and Dallery, (2023); and Stanley et al., (2022). Similar studies that have explored smartphone related PSMU, without CM include Hussain and Kuss (2023); and Pietsch et al., (2023). The study by Hussain and Kuss (2023), investigated the effectiveness of three smartphone interventions whilst monitoring psychiatric disorder symptoms, loneliness, and general health

in a randomised controlled trial. The conditions for the three randomly assigned groups were, mindfulness-based training, tips and advice with managing social networking site (SNS) use, and a third condition where general health and lifestyle advice was provided. Though SMU was not directly monitored, the results of this study concluded significant main effects in the improvement of general health, anxiety, loneliness, and PSMU across all interventions. I did not consider this method as an option to decrease PSMU as I considered CM by single subject design as a more effective method for identifying individual participants goals, and the direct recording of SMU more reliable than the use of self-reporting measures alone. Pietsch et al., (2023), investigated the effect of a smartphone app-based intervention with a group of students from various schools (adolescent to adult). The conditions were to abstain from or reduce smoking (cigarettes/e-products), alcohol, or digital media use (social media, video gaming, or streaming), behaviour for 14 days, with use of this intervention app. The results of this study conclude the successful short-term reduction of specific substance use and media-related behaviour, though there was a substantially high attrition rate. Although this app presents a method of restricting the physical use of participants smartphone device, consequently effecting abstinence or the reduction of use. This method does not prevent or restrict the use of SMU on other devices, nor does it teach a method of regulating use post intervention. These are the reasons why I chose to use a CM based intervention for reducing PSMU. Of the numerous studies that have been conducted on PSMU, the majority have been to aid in identifying psychiatric disorders and health related risks associated with addictive social networking (Andreassen et al., 2016). For these studies the diagnostic research instruments that have been used to measure PSMU include the addictive tendencies scale, bergen Facebook addiction scale, the Facebook dependence questionnaire, internet addiction test (modified), the problematic Facebook use scale, the social networking addiction scale, social media use questionnaire, social media disorder scale (Moretta et al. 2022). Of the

above research instruments the most widely used and well researched tool is the internet addiction test (IAT), due to its psychometric properties and extensive validation in the use across multiple populations and cultures. Based on a design for the assessment of pathological gambling (DSM-5), it has been applied to better understand addictive behaviours associated with excessive SMU. Though it has not been designed for specifically for PSMU, researchers have been known to adapt some of the questions from language describing "internet use" to language describing "social media use", to suit the assessment of behaviours associated with PSMU (Al- Menayes, 2015). This method of IAT language modification was used in the study by Stinson and Dallery (2023) which I have replicated. Self-reporting questionnaires in research studies are used as an indicator of behaviours and cannot be used for accurate and valid diagnosis of addiction. All clinical assessment should be conducted by a healthcare professional in a clinical environment to assess potential functional impairment (Panova and Carbonell, 2018).

Behavioural Interventions With Contingency Management

Behavioural interventions were the earliest form of experimental intervention, based on operant (instrumental) and classical (respondent) conditioning associated with learned behaviour (MacDonald et al., 2016). Contingency management (CM) otherwise known as motivational incentives (Pfund et al., 2021), is one of the most utilized forms of intervention for effecting behaviour changes. CM is based on principles of behaviour analytic theory, by which behaviours that elicit positive and immediate consequences tend to be experienced by an individual as reinforcing, consequently causing the person to increase the frequency of the behaviour. In addition, where aversive consequences are associated with a behaviour, responding tends to reduce in frequency (Ellis et al., 2021; Skinner, 1953). Based on this principle, CM has been used to decrease undesired behaviours and increase desired behaviours. Studies that have used this method to decrease behaviours have focused on

alcohol and substance abuse (Wardle et al., 2024), smoking cessation (Dallery et al., 2017), and problematic behaviours. Other studies have used CM to assist with increasing desired learning behaviours, health and wellbeing practices (Ellis et al., 2021). CM in experimental studies on substance abuse has shown success in the past, and it is now adopted as an intensive outpatient treatment for illicit drug use disorders in the U.K. and similar treatment programs in the U.S. (Davis et al., 2016), including the Mental Health Services Administration and National Institutes of Health and Substance Abuse (Pfund et al., 2021). Interventions that use CM involve differential reinforcement, associated with encouraging engagement in a target behaviour whilst withholding reinforcement when participants do not engage in that target behaviour. Reinforcers can be monetary, a lottery-based system, vouchers, or non-financial based prize. The success of this method is contingent on the effectiveness of the reinforcer. In addition to differential reinforcement, a behavioural contract is entered into with the participant defining the target behaviour that will be monitored, including a timed schedule of events and what contingencies will be used. This behavioural contract includes a structure of support, including face-to-face meetings providing feedback to the participant to assist with goal setting. Monitoring of an objective target behaviour is consistent and frequent, and communication aimed at priming a participant to be aware of the availability of incentives, the immediacy of reinforcement, use of reinforcement magnitude, and reinforcement escalation to maintain responding is included (Ellis et al., 2021). Financial and voucher reward-based CM have been used since the early 1990s, as part of treatment associated with substance abuse, however a frequently cited drawback of CM is the cost associated with funding and maintaining financial rewards (Williams-Buttari et al., 2023). Additional reported limitations associated with successful CM have been related to the incentive value and magnitude of CM, duration, and treatment efficacy (Davis et al., 2016).

The Current Study as a Replication

This current study was based on a package behavioural intervention with CM aimed to reduce SMU, as introduced by Stinson and Dallery (2023). The participants for their study were male and female undergraduate university students, aged 18 – 25 years. This study included monetary based CM, where participants earned $7 for meeting their goal duration of SMU for the first day of the intervention and increased by $1 per day for each consecutive day the participant met their goal, up to $9 per day. An additional $1 was earned for submitting screenshots regardless of their daily duration SMU. If the participant submitted their screenshot and met their goal they could earn between $8 and $10 daily. Participants were asked to select three activities to replace SMU as part of CM. A social media use questionnaire SMUQ and modified IAT was used to assess PSMU, and a behaviour allocation survey (BAS) was used to monitor the duration of time spent in alternative activities. An intervention acceptability questionnaire (IAQ) was used to survey the participants responses of the overall acceptability of the study. Results of their study indicated a decrease in PSMU for 8 of 9 participants, to below target times limits with the implementation of CM. The intervention resulted in 91.8% of days below the participants target time limit, compared with 27.4% during pre-baseline and baseline. 8 out of 9 participants also scored lower on the modified IAT from screening to post intervention. I conduced an approximate replication of this study. In a demographic variation, I extended the age range to include students from all age groups (17-60+ years), as opposed to the 18–25-year-old demographic used in the original study. In a recent report, New Zealand SM statistics indicate higher users in the 30–49-year-old age group for Facebook and WhatsApp than the 18–29-year age group, that are higher users of Instagram, Snapchat, and TikTok (Pacheco, 2023). To be inclusive of tertiary students of all ages and provide more accuracy in a sample of the student body, I encouraged all age groups to participate. The second variation

to this study was that daily duration of SM data was collected using only a smartphone device and did not include data collection of SMU by PC or laptop, as research suggests most regular SMU is by smartphone device (Dixon, 2022). The final variation was due to limitations in funding, that this study provided no financial incentive for reward-based CM, instead academic credits were awarded as part of the IPRP research program were organised to be distributed at fixed intervals, accumulating in value respective to the length of time spent in the study, this was utilized as a reward to assist with maintaining retention as part of the CM plan for the study. Part of my motivation for this study was an effort to provide a form of CM that is more cost-effective than providing monetary rewards for successful intervention motivation, as cost associated with financial based CM, is known to be a study limitation (Williams-Buttari et al., 2023, p. 479). Thus, by providing a cost-effective option would more closely reflect real world settings and aid possible further replications of this study.

Method

Ethics Approval

In accordance with the human participant ethics regulation for the University of Waikato, this study was presented to Te Wānanga o Ngā Kete the Division of Arts, Law, Psychology and Social Sciences (ALPSS), Human Research Ethics Committee, Approval #**FS2024-23** was provided on 30th of May 2024. An amendment was approved on the 18th of October 2024, to include a modified intervention acceptability questionnaire, as an additional measure to ensure ethical standards had been met for each participant, and to provide insight into the effectiveness of the intervention method, and replicability of this study.

Participants

Once ethics was approved, I logged this study with the Introduction to Psychology Research Program (IPRP) at the University of Waikato, to recruit student participants. This

method of participant recruitment was selected as a sample of convenience, to match the university student recruitment by Stinson and Dallery (2023). Through the University of Waikato IPRP, undergraduate students who wish to gain experience in the participation of psychological research are awarded academic credits for an allocated psychology paper, available each semester. I conducted the study in two phases. Recruitment for an initial online screening survey was advertised internally through IPRP digital notices at the university, and information was distributed. (These information sheets are in Appendix B.) Participant anonymity and confidentiality were protected through login credentials to the university server and single participant access via a personal email link. Consent was acquired digitally through a declaration that was posted prior to access of the online survey, outlining that the act of proceeding to the next window and entering the survey would be providing consent to use the information provided for the purpose of the study. To be eligible for Phase 2 of the study, participants of the first phase were required to score a minimum of 31 (out of 100) on a modified internet addiction test (IAT) and have personal use of a smartphone with an operating system less than 7 years old. A total of 148 student participants, ranging from 17 to 50 years old participated in the initial online survey. From 148 participants, 145 provided their age. The mean age of participants was 23.6 years (SD = 5.7). A total of 144 participants provided gender information; 84% were female, 13% male, and 1% were transgender or non-binary. From 144 recorded responses, most participants identified as NZ European (70%), 21% identified as NZ Māori, 12% as Asian, 10% as Pacific Island, and 3% as Middle Eastern, Latin American, African (MELAA). A further 8% of participants identified as Australian, Bangladeshi, Fijian Indian, Indian, Jamaican, Pakistani, Sri Lankan, and South African. From the online survey, 43 potential candidates indicated a willingness to participate in a follow-up study and provided their contact email address at the end of the survey. A total of 38 participants qualified, the majority of this group (23 of 43) scoring between 31 to 49,

indicating a ‘mild’ addiction. Fifteen participants scored between 50 to 79, indicating a ‘moderate’ addiction, no participants scored a ‘severe’ addiction (80-100). Email correspondence was sent out to each candidate providing an information sheet for the follow-up study, including approximate timeframes. Four participants started Phase 2, of which, three completed the intervention process. The fourth participant was dropped from the study during baseline collection, as they were unable to provide regular data. The information for these three participants is shown in Table 1. These participants were from three different age groups and three different ethnicities of the student population at the University of Waikato (The University of Waikato Annual Report, 2023). All three participants in Phase 2 of this study were female. Every effort was made to include male, transgender and non-binary participants but greater diversity was unsuccessful.

Table 1

Participant Characteristics for Phase 2 (Intervention)

Participant	Age Group	Gender	Ethnicity
P 1	25 - 30	Female	Asian
P 2	17 - 25	Female	NZ European
P 3	35 - 40	Female	Bangladeshi

Phase 2 Study Design

Phase 2 used a single-subject, concurrent multiple-baseline design. In this design all participants start the experiment at the same time, however, transition from baseline into intervention at different times relative to the stability of their baseline data. Transitioning at different times allows researchers to rule out alternative explanations for behaviour changes that may occur during the intervention. Therefore, in this study all three participants started

baseline data collection in one group, simultaneously. Each individual participant entered an intervention phase and subsequent withdrawal phase in staggered progression, dependent on the trending data collected for each participant.

Materials

For the design and distribution of the survey and IAT content, the online survey management platform Qualtrics (https://www.qualtrics.com) was used, with the Phase 1 online questionnaire linked to IPRP's SONA platform. In Phase 2, task management in Qualtrics was used to send daily notification prompts to participants to complete a questionnaire recording daily social media app use, and a drop file link was provided to load their screen shots for data collection. The social media use questionnaire (SMUQ) with IAT, and intervention acceptability questionnaire (IAQ) that were used as analytic research instruments for this study have been provided in Appendix C. A university-based Microsoft Outlook and Zoom account were utilised for regular correspondence and scheduled contact with participants. Each participant used their own smartphone and social media accounts via platform applications, and the "screen time" feature in their phone settings to monitor and record social media data usage.

Measurement, Dependent, and Independent Variables

The primary dependent variable across both phases of this study was the duration of minutes per day that participants spent across multiple social media platforms, as recorded by the screen time feature in the settings of their smartphone device. Data were received from each participant itemising their use on each social media platform, these data were calculated using Excel as a total duration of each participant's daily use. The secondary dependent variable was the time spent engaging in alternative activities, replacing time spent in SMU. This was collected as self-report data, captured through a daily survey throughout the intervention and a behaviour allocation survey (BAS) that was administered once during

baseline and repeated during intervention data collection. The independent variable in the intervention of the study, was the goal setting time limits that participants were asked to apply on their smartphone to monitor SMU, in addition to the selection of three alternative activities that they could engage in as a replacement to SMU. Each participant in Phase 2 completed a SMUQ and modified IAT (Stinson & Dallery, 2023) as a pre-screening test during Phase 1 and another IAT post-intervention, at the end of Phase 2. The IAT is a recognised valid and reliable test for assessing social media addiction for university students, as the items reflected relatable language (Moon et al., 2018) and the dimensions relate positively to participants' experiences with SM (Al-Menayes, 2015). The IAT, comprising of 20 questions, was modified by Stinson and Dallery (2023) to reflect language that indicated SMU in lieu of broader internet-related terminology. Specifically, the terms, 'internet', 'email', and 'online,' were replaced with 'social media.' Responses to this test were scored using a 5-point Likert scale (1= Never to 5= Always), with scores ranging from 0-100, a threshold of scores above 31- 49 indicating a 'mild' addiction category, 50 to 79, indicating a 'moderate' addiction category, and 80 to 100 indicating a 'severe' addiction category (Young & Abreu, 2011). For the purpose of this study, I used the following definition of SMU: "forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)" (Merriam-Webster, 2019). Participants were asked to record their average weekly use from a range of five popular SM accounts, Facebook, Instagram, Snapchat, TikTok, and Twitter. They were also asked to identify any other SM accounts that they frequently use. Additional accounts listed by participants were Discord, Little Red Book, Messenger, Pinterest, Reddit, Spotify, Threads, Tumblr, WeChat, WhatsApp, and YouTube, and Zhihu. In the design of the study academic credits were distributed at fixed intervals as the participants completed particular stages of the

study, this feature was utilized as a reward to assist with maintaining participant retention. In addition, I used verbal praise and social reinforcement to encourage the receipt of regular survey completion and SM duration data. In preparation for the intervention, I administered a BAS to assist with identifying each participant's range and duration of daily activities experienced the previous day. The purpose of this survey was to assist in identifying alternative activities and their preference for these activities to assist with a selection of activities that the participants could choose from to replace SMU. This survey was administered for a second time for each participant during their intervention to inform any changes to their chosen activities to meet any current environmental needs. At the end of Phase 2, I administered an intervention acceptability questionnaire (IAQ) including questions presented by Stinson and Dallery (2023). This questionnaire was aimed at providing a self-reported evaluation of the intervention, to assist with understanding the benefits and limitations of this study.

Phase 2 Procedure

Proceeding the recruitment screening for participants via an online IAT, email correspondence with each participant was established and signed participant consent was obtained. I conducted an initial face-to-face Zoom meeting where I outlined the expectations and conditions for the study. During this meeting it was established that the SMU would be tracked automatically through the screen time function (aka screen time goal tracker, digital wellbeing) through the participant's own smartphone device. Participants were asked to turn off any current timer that may have been monitoring SM activity. They were asked to share their daily recorded data via a screenshot and send it to me via their survey (emailed to them) at the end of each day. A second face-to-face Zoom meeting was conducted to provide directions on how to set up the time limits and monitoring of their SM for the intervention. Once a stable baseline was established, participants began an

intervention. In the intervention, participants were asked to set time limits on their phone for SMU and to select three activities that they could engage in as a replacement to SMU. A discussion was had to determine strategies to encourage them to engage in their selected alternative activities. This was followed by email correspondence with participants who required further assistance. It was then determined if stable responding had occurred during the intervention, whether the participant would enter a withdrawal phase. At the completion of the intervention, participants will be asked to repeat the modified IAT to determine whether there have been any changes from their initial score.

Data Analysis

Data were collected through Qualtrics, resulting from distributed surveys and the collection of regular screenshots logging daily SMU. These data were analysed using behaviour-analytic graphical analysis created in Excel (Version 24.11, Microsoft 365), where daily SMU scores were plotted on a graph over time.

Results

Intervention Results

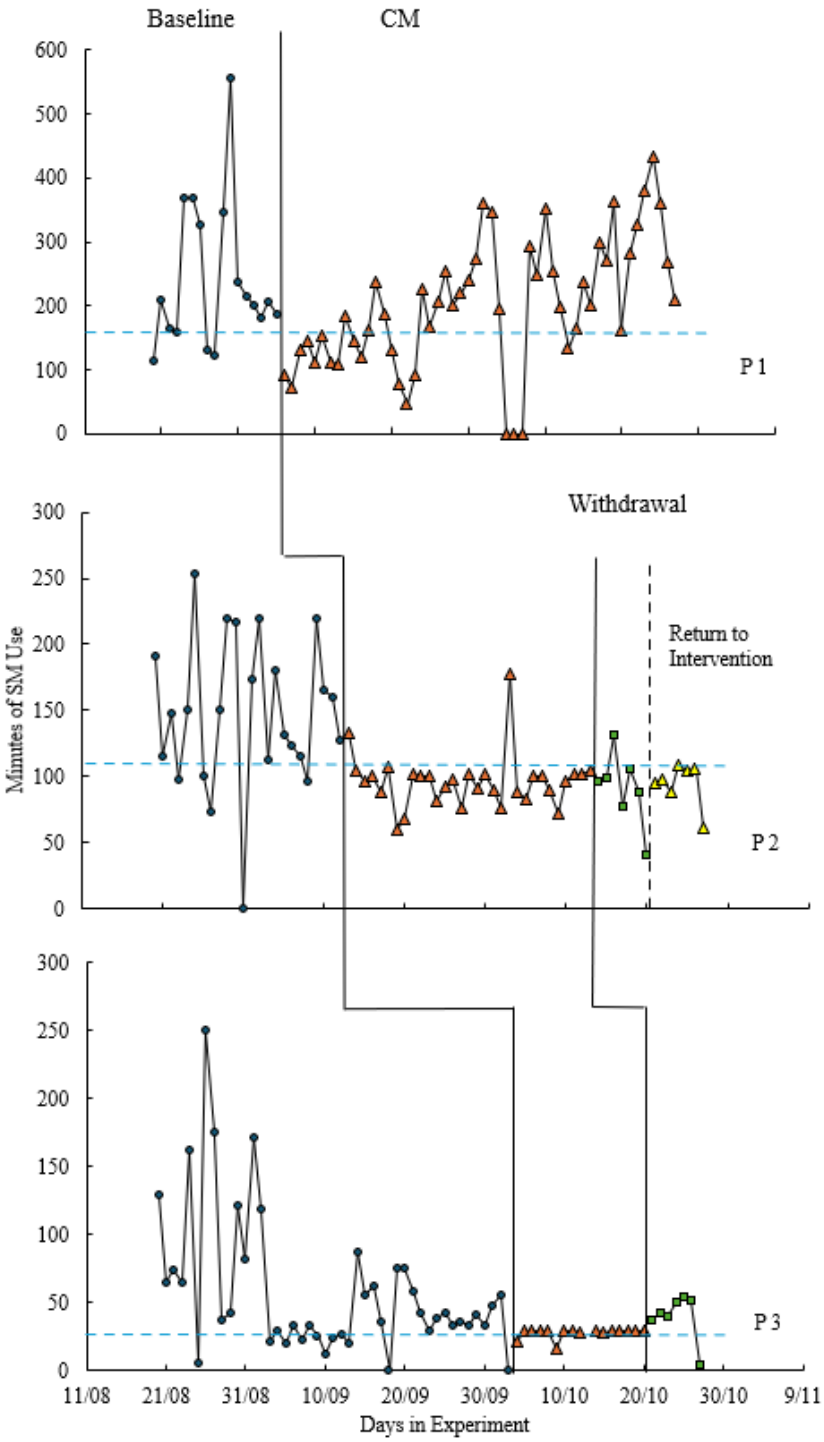
Figure 1 depicts the concurrent multiple-baseline results of the daily duration of SMU via smartphone for all participants (P1, P2, and P3) for baseline through to intervention, and a withdrawal phase for two participants (P2 and P3). In a visual analysis of these data, a high level of variability is evident in baseline across all three participants. The baseline average of SMU for P1 was *M*=244.13. The highest data point recorded for SMU was 555 mins, which did not reoccur during intervention. For P2, their baseline average of SMU was *M*= 153.43. The highest data point recorded for SMU was 253 mins, which also did not occur again during intervention. The baseline average of SMU for P3 was the lowest at *M*= 61.81. Though the highest data point recorded at 250 min, a drop in SMU contributed to a low

average. The mean average for each participant's SMU for baseline was presented to them to choose their own goal time limit for intervention. All three participant's SMU was recorded at or below their individual goal time limit for the first week of the intervention. P2 and P3 maintained SMU under their goal limit for the majority of the intervention phase, simultaneously, P1's SMU increased during the intervention phase. P1 was the first to transition into the intervention phase when several data points indicated steady state had been achieved. The first week of their intervention shows an immediacy of change, with a drop of SMU to below their goal time limit (180 min). On the 8th day of the intervention, P1 went away on holiday until Day 14. A return home was followed by a decrease in SMU (evident at Day 17), followed by an upward trend in use, and a large amount of variability in use for the remaining intervention phase. P1 reported feeling anxious during this time and attributed the increase in SMU to a previous pattern of using SM scrolling to lower anxiety. I recommended a change of alternative activities in the CM to activities that would possibly be more positively reinforcing, whilst withholding reinforcement of the SMU. However, exploring new activities did not decrease the duration of SMU. P2 was the next to transition to the intervention phase, with reasonably steady SMU evident, below the participant's goal time limit (105 mins). A spike in use on Day 22 was immediately followed by a return to SMU, at or below their goal limit. When steady state was observed in the intervention phase, a withdrawal phase was initiated for 1 week. A few data points indicate an area of overlap between phases and an increase in variability is visible during this time, followed by a return to intervention conditions that indicates a return to steady state and less variation in SMU. As data points are reasonably consistent within a similar range across the intervention and withdrawal phase it is inconclusive whether a carryover effect is evident, or the decrease in SMU is attributed to the intervention measures. P3 was the last to transition into the intervention phase. The receipt of daily data was delayed due moving house, and the

participant chose to drop their SMU at this time. The intervention phase indicates a consistent steady state of SMU at their goal limit (30 mins). A withdrawal phase was also initiated for P3 to determine whether the participant's drop in use was due to the intervention conditions. As evident in the withdrawal phase, a slight increase in use occurred over the withdrawal week. A return to intervention conditions was not observed for P3, due to end-of-study-time restraints. Overall, these results indicate a reduction of SMU to goal time limits (or below) during intervention for two out of three participants, with consistent steady state evident for these two participants.

Figure 1

Daily Duration of SMU Via Smartphone, For Participants P1, P2, and P3



Note. BL = Baseline, CM = Contingency Management. The horizontal dotted lines indicate each participant's goal duration of SMU, and the vertical dotted line indicates a return to intervention phase for Participant 2.

Percentage of Days At or Below Goal Social Media Duration

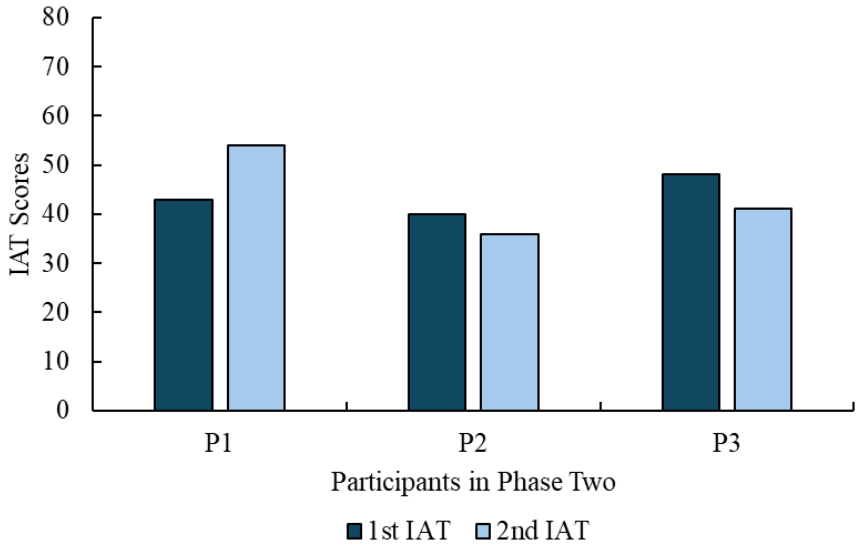
The percentage of days that P1 attained below their goal SM duration, were calculated from 16 day's total baseline, with 5 days at or <180 min goal time limit, at a total of 31%. Their intervention data were calculated from 53 days, with 22 days at or <180 min goal time limit, at total of 42%. This percentage reflects a brief period of time during week one of the intervention that goal duration times were met, however, this percentage is less than half the time of the intervention. For P2, baseline data were calculated from 22 days, with 4 days at or <105 min goal time limit, at a total of 18%. The intervention phase data were calculated from 39 days, with 32 days at or <105 min goal time limit, at a total of 82%. Baseline for P3, was calculated from 43 days, with 11 days at or <30 min goal time limit, at a total of 26%. The intervention phase was calculated from 16 days, with 13 days at or <30 min goal time limit, at a total of 81%. Similar results for P2 and P3 indicate a substantial increase in the percentage of days that they achieved below their goal SM time limit during intervention than during baseline.

Modified Internet Addiction Test Results, Phase 2

Depicted in Figure 2 are the participants' results from an initial pre-screening IAT, and subsequent post intervention test, Phase 2. For Participant 1 (P1), an initial score of 43/100 was followed by a second score of 54/100. This indicates an increase from a 'mild' addiction scale score to a 'moderate' score. Visual analysis of the data in Figure 2 illustrates an increase in SMU during intervention that coincides with the increased IAT score. Participant 2 (P2) scored 40/100 dropping to 36/100 on the second test, maintaining a 'mild' addiction score, suggesting less adherence to statements aligned with potentially problematic SMU (Young & Abreu, 2011). Participant 3 (P3) IAT scores reduced from the first test score of 48/100 to a second score of 41/100, also maintaining a 'mild' addiction score.

Figure 2

Participants Internet Addiction Test Scores Across Phase 1 and Phase 2



Note. Modified Internet Addiction Test (IAT) results, after screening (1st IAT), and repeated at the end of the intervention, Phase 2 (2nd IAT).

Table 2 indicates the hours participants spent in each activity itemized in the BAS, administered during baseline and repeated at the end of the intervention. The activities listed in this survey include the selection of alternative activities chosen by each of the participants for CM. The results for P1 indicate an increase in the duration of time spent in all activities during intervention than baseline (11 hrs, 18 hrs). However, the only increase from these activities as an alternative to SMU during intervention was "Q5. Time spent in study" (6 hrs). For P2, a decrease is evident in the duration of time spent in all activities during intervention than baseline (22 hrs, 15 hrs). Though an increase is evident in the duration of time spent in two alternative activities to SMU, "Q1. Reading for enjoyment" (1hr); and "Q5. Time spent in study" (2 hrs). The results for P3 indicate a slight decrease in the duration of time spent in all activities during intervention than baseline (9 hrs, 10 hrs). With an increase in one selected activity alternative to SMU, "Q7. Spending time with friends, family or partner." Overall,

these results do not indicate an increase in the duration of time spent in chosen activities alternative to SMU for P2 and P3.

Table 2

Participants Duration in Behaviour Allocation Survey Activities, for Baseline and Intervention

Questions	P1 Ist BAS	2nd BAS	P2 Ist BAS	2nd BAS	P3 Ist BAS	2nd BAS
1	0	0	0	1	1	0
2	0	0	2	4	0	0
3	1	1	4	2	0	2
4	0	0	0	0	1	1
5	0	6	1	2	1	0
6	8	4	2	0	1	2
7	1	4	4	5	2	4
8	0	1	0	1	0	0
9	1	0	2	0	2	0
10	0	2	0	0	0	0
11	0	0	7	0	2	0
Total	11	18	22	15	10	9

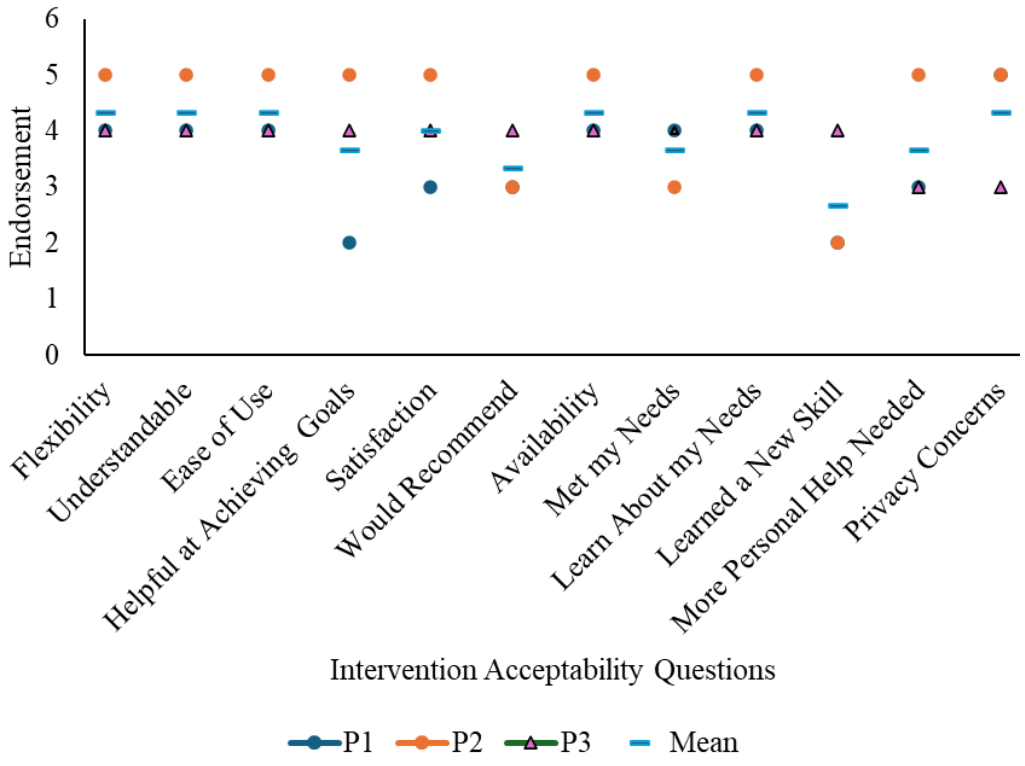
Note. BAS= Behavioural Allocation Survey, administered in baseline and intervention conditions.; 1st= Baseline; 2nd= Intervention. Highlighted numbers indicate participant's selection of alternative activities.

Figure 3 shows each participant's responses to an IAQ administered at the end of the study. Overall, these results indicate an agreement with the item statements indicating a strongly disagree to disagree score of 1-2, a neutral score of 3, and a agree to strongly agree score of 4- 5. These scores included questions "Q11. wanted more personal help," and "Q12. privacy concern" that are reverse coded. The average for all responses was *M*= 3.9 indicating

an overall agreement of satisfaction with the study. However, individual results from P1 indicate a lower score for Q4. "The intervention method has been helpful with achieving my goals" indicating a level of dissatisfaction with the method of intervention, which is in alignment with the unsuccessful maintenance of SM duration below their goal time limits. Another low score is evident from P2, for Q.10 "I learned a new skill, "indicating that the intervention did not teach a new skill to this participant. Results from the reverse coded items suggest no perceived issues with a lack of personal help, or privacy concerns for the study.

Figure 3

Individual Participants' Endorsements For Items on The Intervention Acceptability Questionnaire.



Note. Each mark indicates one individual's response; the horizontal lines indicate the mean response for that question.

Discussion

Results Discussion

The intervention revealed that CM under experimental conditions assisted with a decrease in SMU via smartphone device for all three participants during the first week of their intervention compared to baseline results. However, SMU increased again during the intervention for one participant (P1), while the two other participants (P2, P3) stayed consistently under their relative goal time limit for the duration of the intervention. There is no evidence from the BAS survey results to suggest that any increase in the duration of time spent in chosen alternative activities replaced SMU. Though this was a small study, the overall results indicate a successful reduction of SMU under CM for two out of three participants. These findings are similar to results reported by Stanley et al. (2022) and Stinson and Dallery (2023) who both reported some participants' SMU did not reduce enough to meet the conditions for monetary reward-based CM. Where my study differed with non-financial based CM, poses a question to the efficacy of financial vs non-financial based CM reward. Hunt et al. (2018) also utilized academic credits as a method of non-financial reward to reduce SMU to 30 mins per day for a group of university students. This method also provided no consequence if the goal reduction in SMU was not met. Results of this study concluded that the experimental condition of academic credit reward reduced SMU compared to a control condition without. However, limitations for this study were delays to the receipt of academic credits towards the end of the study which directly affected attrition rates, in a 79% drop off of participants (Hunt et al., 2018). The results of this study shed some light on the use of academic credits as a potentially motivating operation for students in lieu of monetary reward-based CM. Although poses questions as to whether the value and magnitude of academic credits is sufficient enough reward to maintain the level of constant data collection required for the length of a study. For this current study, participants' receipt of academic

credits was delayed until the end of the study, and this may have affected attrition rates in retaining a fourth participant. Although social reinforcement was used for CM, in the form of praise, and the frequency of personal contact was increased in response to reductions in data received from participants, I suggest the possibility that insufficient reinforcement and incentive magnitude relative to SMU may have been a barrier to meeting the criteria for CM and maintaining the target behaviour for P1. In addition, insufficient reinforcement may have contributed to the delays in receiving regular SM data across all participants, as literature suggests a large magnitude for CM reinforcement should match the abuse liability of problematic behaviours (Stanley et al., 2022). Overall, I have concluded the best explanation to understand why SMU for P1 reverted to baseline levels under CM conditions is the matching law principle. The matching law describes that choice is relative to preference, and individuals distribute their behaviour among available options according to the amount of reinforcement they receive for that behaviour. In addition, the individual's history of reinforcement relative to that activity can help predict their present choice (Reed & Kaplan, 2011). It can then be understood that an increase in SMU occurred in relation to the higher amount of reinforcement SMU provided. A potential option that could be considered in this situation would be to decrease the reinforcing value of SMU, an example of this would be to alter the visual display of a smartphone to remove colour, therefore making SMU less reinforcing and behaviour can be directed towards other reinforcing alternatives. With careful consideration of the attributing variables, I hypothesise that the increase in the duration of SMU during the intervention for P1 was caused by the negative reinforcement of escaping from study demands and the positive reinforcement provided by SMU. Given that the intervention was not equally effective for all three participants, there was a lack of generalisation across participants. An additional variation in this study from the original by Stinson and Dallery (2023) was the inclusion of participants from a wider age range (17-40

years). Recent New Zealand data indicates that higher percentages of Facebook and WhatsApp users are female, with 72% in the age group 30 – 49 years using the app on a daily basis, with the second highest recorded of 68.3% for the 18 – 29-year age group. Coincidently, this use of Facebook for the 30 – 49-year age group was the highest user group than any other group on a SM platform (Pacheao et al., 2023). Given higher SMU is associated with the 30–49-year age bracket, it is important for future researchers to include older participants in their studies as intervention effectiveness might depend on age.

Validity and Reliability Measures

Online data collection methods, including the use of SONA and Qualtrics to distribute consistent survey material amongst participants and collate statistical analytical reporting that contributed to validity and reliability for this study. In addition, these methods contributed to less handling and quicker online access. Digital data recording of SMU as monitored by the participants' smartphone 'screen time' function provided data collection across multiple SM platforms, with an option to select individual recorded activity from specific platforms. I conducted a screen time validity assessment prior to the commencement of the study, where I used an observer to time the duration I spent in three different SM applications with a stopwatch. We then compared the observer's duration with the smartphone screen time durations. I repeated this three times, each time I found that the screen time function of my smartphone approximated the total time spent on each SM platform down to the minute. Though there were subtle differences with the orientation of these features across devices (iPhone and Android), the 'screen time' function across smartphone devices was consistent, providing a measure of accuracy in data collection that increases data validity. Across research studies it is recognised that most regular SM use is via smartphone (Dixon, 2022), and the SM monitoring ability for smartphones is a viable intervention tool for reducing SMU

(Stanley et al., 2022). Therefore, I believe the decision to monitor SMU by smartphone device alone was a good option for this study.

Strengths

There are a number of strengths of this current study, one main strength was the online delivery, that the study was conducted entirely remotely. This can be an advantage for technology-based CM interventions that can make CM more accessible geographically and to underserved rural populations (Williams-Buttari et al., 2023). The benefit in this study working remotely was that participants were located in different parts of the country and instant remote access saved time that would have otherwise been required to commute to their location and the university. Instant online access, via email, Zoom, and Qualtrics, assisted with maintaining prompt responding for CM. Online studies are also ecological in the respect of conserving resources that are usually associated with in-person studies, including cost-saving options associated with fuel for travel. A further consideration in cost saving for this study was the lack of funding required for financially incentive prize-based CM. As previously stated, I aimed to provide a form of CM that is more cost effective than monetary rewards, in a method that would more closely reflect the real-world setting. An additional advantage was the extended study timeframe that provided an opportunity to observe participants' behaviour over the course of the semester, as this highlighted differences between when the students were on teaching recess and when they returned to regular university attendance when semester recommenced.

Limitations

A recognised limitation in this study is the representation of only female participants, though problematic smartphone and SM research has been more heavily associated with higher numbers of female (Busch & McCarthy, 2021) and adolescent participants, in an

increasing trend since 2010. Men have been included in SM studies, although their problematic use has been more associated with internet and online gaming (Andreassen et al., 2016; Arora & Mehta, 2023). Though a consideration for future research projects may include ways to encourage all genders. An additional limitation is recognised as the sparse number of participants in Phase 2. From the initial recruitment phase of this study (Phase 1), personal responses indicated a much larger pool of potential student candidates than the four participants that signed up for Phase 2. The majority of this group (23 of 43), scored between 31 to 49, indicating a 'mild' addiction, and 15 participants scored between 50 to 79, indicating a 'moderate' addiction on the IAT scale. With a group of student candidates who may benefit from a behavioural intervention to decrease SMU, it is unclear why there was such a low number of volunteers for Phase 2. Reasons may include the timeframe during the second study semester, that the academic credits may have been insufficient or that they did not consider their SMU to be problematic. The latter is a common consideration supported by research of SM and online gaming, that some individuals who spend longer in SM or in games than expected, or are unable to stop once in that environment, do not recognise that behaviour as problematic (Varona et al., 2022). These variables will need to be taken into consideration for any attempt at a replication of this study. The largest challenge in Phase 2 was regular delays in receiving daily data from participants, an ongoing challenge from the first week of data collection, ultimately influencing the length of time baseline was run before the intervention phase could start without affecting other participants. As the automated screen time function was a successful method of data collection via smartphone, perhaps other automated systems could be used that eliminate the delay in receiving regular data from participants. Verbeij et al. (2021) discussed the possibilities of using both self-reporting and digital trace measures, highlighting the benefits when a researcher's aim is to investigate the within-person effects of SMU.

Conclusion

My primary goal was to determine whether a package behavioural intervention (provided by Stinson & Dallery, 2023), involving CM, would be successful in reducing the duration of SMU via a smartphone device. Results indicate success in the reduction of SMU for two of three participants. However, results of the BAS survey present a lack of evidence to suggest any increase in the duration of time spent in chosen alternative activities replaced SMU. These results raise further questions regarding the effects of environmental changes on the strength of CM reinforcement for participants during the process of this method of intervention, and whether SMU is a more reinforcing option than alternatives. Identifying and evaluating the variables responsible for the maintenance of CM, and which consequences contribute to increases in SM, would better inform this method of intervention to provide greater overall success in reduction of SMU for individuals. Despite the limitation of a smaller study size, this approximate replication has tested the boundaries of non-financial based CM, and the possibilities for more cost-effective forms of CM intervention to reduce PSMU. The recognised negative health consequences associated with PSMU are elevated stress levels, poor sleep quality, and symptoms of anxiety and depression (Stanley et al. (2022), with risks including difficulty maintaining personal and professional relationships, work and academic performance. Researchers caution consumers of higher percentages of internet-based addiction in student populations (Bhargava & Velasquez, 2021). However, many benefits are associated with SMU including an environment where individuals can connect and strengthen bonds formed in existing friendships and create new friendships, which can help to reduce social isolation and loneliness (Keles et al., 2020). SM creates space with a freedom to communicate with and explore global social networking, where learning new information and gaining experiences can occur. The key to decreasing SMU by intervention is primarily centred around each individual's desire to trade in their time on SM

for time spent in alternative activities. The presence of SM applications on handheld smartphone devices increases the instant accessibility of their use, and the very design of SM platforms engages users in a way that can easily prolong the duration of use. Excessive SM is associated with negative effects, as such interventions that can reduce excessive use would benefit many individuals. A recommendation that could benefit future researchers includes exploring the effectiveness of non-financial reinforcers that are earned in association with decreases in SMU, rather than meeting larger targets. In addition to this study, a test could be to determine whether alternative activities actually act as reinforcers. Alternatives for CM could be explored with the consideration of immediate health and wellbeing practices that address mental health concerns around anxiety and depression. An addition to this could be a pre-screening of anxiety and depression as an antecedent measure before intervention to possibly assist intervention alternative CM activities. Longitudinal studies that track the long-term maintenance of this method of CM would also be beneficial, as there is also a body of research that discusses the potential for the renewal of problematic behaviour re-emerging following a change in context, and when behaviour is not placed into extinction (Muething et al., 2022; Podlesnik et al., 2017).

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Appendices

Appendix A, Ethics Application Approval Letter

Te Wānanga o Ngā Kete | ***Division of Arts, Law, Psychology & Social Sciences***

The University of Waikato
Private Bag 3105
Hamilton 3240
New Zealand

Te Kura Whatu Oho Mauri
School of Psychology
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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Zaida Moffat
zm45@students.waikato.ac.nz

Dr Rebecca Sargisson

Te Kura Whatu Oho Mauri
School of Psychology

30 May 2024

Dear Zaida

Re: **FS2024-23: Reducing Problematic Social Media Use by Behavioural Intervention**

Thank you for submitting your revised application to the ALPSS Human Research Ethics Committee. We have reviewed the final electronic version of your application and the Committee is now pleased to offer formal approval for your research activities.

We encourage you to contact the committee should issues arise during your data collection, or should you wish to add further research activities or make changes to your project as it unfolds. We wish you all the best with your research. Thank-you for engaging with the process of Ethical Review.

Kind regards,

Dr Oleg Medvedev, Convenor
Division of Arts, Law, Psychology & Social Sciences Human Research Ethics

Appendix B, Survey Information Sheet

Survey Information Sheet

Project Title:
Reducing Problematic Social Media Use by Behavioural Intervention

Principal Investigator:
Zaida Moffat

Supervisor:
Dr. Rebecca Sargisson, Expert in Behaviour Analysis Research

Introduction
Thank you for considering participating in this innovative research study. There are currently no empirically supported treatments for reducing problematic social media use. A recent study by Stinson and Dallery (2023) have created an intervention that has shown success in reducing social media use with nine university students in Florida USA. As the first test of this intervention package, I aim to test whether this method of intervention can be replicated with university students in New Zealand.

Study Purpose
The primary goal of this research is to reduce social media use by means of behavioural intervention.

Study Procedures
Your participation in this study will initially involve the completion of an online survey that includes a modified Social Media Addiction Scale questionnaire, those that met an "elevated score" criteria of this scale will be invited to participate in the study. This questionnaire is estimated to take between 20-30mins. Please take your time working through the questionnaire. Participants who complete the initial questionnaire but are not selected for the intervention will receive two credits.
I will meet with participants individually either on zoom or in person to explain the study thoroughly.

Through phases of this study, social media use will be tracked automatically by the participants' smartphone – they will be asked to share this information via screenshots sent to me at the end of each day. Once a stable baseline has been established, participants will begin an intervention.

At the completion of the intervention, you will be asked to repeat the Social Media Addiction Scale questionnaire to determine whether there have been any changes from your initial score. This study is estimated to take between 25-30 days to complete.

Potential Risks and Benefits
Risks: There are no known risks associated with this behavioural intervention.
Benefits: In addition to earning course credits to allocate to one of their papers in psychology, students will learn techniques to reduce their problematic social media use. A total of six course credits will be allocated during this study, two credits upon completion of the initial survey, two credits upon submission of baseline data, two credits upon completion of the second survey at the end of the experiment.

Participant Eligibility
I am seeking participants that self-identify as having a problem with excessive social media use and own a modern iPhone or Android smart phone device.

Confidentiality and Privacy
All personal information will be strictly confidential and used solely for the purpose of this research. Data will be anonymised in any publications or presentations resulting from this study. Your personal data will be securely stored for a minimum of 5 years. Secure data handling and storage protocols are in place to protect your privacy, in accordance with university guidelines and legal requirements.

Voluntary Participation and Rights
Participation in this study is entirely voluntary. You have the right to withdraw from the study at any point without any adverse effects or penalties. Should you choose to withdraw, you can decide whether your data collected to that point can be used in the study's analysis.

Contact
If you have any questions, please contact the principal investigator, Zaida Moffat, **zm45@students.waikato.ac.nz**.

Student health and wellbeing support services, contact information
If at any time you require support or guidance, please find further support information listed below:

University of Waikato, Student health services
https://www.waikato.ac.nz/students/health-wellbeing/student-health/
Hamilton campus: (07) 838 4037
Tauranga campus: (022) 013 9003

University of Waikato, Mental health services
https://www.waikato.ac.nz/students/health-wellbeing/student-health/mental-health/
Waikato & Bay of Plenty Mental Health Crisis Team: 0800 800 508
Lifeline Aotearoa Helpline: 0800 543 354, Text: 4357

We deeply appreciate your consideration of this opportunity to contribute to our research.

This research project has been approved by the Human Research Ethics Committee of the Division of Arts, Law, Psychology and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email alpss-ethics@waikato.ac.nz.

Consent
By proceeding with the attached online survey, you agree that:

1) You have read and understood this information
2) Questions about your participation in this study have been answered satisfactorily
3) You are taking part in this research study voluntarily
4) You understand that you can withdraw from this study at any time by contacting the principal investigator

 Check box for providing consent and agreeing to participation

Appendix B, Experiment Information Sheet

Experiment Information Sheet

Project Title:
Reducing Problematic Social Media Use by Behavioural Intervention

Principal Investigator:
Zaida Moffat

Supervisor:
Dr. Rebecca Sargisson, Expert in Behaviour Analysis Research

Introduction
Thank you for considering participating in this innovative research study. There are currently no empirically supported treatments for reducing problematic social media use. A recent study by Stinson and Dallery (2023) have created an intervention that has shown success in reducing social media use with nine university students in Florida USA. As the first test of this intervention package, I aim to test whether this method of intervention can be replicated with university students in New Zealand.

Study Purpose
The primary goal of this research is to reduce social media use by means of behavioural intervention.

Study Procedures
Through phases of this study, social media use will be tracked automatically by the participants' smartphone – they will be asked to share this information via screenshots sent to me at the end of each day. Once a stable baseline has been established, participants will begin the intervention.
During the intervention, each participant will decide on a goal for the duration of social media use per day (which will be lower than the average amount in baseline). Each participant will also be asked to select three activities that they could engage in as replacements to social media use. They will complete the Behaviour Allocation Survey to assist with this. I will assist them in a face-to-face or zoom discussion to determine strategies to encourage them to engage in these activities. Additionally, participants will be asked to set time limits on their phone for social media use.
At the completion of the intervention, you will be asked to repeat the Social Media Addiction Scale questionnaire to determine whether there have been any changes from your initial score. This study is estimated to take between 25-30 days to complete.

Potential Risks and Benefits
Risks: There are no known risks associated with this behavioural intervention.
Benefits: In addition to earning course credits to allocate to one of their papers in psychology, students will learn techniques to reduce their problematic social media use. A total of six course credits will be allocated during this study, two credits upon completion of the initial survey, two credits upon submission of baseline data, two credits upon completion of the second survey at the end of the experiment.

Confidentiality and Privacy
All personal information will be strictly confidential and used solely for the purpose of this research. Data will be anonymised in any publications or presentations resulting from this study. Your personal

data will be securely stored for a minimum of 5 years. Secure data handling and storage protocols are in place to protect your privacy, in accordance with university guidelines and legal requirements.

Voluntary Participation and Rights
Participation in this study is entirely voluntary. You have the right to withdraw from the study at any point without any adverse effects or penalties. Should you choose to withdraw, you can decide whether your data collected to that point can be used in the study's analysis.

Informed Consent
All participants will be required to sign an informed consent form which details the study procedures, risks, and benefits, as well as your rights as a participant. If you have any questions, please contact the principal investigator, Zaida Moffat, **zm45@students.waikato.ac.nz**.

Student health and wellbeing support services, contact information
If at any time you require support or guidance, please contact the principal investigator (Zaida Moffat). In addition, further support information is listed below:

University of Waikato, Student health services
https://www.waikato.ac.nz/students/health-wellbeing/student-health/
Hamilton campus: (07) 838 4037
Tauranga campus: (022) 013 9003

University of Waikato, Mental health services
https://www.waikato.ac.nz/students/health-wellbeing/student-health/mental-health/
Lifeline Aotearoa Helpline: 0800 543 354, Text: 4357
Waikato & Bay of Plenty Mental Health Crisis Team: 0800 800 508

We deeply appreciate your consideration of this opportunity to contribute to our research.
This research project has been approved by the Human Research Ethics Committee of the Division of Arts, Law, Psychology and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email alpss-ethics@waikato.ac.nz.

Appendix B, Experiment Consent Form

EXPERIMENT CONSENT FORM

Project Title: Reducing Problematic Social Media Use by Behavioural Intervention

Please complete the following checklist. Tick (✓) the appropriate box for each point.	**YES**	**NO**
1. I have read the Information Sheet, and I understand it.		
2. I am willing to consent to participate in this study		
3. I understand that being part of the study is voluntary (my choice) and that I may withdraw consent without penalty at any time up until two weeks post intervention, retaining participation credits that I have accumulated.		
4. I know who to contact if I have any questions about the study in general.		
5. I would like a copy of the final report emailed to me		

Signature: Date:

Name:

Contact email address:

Appendix C, Research Instruments

Social Media Use Questionnaire (Version used by Stinson & Dallery, 2023)

1. Your age:_____
2. Your gender _____
3. Do you have an iPhone, Android, or other? _____
4. We would like to know about what you do --are you a student, working now, looking for work, retired, keeping house, or what?
   - [ ] 1 WORKING NOW
   - [ ] 2 ONLY TEMPORARILY LAID OFF, SICK LEAVE OR MATERNITY LEAVE
   - [ ] 3 LOOKING FOR WORK, UNEMPLOYED
   - [ ] 4 RETIRED
   - [ ] 5 DISABLED, PERMANENTLY OR TEMPORARILY
   - [ ] 6 KEEPING HOUSE
   - [ ] 7 STUDENT
   - [ ] 8 OTHER (SPECIFY):_____
5. Do you consider yourself Hispanic/Latino?
   - [ ] 1 YES
   - [ ] 2 NO
   - [ ] 7 REFUSED
   - [ ] 9 DON'T KNOW
6. What race do you consider yourself? Please select 1 or more of these categories.
   - [ ] 10 WHITE
   - [ ] 11 BLACK/AFRICAN AMERICAN
   - [ ] 12 INDIAN (AMERICAN)
   - [ ] 13 ALASKA NATIVE
   - [ ] 14 NATIVE HAWAIIAN
   - [ ] 15 GUAMANIAN
   - [ ] 16 SAMOAN
   - [ ] 17 OTHER PACIFIC ISLANDER (SPECIFY)
   - [ ] 18 ASIAN INDIAN
   - [ ] 19 CHINESE
   - [ ] 20 FILIPINO
   - [ ] 21 JAPANESE
   - [ ] 22 KOREAN
   - [ ] 23 VIETNAMESE
   - [ ] 24 OTHER ASIAN (SPECIFY)
   - [ ] 25 SOME OTHER RACE (SPECIFY)_____
   - [ ] 77 REFUSED
   - [ ] 99 DON'T KNOW
7. How many hours per week do you spend on Facebook? _____
8. How many hours per week do you spend on Snapchat? _____
9. How many hours per week do you spend on Twitter? _____
10. How many hours per week do you spend on Instagram? _____
11. Do you have any other social media accounts? _____

---

12. If you have an iPhone or Android that has a screen time feature, how many hours in the last day did you spend on different social media accounts?
    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

To answer the following questions, please reference the definition of social media below: forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos) (Merriam-Webster, 2019).

1. Do you find that you stay on social media longer than you intended?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

2. Do you neglect household chores to spend time online?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

3. Do you prefer excitement on social media to intimacy with your partner?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

4. Do you form new relationships with fellow social media users?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

5. Do others in your life complain to you about the amount of time you spend on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

6. Does your work suffer (e.g. postponing things, not meeting deadlines, etc.) because of the amount of time you spend on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

7. Do you check your social media before something else that you need to do?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

8. Does your job productivity or performance suffer because of social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

9. Do you become defensive or secretive when anyone asks what you do on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

10. Do you block of disturbing thoughts about your life with soothing thoughts of social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

11. Do you find yourself anticipating when you go online again?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

12. Do you fear that life without social media would be boring, empty and joyless?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

13. Do you snap, yell, or act annoyed if someone bothers you while you are on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

14. Do you lose sleep due to late night social media use?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

15. Do you feel preoccupied with social media when off-line or fantasize about online?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

16. Do you find yourself saying “Just a few more minutes” when on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

17. Do you try to cut down the amount of time you spend on social media and fail?

1	2	3	4	5

Never	Rarely	Sometimes	Often	Always

18. Do you try to hide how long you've been on social media?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

19. Do you choose to spend more time on social media over going out with others?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

20. Do you feel depressed, moody or nervous when you are off social media, which goes away once you are back on it?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

Appendix C, Research Instruments

Social Media Use Questionnaire (Revised)

1. Your age:_____
2. Your gender: _____
3. Your ethnicity, please select 1 or more from the following:

☐ NZ European ☐ Maōri ☐ Pacific Island ☐ Asian

☐ MELAA (Middle Eastern/ Latin American/ African ☐ Other ethnicity

4. Do you have an iPhone or Android, or other? _____
5. Is your smart phone less than 7 years old? _____

6. Do you access your social media account from a laptop or PC? _____
7. How many hours per week do you spend on Facebook? _____
8. How many hours per week do you spend on Snapchat? _____
9. How many hours per week do you spend on Twitter? _____
10. How many hours per week do you spend on Instagram? _____
11. Please list any other social media accounts you may use:

_____

How many hours a week do you spend on other social media accounts?

_____

12. If you have an iPhone or Android that has a screen time feature, how many hours in the last day did you spend on different social media accounts?
    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

    Social media type (e.g. Facebook, Twitter, etc.): _____ Duration: _____

To answer the following questions, please reference the definition of social media below: Forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos) (Merriam-Webster, 2019).

21. Do you find that you stay on social media longer than you intended?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

22. Do you neglect household chores to spend time online?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

23. Do you prefer excitement on social media to intimacy with your partner?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

24. Do you form new relationships with fellow social media users?

1	2	3	4	5

Never Rarely Sometimes Often Always

25. Do others in your life complain to you about the amount of time you spend on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
26. Does your work suffer (e.g. postponing things, not meeting deadlines, etc.) because of the amount of time you spend on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
27. Do you check your social media before something else that you need to do?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
28. Does your job productivity or performance suffer because of social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
29. Do you become defensive or secretive when anyone asks what you do on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
30. Do you block disturbing thoughts about your life with soothing thoughts of social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
31. Do you find yourself anticipating when you go online again?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
32. Do you fear that life without social media would be boring, empty and joyless?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
33. Do you snap, yell, or act annoyed if someone bothers you while you are on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
34. Do you lose sleep due to late night social media use?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
35. Do you feel preoccupied with social media when off-line or fantasize about online?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
36. Do you find yourself saying “Just a few more minutes” when on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
37. Do you try to cut down the amount of time you spend on social media and fail?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
38. Do you try to hide how long you’ve been on social media?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
39. Do you choose to spend more time on social media over going out with others?
    1 2 3 4 5
    Never Rarely Sometimes Often Always
40. Do you feel depressed, moody or nervous when you are off social media, which goes away once you are back on it?
    1 2 3 4 5
    Never Rarely Sometimes Often Always

Appendix C, Research Instruments

Behavior Allocation Survey

How many hours did you engage in each of the activities listed below yesterday? If there is another activity that you spent time doing that is not listed, please add it to the "other" section.

- Reading for enjoyment _____hours
- Watching a movie or series or episodes _____ hours
- Exercising _____ hours
- Talking on the phone/ Video call (Facetime etc.) _____ hours
- School work/ Study _____ hours
- Employed work, paid or voluntary _____ hours
- Spending time with friends, family or partner _____ hours
- Hobbies, Crafting _____ hours
- Cooking or baking _____ hours
- Online gaming _____ hours
- Other
- _____ hours
- _____ hours

Appendix C, Research Instruments

Intervention Acceptability Questionnaire

For the following statements, please rate your experience with the intervention phase of this study.

	Strongly disagree	Disagree	disagree	Agree	Strongly agree
The intervention method was flexible	○	○	○	○	○
The intervention method was understandable	○	○	○	○	○
The intervention method was easy to use	○	○	○	○	○
The intervention method has been helpful with achieving my goals	○	○	○	○	○
I am satisfied with the results from the intervention method	○	○	○	○	○
I would recommend this intervention method to others	○	○	○	○	○
The intervention method was easily available	○	○	○	○	○
The intervention method met my needs	○	○	○	○	○
The intervention method provided me with an opportunity to learn about my own needs	○	○	○	○	○
I learned a new skill	○	○	○	○	○
I could have done with more personal help	○	○	○	○	○
I have privacy concerns from the method of this study	○	○	○	○	○

Questions:

1. The intervention method was flexible
2. The intervention method was understandable
3. The intervention method was easy to use
4. The intervention method has been helpful with achieving my goals
5. I am satisfied with the results from the intervention method
6. I would recommend this intervention method to others
7. The intervention method was easily available
8. The intervention method met my needs
9. The intervention method provided me with an opportunity to learn about my own needs
10. I learned a new skill
11. I could have done with more personal help
12. I have privacy concerns from the method of this study