Social Media Breaks: An Opportunity for Recovery and Procrastination

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Social media (SM) breaks from studying can either support students' wellbeing and performance by acting as a recovery behaviour or subvert it by acting as a procrastination behaviour. It is currently unclear which influences lead an SM break to be a positive recovery vs. negative procrastination behaviour. A behavioural and emotion regulation (ER) perspective may help to elucidate these influences. In this paper, we report a semi-structured interview study with 20 undergraduates to explore their experiences of SM breaks when studying. Our analysis describes how motivational and environmental factors can influence a break's propensity for recovery or procrastination during the break initiation and execution phases. We apply an ER perspective to these reports and demonstrate how it helps to explain further in which circumstances SM breaks are likely to support recovery or procrastination. Based on this analysis, we present recommendations for designing interventions to support healthy breaks and reduce unhealthy ones.

1 INTRODUCTION

University students will often multitask with social media (SM) technologies for off-task purposes when studying [34,36,37,71,102]. SM multitasking refers to a behaviour in which an individual switches between their primary task and SM in an interleaving manner. This can be seen as digital break-taking in a work or study context [91]. Some research has found that engagement in such SM breaks can be a distractive and procrastinatory behaviour that negatively impacts academic performance and wellbeing [1,99,135]. However, other research demonstrates that these breaks can positively affect performance [122,163] and wellbeing [27,94]. One reason for these mixed findings is that SM breaks can be an opportunity for recovery and procrastination [118]. It is essential, therefore, to understand the factors that influence these differing outcomes.

Existing research suggests that the behavioural factors underlying SM breaks can be helpful in better understanding why they can support recovery and procrastination. Comprehensive behavioural frameworks [45,100] posit that *environmental* factors (influences outside of the individual), *motivational* factors (internal automatic or controlled processes), and *capability* factors (psychological and physical abilities) interact to characterise digital media behaviour. These factors seem to influence the propensity for digital media behaviours to act as a form of recovery or procrastination. Past examples include environmental factors such as notifications and social presence [6,96,117,118,120,121,123], motivational factors such as controlled and

automatic processes [97,99,118,123,127], and capability factors such as level of media challenge/effort [115,119].

Whilst comprehensive behavioural frameworks provide a helpful starting point, adopting a specific theoretical perspective may help further understand why SM breaks can support recovery and procrastination. Theories of media multitasking point towards the idea that individuals take SM breaks to regulate emotion [4,92,153,165,168]. This phenomenon applies to students, who often take SM breaks to balance their emotions [94] due to the increased workload demands of their academic lives [150]. Employing perspectives from emotion regulation (ER) research may thus help better understand why such breaks are sometimes a form of recovery and other times procrastination.

Existing research investigating SM breaks as a form of recovery and procrastination [58] describes the moderating *situational SM factors* (i.e. the non-behavioural factors influencing the recovery/procrastinatory potential of breaks such as SM content valence). In contrast, this paper focuses on mapping out the specific SM behaviours and their underlying factors in greater detail. In addition, no one, to the best of our knowledge, has analysed SM breaks using ER frameworks [51]. This paper aims to incorporate an ER perspective into the identified SM behaviours and factors characterising breaks as recovery and procrastination. Therefore, in this study, we report the findings of a semi-structured interview study that sought to answer the following research questions (RQs):

1. **What types of SM behaviours characterise a break as a form of recovery or procrastination?**
2. **What behavioural factors underlying these SM behaviours distinguish a break as a form of recovery or procrastination?**
3. **To what extent does an ER perspective help to better understand an SM break as a form of recovery or procrastination?**

The key contributions of this paper are: 1) a descriptive model of the behavioural and ER factors that influence break initiation and execution such that an SM break supports either recovery or procrastination, and 2) recommendations based on the identified factors that researchers can use to design interventions to support individuals to engage in healthy SM breaks and reduce unhealthy ones.

2 RELATED WORK

2.1 SM breaks

In this paper, we define *SM breaks* as a behaviour in which an individual switches between their primary task and SM in an interleaving manner for off-task purposes. This definition is derived from work by Mark and colleagues [91,94], who view this type of multitasking as commonplace digital break-taking, particularly in the workplace (e.g., workers interrupting their tasks to check Facebook whilst at their desks). Multiple studies demonstrate that students take SM breaks while self-studying (outside the lecture/classroom environment) [34,36,37,71,102]. Breaks are often frequent and collectively may take up a large portion of a student's study session. For example, Calderwood et al. [25] found that students engaged in non-study task smartphone messaging and computer-based internet use on average 35 times for a total of 26 minutes across a 3-hour study session, and Rosen et al. [122] found students would last an average of 6 minutes on a study task before switching to SM.

2.2 SM breaks: a double-edged sword

There are concerns about the negative consequences of SM breaks for students' academic performance and wellbeing. Mokhtari et al. [102] found that most students felt digital breaks

affected their concentration levels. Multiple studies by Junco [61,62] and colleagues [63–65] have shown that SM breaks are negatively associated with class grade-point average (GPA) scores and schoolwork performance quality. Xu et al. [164] found that student engagement in digital breaks during cognitive activities such as studying was negatively associated with social and psychological wellbeing. In a comprehensive review, van der Schuur et al. [129] found that higher levels of digital breaks were associated with poorer socioemotional functioning. Digital breaks are also associated with an increased risk of depression and anxiety symptomology in adolescents [27].

However, other studies suggest that the consequences of SM breaks on performance and wellbeing are challenging to predict. The same review by van der Schuur et al. [129] found that the impact of digital breaks on cognitive control (a measure of academic performance) was mixed, with weak relationships between digital breaks and performance-based metrics (task switching, response inhibition, working memory). Further, the negative relationships between digital breaks and academic performance are often small-to-moderate in effect size and not statistically significant. Multiple studies show an inverted-U relationship between digital breaks and academic performance – whereby small and substantial levels of breaks are associated with poor academic performance, but medium levels are associated with *improved* academic performance [161,162]. Further, two in-depth time-sensitive logging studies of students by Wang & Mark [151] and Wang et al. [152] found that students who differed in their propensity to take SM breaks did not differ in their academic performance. Regarding well-being, a logging study by Mark et al. [94] found that whilst heavier multitasking (which included SM breaks) was associated with decreased positive affect, SM use was still associated with decreased stress. Relatedly, a logging study by Wang et al. [152] found that whilst constantly checking SM over the day was negatively associated with an end-of-the-day positive affect, self-report data showed that students felt SM use reduced their stress in the short-term.

2.2.1 *SM breaks: recovery or procrastination?*

One explanation for the mixed impact of SM breaks on students' academic performance and wellbeing is that they can be either a healthy recovery or an unhealthy procrastination behaviour. *Recovery* is "the process of replenishing depleted resources or rebalancing suboptimal systems" [134:331]. Sonnentag & Fritz [133] posit four facets of a recovery experience: *psychological detachment* (mentally disengaging from a demand), *relaxation* (a psychobiological state of low arousal/activation and positive affect), *mastery* experiences (activities that build up internal resources such as skills and self-efficacy) and *control* (the level of perceived autonomy over the recovery behaviour choice, which likewise builds internal resources such as self-efficacy and competence). A *recovery behaviour* refers to activities that support a recovery experience by providing new resources (e.g., self-regulatory, social support, physiological activation) alongside respite from resource-draining demands to allow an individual to return to an optimal physical and psychological functioning state [115]. SM can support recovery by acting as digital *microbreaks* (voluntary rest activities from work that last within seconds to minutes range) [43,69]. This may help explain the sometimes positive impact of SM breaks on students' academic performance and wellbeing, for example, supporting academic performance and wellbeing through psychological detachment and relaxation [160,161].

By contrast, a *procrastination behaviour* refers to "the voluntary delay of an intended and necessary and [personally] important behaviour, despite expecting potential negative consequences that outweigh the positive consequences of the delay." [70:26]. This behaviour is, fundamentally, a failure of an individual to self-regulate their impulses and desire to feel good in the short-term, which puts the attainment of longer-term goals at risk [118,132]. Using technologies to procrastinate has been termed *cyberslacking* or *cyberloafing* [80,86]. When an

SM break promotes procrastination, it can harm students' academic performance and wellbeing. For example, procrastination with Facebook increases students' academic stress and decreases overall wellbeing [99].

2.2.2 SM behaviours and factors: distinguishing between breaks for recovery and procrastination. Understanding why an SM break can sometimes support recovery and, at other times, procrastination requires a comprehensive approach. However, there is currently no existing overarching framework that suits our needs. Therefore, through a synthesis of prior literature, we propose that an SM break can be analysed in terms of its underlying *behavioural factors* (environmental, motivational, capability) and specific *SM behaviours* (active or passive usage) to understand these differing outcomes. The model in Figure 1 visualises this proposal. It outlines how a break involves behavioural factors (determinants) that interact to generate an SM behaviour, supporting recovery or procrastination. The single and double-headed arrows indicate the influences between components within the model. First, environmental (e.g., notifications from friends) and capability (e.g., platform expertise) factors influence an individual's motivation to enact a behaviour (e.g., online messaging) which has a particular outcome (recovery/procrastination). In other words, the more capable an individual is and the more conducive an environment is, the more likely there will be motivation to enact behaviours that support a particular outcome. Second, enacting an SM behaviour can provide feedback to alter environmental, motivational, and capability factors positively or negatively. For example, online messaging will improve one's capability and further social opportunities, increasing motivation to engage in the behaviour. The following sections will outline how we arrived at this model.
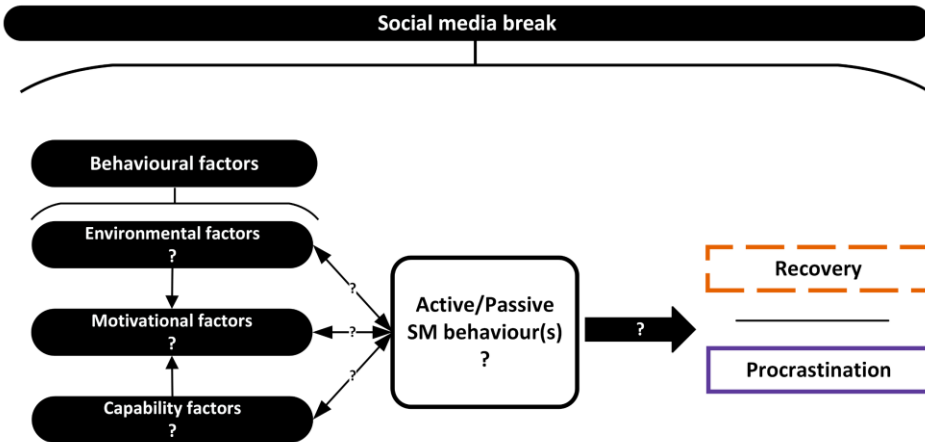

Figure 1: A proposed model outlining how SM breaks can be analysed through its behavioural factors: environmental, motivational, and capability (derived from [45,100]) (black rounded rectangles) and SM behaviours: active and passive SM usage (white rounded square) to characterise it as either a form of recovery (orange dotted rectangle) or procrastination (purple solid rectangle). Question marks indicate these factors and behaviours, and their links to recovery/procrastination are currently unknown.

To better understand why an SM break has the potential to be either a form of healthy recovery or unhealthy procrastination, it is helpful to step back and understand the nature of the behaviour itself. Past work has developed integrated models of behaviour that provide a comprehensive overview spanning *behaviourist* (behavioural factors from the external

environment) and *cognitivist* (behavioural factors from the internal cognitive environment) paradigms to identify underlying causal factors.

The COM-B model [100] (see Figure 2) is a comprehensive model that unifies external generators of behaviour with the controlled and automatic cognitive processes of behaviour. It posits that three factors interact to generate a behaviour:

- **Capability**: an individual's psychological and physical capabilities
- **Opportunity**: the external physical and social affordances that enable the behaviour
- **Motivation**: the internal conscious/unconscious mental processes that energise and direct behaviour

Similarly, Fogg's Behaviour Model [45] (see Figure 2) posits that any technology use behaviour is a result of three factors that must be present:

- **Motivation**: an individual must be sufficiently motivated to perform a behaviour
- **Ability**: an individual must have sufficient skills and capacity to perform a behaviour
- **Prompt/Trigger**: an environmental trigger must be present to activate the behaviour.
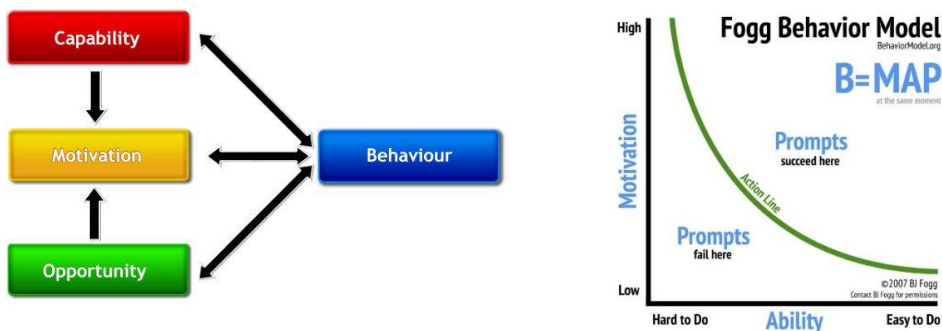
Figure 2: The COM-B model of behaviour (left), where capability, opportunity, and motivation interact to generate behaviour (from [100]) and the Fogg Behavior Model (right), where sufficient motivation, ability and prompts must be present for a behaviour to occur (from [45]).

The COM-B model and Fogg Behaviour Model are helpful here because their categorisation of behaviour into its causal constitutions affords a deeper understanding of SM breaks, which at the surface level look similar but have differing outcomes (recovery/procrastination). Synthesising these two models for this purpose is reasonable for several reasons:

1. The COM-B model is well positioned theoretically (due to the embedded PRIME theory of motivation within its workings [157]) to systematically analyse behaviour. However, its broad scope means it is relatively underutilised in a Human-Computer Interaction (HCI) context. Conversely, the Fogg Behaviour Model was derived within a technology-context to study user behaviour. However, it lacks clarity in its underlying psychological mechanisms because it is a process model rather than a theory [108].
2. The behavioural factors outlined by both models overlap conceptually (motivational factors are the same, capability and ability factors are the same, and prompts/triggers fall under opportunity as a physical affordance).
3. Previous HCI research has integrated the two models for their study purposes, such as developing digital behaviour change interventions [82].

Thus, synthesising these models and applying them to SM break-taking enables us to see that the SM behaviour(s) during a break can be analysed through three-factor categories:

1. **Environmental factors** (Opportunity/Prompt): factors outside of an individual influencing SM behaviours such as smartphone access, notifications, and social influence.
2. **Motivational factors** (Motivation/Motivation): factors that are internal to the individual, such as the mental processes guiding behaviour, which can either be *automatic* (those which are habitual, instinctive, drive-related, or affective processes

– for example, desires and habits), or *controlled* (those which involve conscious thought processes – for example, plans and evaluations).

3. **Capability factors** (Capability/Ability): factors relating to an individual's physical and psychological ability to perform a behaviour, such as the physical or psychological effort and knowledge required.

These behavioural factors may help to characterise an SM break as a form of recovery or procrastination. Environmental factors such as external notifications [6,123] and social triggers [6,131] have been previously associated with using digital media for procrastination. Motivational factors such as controlled and goal-oriented motivations have been linked to digital media use for recovery [75,118] and automatic motivational processes (e.g., habits) linked to procrastination [85,99,123,127]. Lastly, capability factors such as the level of expertise in using digital media influence whether a digital media behaviour is a form of recovery or procrastination [28,115,119].

In addition to the behavioural factors are the specific SM behaviours they determine during breaks. These behaviours can be organised into the *active* and *passive* SM use dichotomy. *Active SM use* involves direct interaction with people (e.g., messaging friends, liking/commenting on posts, or posting status updates or content). *Passive SM use* involves consuming SM content without directly interacting with people (e.g., browsing a News Feed) [23,77,147]. Scholars have attempted to expand within this dichotomy through developed subscales. Kaye [67] proposes a practical conceptual framework that identifies sub-usage-styles for active SM use: *interactive SM use* (user operates as sender and recipient, e.g. actively messaging others), *reactive SM use* (user is reacting as recipient to other's content, e.g. liking content, responding to messages, commenting), and *broadcasting SM use* (user is sending information in one-way exchange, e.g., posting content) – alongside *passive SM use* (user is not engaging with content in an interactive/reactive way e.g., accessing content). Initial research with this dichotomy seemed to suggest that active SM use increases wellbeing and passive use decreases wellbeing. This is known as the *active and passive SM use hypothesis* [148]. However, mounting evidence suggests little support for the initial hypothesis, with the relationship between active and passive SM use and wellbeing depending upon various factors such as how wellbeing and illbeing are conceptualised, how active and passive behaviours are defined, and heterogeneity in person-, situation-, and technology-specific characteristics (e.g., personality traits, content valence) [98,145,146]. This evidence has led some scholars to point out the limitations of this dichotomy, as it hides nuanced cases that may straddle between both types of usage. For example, some SM behaviours are more active than others, such as messaging a friend versus 'liking' a post, where the latter is too active to be passive use but not as interactive as messaging [10]. Whilst these findings have called into question the validity of the active/passive dichotomy, scholars [98] have defended its use in several ways:

1. The dichotomy holds utility in supporting a more fine-grained analysis of SM use than other measures (e.g., time spent on SM/frequency of SM use). Recent reviews [146] have recommended utilising the dichotomy to explore more nuanced measures of SM behaviours in relation to wellbeing that account for other characteristics (e.g. SM content, senders, and receivers). The current study utilises this approach by exploring the impact of different SM behaviours on wellbeing by accounting for variations in their underlying behavioural and ER factors.

2. The dichotomy is valuable heuristically as it affords good translational research. The simple framing supports the development of actionable insights for changing SM use to improve wellbeing. The current study will achieve this through design insights that researchers can use to develop interventions to support students to engage in healthy SM breaks and reduce unhealthy ones when studying.

3. The dichotomy allows SM research that generalises across different SM platforms. This is because the binary applies across multiple social technologies ranging from pre-

Facebook online communities to TikTok due to its alignment with core SM features and interactions. The current study aims to use this to explore platform-non-specific SM breaks.

Therefore, as summarised in Figure 1, underlying behavioural factors (environmental, motivational and capability) and the active/passive dichotomy are helpful starting points for understanding why an SM break can support recovery or procrastination. However, an additional ER perspective may also prove helpful in investigating the phenomenon.

2.3   Digital breaks: the importance of ER

2.3.1   ER theories, models, and frameworks.

Digital media multitasking perspectives derived from established theory and empirical research [4,92,109,168] can help to explain further why SM breaks may sometimes support recovery or procrastination. A common theme underlying them all is that digital breaks have a core function of regulating an individual's emotions. *Uses and Gratifications theory* applied to media multitasking posits that individuals are aware of their psychological and social needs, with the goal of media multitasking being to gratify *emotional needs* – "needs related to strengthening aesthetic, pleasurable, and emotional experience' '[66:166] by increasing positive emotions [165,168]. *Emotional homeostasis* posited by Mark based on an in-situ study of office workers [92] suggests that individuals will engage in media multitasking to maintain or achieve a particular attentional/emotional state in the face of environmental demands – for example, office workers self-interrupting with digital media to relieve stress. Lastly, the theory of *self-regulation* applied to media multitasking posits that individuals engage in goal-directed digital media behaviours to reduce the discrepancy between a current and desired state (increasing positive and decreasing negative emotions) [4,109].

An ER perspective may be a useful theoretical lens for further understanding the capacity of SM breaks to support recovery and procrastination. *ER* refers to "processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" [50:275]. To avoid conceptual confusion between affect, emotion, mood, and stress, ER can subsume these categories as they all fundamentally relate to changing *core affect* (the sensation of goodness or badness, and energy or enervation) [72]. The use of digital technologies for ER has been termed *digital ER* [149]. Indeed, SM is commonly used to regulate emotion [26,40,41,60,68,83,94,107], often to increase positive emotions [41]; for example, Panger [107] found that individuals use SM to support facets of recovery such as relaxation.

Different models and frameworks comprise an ER perspective. ER processes, ER motives, and ER strategies (strategy categories, strategies, subtypes) categorise the various factors. Those relevant to this paper are presented in detail in Table 1 and described below.

ER processes are the core processes underlying ER. Of relevance to this paper are *intra/inter-personal ER* and *implicit/explicit ER*. Intra-personal ER refers to ER *within* an individual. *Inter-personal ER* refers to ER *between* individuals and can be specified as *intrinsic inter-personal ER* when Person A engages with Person B to regulate Person A's emotion [39,56,167]). *Implicit ER* refers to intentions and processes that are automatic and not consciously accessible. *Explicit ER* refers to intentions and processes that are deliberate and consciously accessible [21,73,74]).

ER motives are the various reasons for engaging in ER [136]. Of relevance to this paper are *pro-hedonic* and *instrumental-performance ER motives*. *Pro-hedonic motives* are when an individual regulates their emotion to increase the ratio of pleasure to pain by directly increasing immediate pleasure or decreasing immediate pain. *Instrumental-performance motives* are when an individual regulates their emotion for less immediate benefits, such as supporting social or work goals.

ER strategy categories, strategies, and subtypes are the means to achieve ER. *ER strategy categories* derive from Gross's *process model of ER* [50,51] and *ER strategies* and *sub-types* from

Webb et al.'s taxonomy [156]. The ER strategy categories *attentional deployment* and *cognitive change* are relevant to this paper.

Attentional deployment refers to strategies that direct attention to shape an emotional response. This category comprises the *distraction strategy* (D) and *concentration strategy* (C). *Distraction strategies* involve actively thinking about something or passively engaging with materials or tasks unrelated to the emotion or emotional stimulus. This strategy is organised into the sub-types of *active positive distraction* (D1) (thinking about something positive), *passive positive distraction* (D2) (engaging with emotionally positive materials or tasks), *active neutral distraction* (D3) (thinking about something neutral), and *passive neutral distraction* (D4) (engaging with emotionally neutral materials or tasks). *Concentration strategies* involve focusing attention on specific aspects of the emotional experience. This strategy is organised into the sub-types of *concentrate on feelings* (C1) (focusing on the emotional experience), *concentrate on causes and implications* (C2) (focusing on the causes, meanings, or consequences of the emotion), and *concentrate-mixed* (C3) (focusing on feelings, causes, and implications).

Cognitive change refers to strategies that change the meaning of an emotion. This category contains the *reappraisal strategy* (R), which involves reinterpreting aspects of the emotional experience. This strategy is organised into subtypes of *reappraise emotional response* (R1) (reinterpreting the focal emotion), *reappraise emotional stimulus* (R2) (reinterpreting the emotional stimulus), *reappraise via perspective taking* (R3) (adopting a more or a less objective perspective), and *reappraisal-mixed* (R4) (reinterpreting the focal emotion and/or emotional stimulus with/without perspective taking).

2.3.2 ER applied to digital breaks. An ER perspective can help to extend our understanding of SM breaks as a form of recovery or procrastination. We consider digital *recovery* an instance of adaptive ER, as they are resource-providing activities that replenish an individual's internal resources on a task, increasing positive affect and energy [115,133]. Recovery behaviours have been shown to align with instrumental ER motives [118,136] and the implementation of a diverse range of ER strategies [128,133]. At the same time, we consider digital *procrastination* an instance of maladaptive ER, as they are *resource-consuming* activities that put additional strain on an already resource-drained individual – ultimately increasing negative affect (e.g. shame and guilt) [115]. Procrastination behaviours have been shown to align with pro-hedonic ER motives [132] and the implementation of limited ER strategies [76,111].

In summary, prior literature suggests that students frequently take SM breaks during self-study to regulate emotions. These breaks can be an opportunity for healthy recovery or unhealthy procrastination. Applying a comprehensive behavioural and ER perspective to these breaks may help to distinguish between these differing outcomes.

Table 1. ER factors organised into ER processes, motives, strategy categories, and strategies/subtypes with definitions (adapted from relevant sources [21,51,136,156,167])

ER factors		
Types	Factor	Definition
ER processes	Intra-personal ER processes	An individual regulates their own emotion
	Intrinsic inter-personal ER processes	ER between individuals –where Person A engages with Person B to regulate Person A's emotion
	Implicit ER processes	ER intentions and processes that are automatic and not consciously accessible
	Explicit ER processes	ER intentions and processes that are deliberate and consciously accessible

ER motives	Pro-hedonic ER motives	ER is motivated to increase the ratio of pleasure to pain by directly increasing immediate pleasure or decreasing immediate pain to promote overall hedonic balance
	Instrumental-performance ER motives	ER is motivated to attain concrete valued outcomes that result from their activities, going beyond the benefits of immediate pleasure/displeasure
ER strategy categories	Attentional deployment	Directing attention towards or away from a source of emotional stimulation to shape an emotional response.
	Cognitive change	Cognitively modifying/reappraising an emotionally-stimulating situation
ER strategy and subtypes	Distraction – Active positive distraction (D1)	Thinking about something positive that is unrelated to the focal emotion or emotional stimulus to distract themselves
	Distraction – Passive positive distraction (D2)	Engaging with emotionally positive materials or a task that is positive and unrelated to the focal emotion or emotional stimulus
	Distraction – Active neutral distraction (D3)	Thinking about something neutral that is unrelated to the focal emotion or emotional stimulus to distract themselves
	Distraction – Passive neutral distraction (D4)	Engaging with materials or a task that is neutral and unrelated to the focal emotion or emotional stimulus
	Concentration – Concentrate on feelings (C1)	Attending to, focusing on, making judgments about, or reliving the emotional experience
	Concentration – Concentrate on causes and implications (C2)	Thinking about the causes, meanings, or consequences of or the reasons for the feelings
	Concentration – Concentrate-mixed (C3)	Concentrating on feelings, causes, and implications
	Reappraisal – Reappraise emotional response (R1)	Interpreting the focal emotion in a particular manner. For example, that the emotion is normal or to accept or not judge the emotion
	Reappraisal – Reappraise emotional stimulus (R2)	Reinterpreting the emotional stimulus (the context or the cause of the emotion). For example, imaging that a negative event had a positive outcome.
	Reappraisal – Reappraise via perspective-taking (R3)	Altering the impact of the emotional stimulus by adopting a more or less objective perspective. For example, being objective or viewing the stimulus as detached observer.
	Reappraisal – Reappraisal-mixed (R4)	Reappraising the emotional response and/or reappraising the emotional stimulus and/or reappraisal via perspective-taking

3 METHOD

To identify the SM behaviours and factors characterising instances of recovery and procrastination, we conducted semi-structured interviews with undergraduates to explore their experiences of SM breaks when studying. Semi-structured interviews can provide insight into individuals' motivations and experiences using digital technologies. They also allow the investigator to explore planned themes (in this case, behavioural and ER factors) while affording flexibility in exploring nuanced or unexpected emerging avenues [12].

3.1 Participants

We recruited 20 participants (18-24 yrs.; 18 female) through convenience and snowballing sampling (see Table 2 for full demographic breakdown). This strategy led to an overrepresentation of females in the sample. We reflect upon this and its implications for the generalisability of findings in the limitation section. Participants were required to be in their first or second year of an undergraduate degree (to control for the possible influence of year-of-study differences on SM break experience [35,152]), to use SM daily, and to have no diagnosis of clinical emotional disorders or self-identify as having an SM, gaming or internet addiction or disorder (to control for possible influences of such disorders creating excessive negative SM break experiences) [124,166].

Table 2. Participant demographics. F = Female, M = Male, N = Non-Binary

Participant	Gender	Age
P1	F	21
P2	F	19
P3	F	19
P4	F	20
P5	F	19
P6	F	20
P7	F	19
P8	F	19
P9	F	18
P10	F	20
P11	F	19
P12	N	19
P13	F	20
P14	F	19
P15	M	21
P16	F	19
P17	F	24
P18	F	18
P19	F	21
P20	F	19

3.2 Materials

3.2.1 Online questionnaire.

An online questionnaire hosted on the REDCap platform was used to onboard participants and to collect general information about them and their SM break-taking behaviour. It was organised into the following sections:

1. Participant information sheet and consent form
2. Contact details (name, email address)
3. Demographic information (age, gender)
4. SM platforms used for breaks
5. Devices used for breaks
6. Frequency of SM break-taking (5-Point Likert Scale: Not Frequently – Very Frequently)

3.2.2 Interview schedule. Interview topics focused on recent study sessions and the SM breaks taken within them (example: "Tell me about your use of SM for non-study purposes in private study sessions") and explored SM breaks in relation to recovery and procrastination (example: "Could you talk to me through a time when using SM for non-study purposes positively/negatively impacted the study session?"). Questions were centred around specific study session examples (recent/salient) to aid participants' retrospective recall of their experience [34]. No specific time frame was imposed on what constituted a 'recent' SM break. Further, the researcher did not restrict the participants to a specific SM platform and instead left the term open to their interpretation. This decision was because the study was interested in exploring all forms of SM platforms and whether there were similarities or differences in their underlying behaviours and factors.

Behavioural and ER factors provided *sensitising concepts* to focus the data collection process [12]. Behavioural prompts included exploring environmental factors (example: "Tell me about the situation"), motivational factors (example: "What did you aim to achieve when using SM?"), and capability factors (example: "What features did you engage with and why not others?"). ER prompts explored the possibility that SM breaks were taken to regulate emotion, which included ER motives (example: "What did you aim to achieve when using SM? And why?") and ER strategies (example: "How did using SM negatively/positively impact the session?"). The relation between theory and particular interview questions can be seen in full within the interview schedule in Appendix 1.

Prompts were devoid of any theory-specific jargon to reduce the risk of leading participants with questions. The interviewer actively explored responses that contradicted theory (e.g., exploring participants' use of a particular ER strategy with atypical outcomes) or went beyond the theory (e.g., participants implemented novel ER strategies). Further, the risk of confirmation bias was reduced by grounding questions in the participant's direct experience by incorporating their terminology into the wording of questions.

3.3 Procedure

A study advertisement linking to the online questionnaire was deployed through the university psychology subject pool and various SM platforms. After reading the participant information sheet and giving informed consent, participants accessed the online questionnaire. They were asked to provide contact information demographic information and answer questions about their general SM break-taking behaviour. After completing the questionnaire, online interviews were scheduled with each participant at a time that suited them.

Interviews were conducted by a researcher through the Microsoft Teams video channel and lasted approximately 30-60 minutes. The interview began with the researcher introducing the study's aim. It defined a *study session* to the participant as "any individual study activities outside of formal academic teachings, such as lectures and seminars, for example: working on

an individual assignment or revising for an exam". Some opening questions followed this definition, and then the main interview topics. After the interview, participants were debriefed and compensated with a fair wage of one £10 Amazon voucher for their time.

Deciding when to end the data collection process and the justification for doing so is a debated topic in qualitative research. As stated in Braune and Clarke [17], the conventional conceptualisation of *data saturation* (the point at which no new information, codes or themes are yielded from the data) was *not* utilised in this study as a way to determine sample size because the concept does not align with the values and assumptions of this study's chosen analysis method (reflective thematic analysis). This is because the methods emphasise the dataset's primacy and a situated and reflexive interpretative process to derive meaning from data – rather than assuming meaning lies within the data waiting to be excavated. Instead, a two-stage process was used inspired by recommendations by Braun and Clarke [17].

First, an *information power* analysis was used *before* data collection and analysis to generate a sample range as a *provisional* reference point [90]. *Information power* refers to the level of information a sample holds that is relevant to the actual study – with higher levels of power requiring fewer participants and vice versa. Information power is calculated by considering five items: 1) *study aim* (narrow-broad), 2) *sample specificity* (dense-sparse), 3) *use of established theory* (applied-none), 4) *quality of dialogue* (strong-weak), 5) *analysis strategy* (case-cross case). Researchers position themselves along a continuum for each item to determine the appropriate number of participants required for responsible analysis. Each item position confers either higher or lower levels of information power. Taking an information power approach to this study, the aim of investigating undergraduate SM break experiences and the factors characterising it as recovery or procrastination was relatively broad (low information power). The sample specificity was relatively sparse, involving healthy 1st/2nd-year undergraduates (low information power). The established theory was relatively applied, as the study involved applying an ER perspective to shape the interview guide and reflect on data post-analysis (high information power). The quality of dialogue was moderate (neither too weak nor strong) as communication and dialogue between the researcher and participants were focused and articulate, and the researcher had sufficient background knowledge on SM breaks and developed skills in conducting interviews (moderate information power). Lastly, the analysis strategy was a cross-case analysis as the insights gained were planned for general design suggestions (low information power). Based on these considerations alongside a number estimate for a similar example outlined by Malterud et al. [90], this study had low-medium information power, so a medium-high sample size (e.g., fifteen to twenty participants) was placed as a provisional estimate.

Second, *during* the data collection/analysis process, the researchers then made ongoing *in-situ* interpretative judgements of when to stop by reflecting on 1) the provisional information power analysis, 2) the purpose and goals of the analysis, 3) the *adequacy* (richness, complexity) of the data for addressing the RQ, and 4) pragmatic elements such as time and financial constraints of the study.

3.4   Analysis

3.4.1   Online questionnaire data.

Descriptive statistics of relevant online questionnaire data (demographic information, general SM break-taking behaviour) were generated using the REDCap platform data export, reports, and stats feature.

3.4.2   Interview data. Interview recordings were downloaded from Microsoft Teams, and audio was extracted and transcribed using Scrintal. Interview transcripts were then uploaded into NVivo-12 for analysis.

To answer RQ 1 and 2, a *reflexive thematic analysis* (RTA) method [20] was chosen over other forms of thematic analysis (coding reliability, codebook) because the research questions focused on people's experience of contextually situated behaviours and the factors influencing the shape and texture of the phenomenon [16,18]. It is necessary when using RTA to reflect on and specify the underlying philosophical and theoretical assumptions informing the RTA [19,24]. We took an *essentialist* (language unidirectionally reflects articulated meaning and experience), *experiential* (thoughts, feelings, and experiences reflect internally held personal states), *inductive* (bottom-up dataset-driven coding with no preconceptions) and *semantic* (codes reflect the explicit surface meaning of the data) oriented approach for the analysis.

An initial familiarisation stage involved actively listening to recordings and re-reading transcripts in-depth whilst taking preliminary notes relating to observations of initial trends or salient remarks within the data. The generation of initial codes then occurred by reading transcripts at the sentence level and applying semantic codes to units deemed meaningful to the research questions, followed by an iterative process in which codes were reviewed, merged and updated so that they offered sufficient detail about the underlying data item and were conducive to interpreting subsequent themes [14,24]. The generation of themes involved organising and collapsing initial codes into single codes, with some promoted as candidate sub-themes or candidate themes [17]. The generated themes were then reviewed for their internal and external consistency, relevance to the study research question, and their level of data support – with codes, sub-themes, and even themes added/removed based on this review process. The themes were then defined and named to generate a final thematic map. The generated themes were then used to develop a descriptive model of SM break-taking [15].

To answer RQ 3, a *codebook approach* form of thematic analysis [20] was taken to identify to what extent ER factors helped characterise SM breaks as a form of recovery or procrastination. A codebook was developed before the analysis using factors derived from various ER frameworks to ensure the entire regulation process could be categorised (see supplementary materials for the complete codebook). This codebook included 1) Zaki and William's framework of intra/inter-personal ER processes [167]; 2) Braunstein et al.'s multi-level framework of explicit and implicit ER processes [21]; 3) Tamir's ER motive taxonomy [136]; 4) Gross's ER strategy categories [50,51]; and 5) Webb et al.'s ER strategy and subtype taxonomy [156]. The codebook acted as a *tool for analysis* (rather than as an endpoint of analysis). It was applied deductively to the generated themes and descriptive model from the RTA to identify the presence of these codes (ER factors) within the data. Once codes were identified in the data, mapping and interpretation were conducted. This process supported the development of a more comprehensive model of SM break-taking that extended upon the one developed through the RTA by incorporating ER factors.

3.5   Ethical considerations

The university's departmental ethics committee granted the study ethical approval. Participants provided informed consent to take part in this study. Participant data was pseudo-anonymised

by assigning them a participant number and manually removing any personally identifiable information reported by participants from interview transcripts.

4 FINDINGS

4.1 General SM break-taking behaviour

During study breaks, participants regularly engaged with a variety of SM platforms through their smartphone and laptop devices. As seen in Figure 3, Instagram (95%) was the most popular platform, followed by WhatsApp (60%), YouTube (55%), Snapchat (55%), and TikTok (55%). These were mainly accessed through smartphones (100%) and laptops (65%). The majority of participants reported engaging in SM breaks 'somewhat frequently' (60%), followed by 'very frequently' (30%), and a few 'sometimes' (10%). No participants reported taking SM breaks rarely or never.
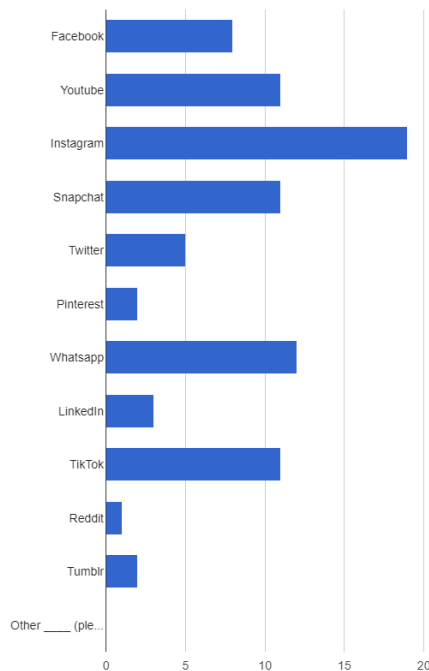

Figure 3: Platforms used for SM breaks. Facebook (n=8, 40.0%), YouTube (n=11, 55.0%), Instagram (n=19, 95.0%), Snapchat (n=11, 55.0%), Twitter (n=5, 25.0%), Pinterest (n=2, 10.0%), WhatsApp (n=12, 60.0%), LinkedIn (n=3, 15.0%), TikTok (n=11, 55.0%), Reddit (n=1, 5.0%), Tumblr (n=2, 10.0%), Other (n=0, 0.0%)

4.2 A behavioural analysis of SM breaks

The RTA identified the specific SM behaviours and related behavioural factors that characterise SM breaks as a recovery or procrastination behaviour in undergraduates when studying (summarised in Figure 4). This model refines the model proposed in Figure 1 by differentiating

the initiation, execution, and outcome phases of an SM break, as the findings indicated it is essential to have a finer temporal resolution to understand SM break-taking as a form of recovery and procrastination. The *initiation* phase involves the SM break's triggers and the underlying motivational processes. The *execution* phase involves the types of SM behaviours (with relevant sub-usage styles identified according to Kaye's framework [67]) and their underlying motivational processes. The *outcome* involves whether the break resulted in recovery or procrastination. The empirical data supporting this model will be explored in the following sections.
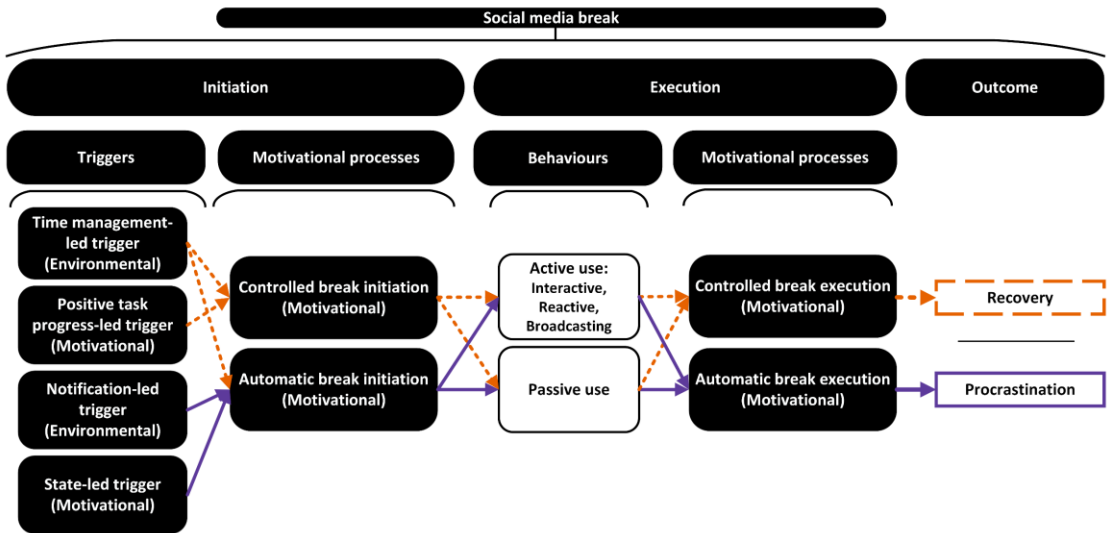

Figure 4: A proposed descriptive model based on the RTA builds upon Figure 1. It depicts the behavioural factors: motivational and environmental factors (black rounded rectangles) during break initiation and execution phases that underly SM behaviours organised according to Kaye's conceptual framework [67] (white rounded squares) to characterise a healthy recovery (orange dotted rectangle) or unhealthy procrastination (purple solid rectangle) break outcome. Orange dotted line arrows indicate factors that characterize a recovery, and purple solid line arrows indicate procrastination.

4.2.1 RQ 1: What types of SM behaviours characterise a break as a form of recovery or procrastination?

Finding: Active and passive types of SM usage do not clearly map onto recovery and procrastination. Participants' SM breaks involved active and passive behaviours in line with prior research. Active SM use comprises actively *interacting* with other people through messaging, *reactively* responding to messages, and *broadcasting* to others by posting social content. Passive SM use comprised of non-interactive behaviours such as scrolling through SM feeds. However, we found that *both* active and passive SM usage types have the potential to make an SM break a recovery or procrastination behaviour.

Active SM use can support both recovery and procrastination. Active SM usage supported recovery by providing certain facets of the recovery experience (psychological detachment, mastery experiences) and recovery in general, as reflected in increasing overall positive emotion and post-break performance.

Engaging in online conversations with friends and family through messaging and calling helped students temporarily to *mentally detach* from their academic tasks:

> "I'm . . . probably looking for something to take my mind off the work, then, that's really the place to go. Yeah, I'll be talking to people who aren't doing psychology or like friends and family who obviously don't know the work I'm doing, and we'll just be, you know, just having a nice conversation, asking each other how we are and stuff..." (P7)

> "It's just something to think that's not work." (P18)

Active SM behaviours increased positive emotions and reduced stress by providing feelings of *accomplishment and mastery*. These behaviours included replying to messages, creating content, and helping others instrumentally and emotionally.

Students experienced mastery (exemplified by a sense of accomplishment and satisfaction) when replying to messages. This reduced stress and supported a more productive state of mind post-break:

> "That would really help a bit if I have just managed to get some stress out of my brain. Yeah... [I've] been probably more able to make decisions in my work." (P12)

Creating TikTok videos during breaks resulted in feelings of *accomplishment* and positive emotion:

> "If you're creating something, if you're putting it out into the world, that feels like you kind of accomplished something. It's a nice feeling..." (P12)

Students also *helped others instrumentally* with academic problems:

> "A lot of the time, someone's always messaging, asking for help. And so sometimes I'll see like, oh, that's relevant to me. I can help that person." (P7)

They also provided *emotional support* to others:

> "My aim is not to just talk about myself [but rather I am also] helping them with their problems and their issues and their scenarios and situation, whatever they're going through." (P11)

Helping others instrumentally and emotionally during a break was associated with feelings of accomplishment and increased positive emotions:

> "It made me feel like I made an impact on society . . . it made me feel better when I went back to my work". (P11)

A couple of students upregulated positive emotions during breaks by *sharing positive content* with friends, be it personal achievements or content from their feed:

> "It makes you feel good because it's like, oh, now we can have a conversation about this . . . it's just a sort of interaction thing [to do]." (P13)

Several students experienced recovery during breaks by *sharing their negative emotions* – often arising from the study session, such as stress from their academic task – with friends to receive emotional support. This sharing was done both directly by messaging and indirectly by broadcasting to wider social networks via posts such as Instagram stories:

> "Relieving my stress on to someone. So just like being, oh, that [lecture] was so hard, I'm finding this really difficult . . . are you?" (P8)

> "I can share my really busy schedules, plans or exam schedule [through Instagram stories] so that people will be like, oh, like, good luck! They will understand how I'm feeling right now. Sometimes empathy is something nice to help [you]..." (P3)

Sharing negative emotions with friends and family online supported emotional repair through encouragement, reinterpretation, clarification, and by acting as a space to express their emotions.

Friends would send *encouraging* replies that boosted students' levels of motivation, validation, and self-efficacy – increasing positive emotions:

> "It's always feels nice to have someone be like: You can do it, just concentrate. It always feels nice to have their support and their validation." (P13)

Responses from others helped students *reappraise* the negative emotion-inducing situation (e.g., accepting stressful situations and moving on from them, allowing them to realise some things are in their control whilst others are not worth overthinking):

> "If somebody tells me that they find that module hard as well, I might be inclined to just say, oh, then maybe: a) I'll give myself a longer break, b) Maybe it's just I'll never learn this module in a way that [I] will find it easy." (P8)

Emotional support from others helped a student to *clarify* their understanding of their own emotions and why they were experiencing them – improving their emotional awareness:

> "Just communicating that with somebody and just having somebody to bounce off an idea or a feeling [. . .] they can help me clarify why I'm feeling like this" (P11)

Finally, just having the interaction with another acted as a space where the students could *express* their emotions, which itself would help to repair negative emotions:

> "I feel it would make me better with how I'm feeling because I can communicate how I'm feeling in the given time that I'm in." (P11)

Engaging in active SM use – particularly active conversations – could also support procrastination. Active conversation was enjoyable, and sometimes, students would not want to leave the conversation and go back to work:

> "...my timer went off, but what I was talking with him [about] which is very interesting. So, I just...we just carried on a conversation for quite a while. And then... so I had disrupted my study session by doing that." (P6)

Needing to end an enjoyable conversation could result in negative emotions, nullifying any positive effects of the breaks:

"Once I'm ready to leave and start work, I don't think I'll feel great because I need to leave this conversation now." (P6)

In such instances, active conversations were described by students as a form of distraction from their work, i.e., students' choosing to immerse themselves in conversations as a form of escape:

"I would focus more on what I was talking with my friends about than on studying itself . . . this is why sometimes it would take me more to go back to work…" (P10)

Due to the risk of procrastination, some students were careful with active use during breaks, sometimes altogether avoiding it until after their study session:

"I am still trying to be careful not to be really active. Just because I know if the other person's online and we start a conversation, then you know, time's just going to go." (P9)

Some students also mentioned that posting content during breaks could cause subsequent rumination. Students would dwell on how others may react to their post, causing frequent SM checking and low focus:

"I keep checking my post, and I was like, should I delete, or should I just leave it… so I was after [for] at least five hours of posting something on SM, I might not be fully concentrated on my work sometimes." (P3)

Passive SM use can support both recovery and procrastination. Passive SM usage supported recovery by providing psychological detachment, relaxation, and mastery experiences. Many students described how engaging with SM feeds allowed them to temporarily take their minds away from the academic task at hand and the stress associated with it by becoming immersed in it:

"[Browsing SM] gives me time to refresh, gives me time to, you know, forget for a little bit about this work and sort of just be in my world." (P15)

Engaging with random content from SM explore feeds supported psychological detachment. The feeds' novelty and unpredictability invited focus on the content and thus detachment from academic tasks:

"It just makes me not think about what I was doing because you get so focused on the phone that you don't even think of anything else." (P2)

Generally, exposure to positively valanced content supported psychological detachment and the development of positive emotions:

"It allowed me to . . . completely distance myself from the work that I was doing. I just got to see some, like, nice, positive, friendly, happy content which just… which wasn't, overwhelming. It was just nice and completely unrelated to what I was doing . . . it just made me feel happy." (P12)

Further, the quantity of information and the low cognitive effort required to engage with it supported detachment:

"There's so much information. I feel it's easy to get lost in it and just sort of forget that you're actually supposed to be doing work." (P13)

SM feeds also supported relaxation. Scrolling and allowing content to flow past calmed students:

"I can just relax and then go back and be ready." (P15)

One student also found that watching all of their friends 'stories' (highlights from their day) resulted in a sense of mastery which was exemplified through feelings of accomplishment and achievement:

> "I sometimes have a feeling of achievement of watching... finishing to watch all the stories or the post of the day." (P3)

Passive SM usage could also act as a procrastination behaviour, via the same immersive effects that support its use as a recovery behaviour:

> "But then sometimes I go on to Snapchat. They have the random, the most irrelevant stories, not [of] people I know. But just random ones. Yeah, if I'm really procrastinating. Sometimes I just go on there and waste time." (P9)

Students described the ease of becoming sucked into scrolling through feeds, losing track of time, and struggling to disengage from the platform:

> "...because especially a lot of the videos are very short, you kind of lose track of time. You're like watching one, and then you're like, oh, I'll watch another one . . . and you don't really realise how long you're spending on the app." (P5)

In summary, SM breaks involve types of SM behaviours that can be categorised into the conventional active and passive use dichotomy. However, interestingly, both active and passive SM breaks have the potential to act as a form of recovery and procrastination.

4.2.2 RQ 2: What behavioural factors underlying these SM behaviours distinguish a break as a form of recovery or procrastination? **Finding: Motivational and environmental factors differentiate between an SM break as a recovery or procrastination behaviour.** Participants' SM behaviours supported recovery or procrastination depending on the underlying motivational and environmental factors. Recovery breaks were associated with SM behaviours underpinned by controlled motivational processes and scheduled triggers and procrastinatory breaks by automatic processes and unscheduled triggers.

Automaticity driven by cue-laden study environments underlies SM breaks as procrastination. A common characteristic underlying procrastinatory breaks was its automatic and habitual nature. Participants described experiencing the initiation and enaction of the behaviours as automatic. Conversely, recovery breaks were described as being relatively more conscious and effortful.

Participants engaged in SM breaks with their smartphones, often in the same physical space as where they conducted their academic tasks:

> "I would take breaks just staying on the phone . . . I would stay on my desk..." (P10)

The smartphone's proximity to their academic workspace led to the initiation of engagement being automatic. The smartphone acted as a salient stimulus in their work environment, towards which students impulsively gravitated towards:

> "It's almost automatic. I just see it on my desk, and I'll pick it up." (P6)

The automaticity encouraged by the proximal smartphone resulted in students engaging in breaks for procrastination. This was evidenced by participants' description of the breaks as a distraction, a lapse in focus, and lasting for an extensive time:

> "It's not quite ten [minutes] anymore, it becomes half an hour of things that I wanted to do. So, yeah, the discipline goes when the phone is right next to me." (P14)

Participants engaged in various strategies to try and control their SM stimulus environment. Strategies included removing proximal access to their smartphones, creating additional barriers to access, filtering notification stimuli, or outright deleting platforms.

Removing the smartphone from the immediate study environment reduced the risk of procrastination:

"I usually put my phone somewhere else. So, it will not be that distractive for me..." (P1)

A couple of students created barriers by logging out of their accounts:

"to try and like, limit this [SM use], I basically always log out. So, its effort to log in, it doesn't stop me. It just takes longer." (P9)

Students utilised software apps that blocked SM during their study sessions:

"I also I used to have, like, this app that basically blocks certain [apps] when you open your phone if you're in a study session." (P7)

Other students managed their SM notifications either by turning off the smartphone notification light, muting notifications for particular platforms, or muting notifications on their lock screen:

"Typically, I don't actually have my notifications on . . . I get so easily distracted so I don't have them on." (P9)

Lastly, students decided to delete specific SM platforms they found themselves repeatedly procrastinating on:

"I felt like Snapchat took a lot of my time. Like I felt like I was struggling to come off of Snapchat. So, I just took the executive decision and like I need to delete it." (P6)

SM breaks that were procrastinatory involved engaging in automatic, ritualistic behaviours, where students felt the compulsive need to cycle through particular features or platforms methodically:

"I usually look at stories first because that's on the top of my feed. That's the first page. Then once I finished stories, I usually go to explore page, and that's quite automatic I would say. I don't really think about it." (P6)

Generally, the execution of passive SM use was associated with an automatic, immersive procrastinatory experience:

"If I'm watching a story I can be distracted, I can just be clicking. I can just be just looking at it and then forgetting about it immediately after..." (P5)

Active SM use could support similar immersive experiences and the experience of fleeting time:

"I know if the other person's online and we start a conversation, then you know, time's just going to go." (P9)

This potent ability to detach individuals from their immediate study session was reflected in a sense of a loss of autonomy:

"It's just allowing whatever comes up, and that's it. I don't actively search for something. I just wait for something else to hit me." (P2)

Students would reawaken from their break with negative emotions such as frustration, guilt, and shame – typical symptoms of procrastination:

"You've got lost in in some videos in an app, and then you suddenly come back to the present and you've got to work again. So sometimes it doesn't make you even feel better or rested." (P13)

This immersive procrastination caused students to engage in a negative spiral of rumination, which would slow down their work and harm their productivity:

"I just get into this, like, cycle in my head. It's like, oh, you wasted time you shouldn't have done that. And then I just feel bad so then I... I am less productive." (P5)

The low effort of such breaks would also reduce recovery. One student explained how little physical and cognitive effort was required to process content and to move their fingers whilst scrolling media feeds:

"I'm just not really thinking both in terms of like my brain and also, just in terms of like, my motor processes..." (P12)

Exposure to a continual stream of content led to feeling "overwhelmed and just kind of everything was too much" (P12).

Passive SM use that was executed more consciously and intentionally supported recovery. Conscious passive SM use was characterised as intentionally searching for media content and being aware of the content rather than mindlessly scrolling SM feeds:

"It's probably more of a positive thing if I'm actually consciously [using SM] . . . I know what I'm doing, I've scheduled in time to scroll through TikTok or whatever you know, and finding it entertaining and like, it's helping me relax." (P16)

Lastly, the automaticity underlying procrastinatory breaks was evidenced by students explaining how mindful-inducing cues such as an awareness of time spent on SM, hungriness, or the absurdity of their behaviour snapped them out of procrastination:

"When I see something really stupid, Let's say like a really stupid video or comment. I feel like it sends a signal to my brain like, okay, what I'm doing is really, like, stupid. Let's, let's stop and do something productive." (P4)

Mindless usage was particularly true for passive SM usage as procrastination, which was attributed to the design of SM platforms.

"The thing with TikTok, is that you can't see the time... the app just covers the clock. So, you don't know how long you're spending on there, and then suddenly you've spent half an hour on there . . . and then it can feel more stressful." (P13)

Types of triggers differ between recovery and procrastination breaks. Students' engagement in SM breaks involved two main trigger types: *scheduled* and *unscheduled*. Scheduled triggers are internal and external and involve some level of pre-planning. These include *time-management-led* and *positive task progress-led* triggers. Unscheduled triggers are internal and external and are not pre-planned on the students' part. These include *state-led* and *notification-led* triggers.

Generally, scheduled triggers were associated with recovery, whilst unscheduled triggers were associated with procrastination. Individuals did not necessarily experience only one type of trigger but could fluctuate between types during a study session.

The *time-management-led* trigger involves scheduling academic tasks and breaks around a time cycle. The student studies for a set amount of time, then breaks are externally triggered (e.g., via a timer notification) and last a set amount of time. For example, one student used the Pomodoro technique to schedule their breaks:

> "I will do 25 minutes, down five minutes, four times, Then I'll do a 15-minute break. Then I usually go back, . . . I'll probably do that twice." (P6)

The *positive task-progress-led* trigger involves either pre-setting a particular goal for the study session or dynamically monitoring progress on the task, with breaks internally triggered (i.e., decided by the student) after a sufficient amount of work has been completed:

> "I try and just say to myself, well, read this chapter or this amount of pages, and then we'll have a break. So yeah, I normally give myself breaks. Once I feel like I've sort of ticked something off, once I've actually done something." (P13)

> "I'll set myself, a goal of if I finish this lecture or if I finish this problem sheet then I'll turn it back on again." (P18)

Naturally, these progress-triggered breaks were associated with feelings of exhaustion resulting from the student striving to meet their particular goal:

> "Usually if I've completed the task. I'm on the verge of burnout, but I have to get this done and then I'll get it done, and then have my SM break." (P18)

Scheduled triggers were mainly associated with the explicit motive of engaging in breaks to refresh and rejuvenate and increase focus to support subsequent task performance:

> "I guess the goal while I'm taking a scheduled break is more to refresh and rejuvenate myself, ready to start doing work again." (P16)

Scheduled triggers were also associated with breaks being experienced consciously, with greater awareness surrounding the initiation and execution of a break, and knowing the purpose of engaging with SM:

> "It's definitely because I'd. . . scheduled it in and plan to go and do those tasks. So yeah, it's definitely more conscious." (P16)

Conscious execution involved greater regulation, for example, watching a single time-restricted YouTube video:

> "I just watch this particular video that a certain influencer has posted . . . I just see one video." (P17)

Students recognised that more conscious breaks would be recovery-supportive:

> "If I used [it] in a way of like I actually paid attention. I gave myself a hard time limit of like 10 minutes. Then I think I'd probably feel better afterwards." (P18)

However, scheduled breaks could be automatic during time-management-led triggers, suggesting the potential for healthy habit formation:

> "...it would be automatic in the way that I would grab my phone either way." (P10)

Scheduled triggers were generally associated with recovery rather than procrastination and more positive outcomes, particularly for passive SM usage during scheduled breaks, where students were afforded positive psychological detaching and relaxing effects:

> "It has a positive effect when I sort of, scheduled in a [SM] break, to go and do it [scroll SM] . . . And you don't have to think that much when you do it, and then you just... I feel a bit better afterwards." (P16)

Scheduled breaks supported general positive outcomes characteristic of an effective recovery experience, such as improved mood and feelings of refreshment and rejuvenation:

"Afterwards I'm probably, I don't know, refreshed and revived again and ready to go back and start working. And then I had the same level of concentration and productivity as I did when I first started the day." (P16)

Scheduled triggers reduced the risk of procrastination through timers that prompted task resumption and through appraisal of SM use as an earned behaviour rather than being time wasteful – eliminating negative emotions associated with procrastination:

"I feel I can scroll through Instagram for a very long time without realising how much time has gone past. So, I always set timers." (P6)

"That's more a dedicated break. Whereas for the other one [unscheduled SM breaks], it's like, this isn't my break time . . . I should be doing my work." (P9)

The *state-led* trigger involves breaks triggered by internally generated emotional states attached to particular situations. These situations can be split into *socio-informational* and *academic tasks. Socio-informational state-led* triggers involve breaks in response to internal states of agitation relating to gratifying a particular social need, such as knowing what other course mates are doing or remembering to reply to a friend's question. These states are characterised as uncomfortable, uneasy, and thought-ridden states, often rooted in fear of missing out (FoMO):

"I think almost while I'm sat here, what are other people doing, are the medics revising like me? Or are they able to go out?" (P8)

Academic task state-led triggers involve breaks triggered in response to negative emotional states relating to the current academic task. Students mentioned experiencing both low arousal, e.g., boredom, and high arousal negative states, e.g., frustration:

"If I'm bored with revision. Or if I feel like I need to take a break because something is frustrating. I can't come up with an answer. I will try to take a break and do something else for a while..." (P1)

The *notification-led* trigger involves breaks externally triggered by SM notifications, mainly caused by direct messages from others and sometimes indirect posts from others:

"Sometimes I take non-planned breaks because someone messages me." (P2)

Unscheduled triggers, particularly state-led, were associated with engaging in breaks to improve one's immediate emotional state. For socio-informational state-led triggers, breaks were motivated to quell the agitated/tense states that arose from the social need itself:

"After I replied to a message, I feel less stressed because I've probably been stressed about the fact that I didn't reply to it." (P12)

For academic task state-led triggers, the negative state was often coupled with the motive to avoid the academic task at hand, using breaks to improve their immediate emotional state:

"When I'm feeling burnt out like, I want to get away from the work task and also just to, like, fill myself up. So, just to feel more energised, and also just like not feeling negative." (P11)

Unscheduled triggers were associated with students experiencing the initiation and execution of a break as automatic and outside of conscious awareness. State-led triggers were associated with the automatic initiation of breaks. Negative emotions underlying state-led triggers were linked to task avoidance motives that prompted students to initiate a break automatically:

"Maybe because of tiredness or some kind of stress I go on SM... not like I planned it." (P19)

"I don't want to see it for a moment [the academic task]. But I don't think about some kind of a plan. How is this going to help me?" (P4)

Negative emotional states from socio-informational triggers also prompted students to automatically check their SM to satiate those needs with the initiation of such breaks described as rapid and impulsive:

"It's really instinctive, to look at it. Or to flip it over, just cos I think... oh what's happened on there." (P14)

Socio-informational state-led triggers interacted with emotions from academic task state-led triggers, such that students not enjoying their current academic task were more likely to initiate a break to quell social needs automatically:

"When I don't enjoy something, I'm much more likely to pick up my phone and just look at it for a second to be okay, what's there?" (P14)

Automatically initiated breaks caused by state-led triggers were also associated with breaks being executed automatically:

"It starts with me just getting bored and getting on SM, and then it ends with me just getting stuck on it instead." (P20)

Notification-led triggers were also associated with automatic breaks:

"Especially if I get them [replies] in the notification. I don't really think it's something I think twice about. I'm just like, oh, let me just see what it is." (P5)

Unscheduled triggers were generally associated with adverse outcomes characteristic of procrastination. Academic task-related negative emotional states, e.g., boredom, frustration and tiredness, triggered students to engage with SM for prolonged periods, with students less willing to return to the task:

"I don't want to go back to seeing the paper and the tasks that are just causing me frustrations and negative feelings." (P4)

"I think that's what you want when you're demotivated, you want to have your motivation brought back up again and it doesn't do that. It literally just wastes my time. Makes me feel guilty about it." (P18)

A notable example of how unscheduled triggers interacted with automaticity to support breaks as a procrastination behaviour was through 'side-tracking', where a student's initial engagement in breaks results in them staying on the platform for prolonged periods, moving between features, and even migrating onto other platforms. Students described how state-led triggered breaks for quick emotional relief turned into long-term usage as they began to engage with multiple features within the platform:

"...you just need to go on it . . . it feels like that would take your mind off of it . . . You're just gonna see if anyone's message you and then somehow you end up on Instagram or on another [platform] and then you're on it, and then you think that it's just gonna sort of distract you for a little bit from the work... and then you get lost in it." (P13)

Notification-led triggers also supported procrastination through side-tracking:

"When I get notifications, I usually check right after I get them. . . . But then I usually end up doing some other stuff as well. If I open my phone, for example, just looking [at an] Instagram story or even looking to some hashtags…" (P3)

For several students, external notification-led triggers interacted with internal negative emotional state-led triggers to support procrastination. Specifically, students experiencing negative affect from their academic tasks were more susceptible to SM notifications triggering breaks, that in turn resulted in side-tracking and procrastination:

"Well, there was one time . . . and I was trying to write something, and I just went onto my phone to answer a message. And then I was just so frustrated with the essay that I just continued on my phone for literally hours." (P2)

Performance of side-tracking was often experienced as automatic and coupled with feelings characteristic of immersive procrastination, e.g., losing a sense of time and getting sucked into the platform:

"Sometimes I'll just pick up my phone and starts scrolling on TikTok when I was just supposed to just read a text message and put it down and keep on working, but I just yeah, get sucked into it…" (P16)

In summary, the propensity for an SM break to act as recovery or procrastination is influenced by the motivational and environmental behavioural factors underlying active and passive usage. Recovery is associated with controlled, conscious motivational processes and procrastination with automatic, unconscious processes. Scheduled and unscheduled triggers support these controlled and automatic processes, respectively.

4.3 An ER analysis of SM breaks

4.3.1 RQ 3: To what extent does an ER perspective help to better understand an SM break as a form of recovery or procrastination?

Finding: An ER perspective helps to further differentiate between recovery and procrastination during break initiation and execution. The codebook approach identified the specific ER factors (ER processes, motives, strategy categories, strategies, and subtypes) that characterise an SM break as a recovery or procrastination behaviour (Figure 5). This figure extends the descriptive model (Figure 4) reported in the previous two sections. Figure 5 outlines how ER factors slot in between (and in some cases) overlap with behavioural factors in the causal chain of events during break initiation and execution. We identified *ER processes* (implicit/explicit, intra/inter-personal), *motives* (instrumental-performance, pro-hedonic), *strategy categories* (cognitive change, attentional deployment), *strategies* (reappraisal, distraction, concentration), and *strategy subtypes* (passive positive distraction, passive neutral distraction, concentrate-mixed, reappraisal-mixed) that characterise instances of recovery and procrastination.
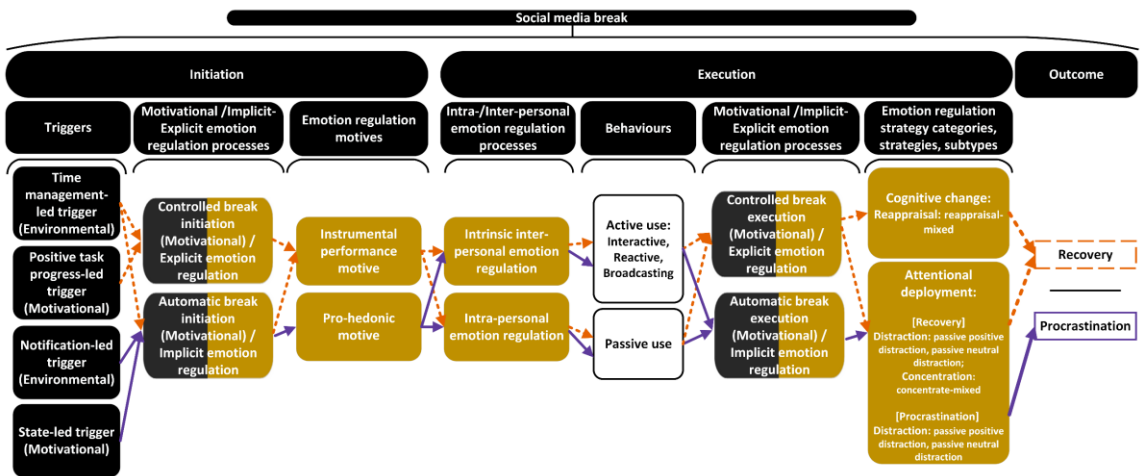

Figure 5: An extension to the previous descriptive model (Figure 4) depicting the ER factors (processes, motives, strategy categories, strategies, and subtypes) that occur during SM break initiation and execution phases to characterise a healthy recovery (orange dotted rectangle) and unhealthy procrastination (purple solid rectangle) break outcome. ER factors (gold rounded rectangles) fit between behavioural factors (black rounded rectangles) and SM behaviours (rounded white squares). In some cases, ER and behavioural factors overlap conceptually (black and gold rounded rectangles). Orange dotted line arrows indicate factors that characterise a recovery behaviour, and purple solid line arrows a procrastination behaviour.

SM breaks for recovery: an ER perspective. SM breaks can promote recovery when they involve relatively more *explicit* (rather than implicit) *ER processes*, have *instrumental ER motives*, involve *intra- and inter-personal ER processes*, and implement ER strategies spanning *attentional deployment* and *cognitive change categories*. The following paragraphs will explore these ER factors in detail using examples from the data and comparing findings with past literature.

SM breaks can promote recovery when they involve *explicit ER processes* during break initiation and execution; that is when the ER attempt is deliberate and consciously accessible to the individual. This is conceptually similar to *controlled* motivational processes. Students reported more conscious awareness of their ER goal when initiating a recovery break. During

break execution, the ER strategies (e.g., reappraisal) involved more *controlled change processes* [21] or conscious top-down control. Active and passive SM use during recovery breaks were reported as being enacted more consciously and intentionally.

SM breaks can promote recovery when they involve *instrumental-performance ER motives*, that is, engaging in breaks for ER to support subsequent study performance [136]. Students would take breaks to feel refreshed to perform better in their tasks afterwards. This helps to explain why scheduled triggers that supported automatic break initiation resulted in recovery. In contrast, other instances of automatic break initiation would usually result in procrastination. Instrumental ER motives are often associated with experiencing greater wellbeing [137]. For example, an *accepting attitude* (breaks are a temporary strategy, and there is an intention to return to the stressor – in this case, studying) supports wellbeing compared to an *avoidance attitude* (breaks are used only to avoid aversive experiences) [159].

SM breaks can promote recovery by involving *intra-personal ER processes* (during passive SM use, such as scrolling) and *intrinsic inter-personal ER processes* (during active SM use, such as messaging for emotional support). The *intra*-personal nature of passive SM use for ER supports prior findings that individuals use digital media to distract themselves from their current affective state [114,149]. The *inter*-personal nature of active SM use classifies these regulation attempts under *intrinsic inter-personal ER processes* (engaging with another individual to regulate one's emotions). Specifically, these findings show undergraduates implement both *intrinsic response-dependent processes* (attempts to regulate Person A's emotions that are dependent on Person B's response, such as Person B providing words of encouragement that increase positive emotions of Person A) or *intrinsic response-independent processes* (attempts to regulate Person A's emotions that are not dependent on Person B's response such as Person A using the conversation with Person B merely as a space to express their emotions outwardly) [167]. This finding supports prior research that interpersonal processes achieved through active SM use support ER [13,40] and positive wellbeing outcomes [26].

SM breaks can promote recovery when they involve active and passive SM use that supports a variety of ER strategies that fall within the *attentional deployment* and *cognitive change* ER strategy categories [51]. These can be subdivided into the ER strategies of *distraction*, *concentration* and *reappraisal* [156]. In terms of distraction, active SM use supported the strategy subtypes *passive positive distraction* and *passive neutral distraction* from the emotion or emotional stimulus through messaging or posting content. Passive SM use, such as scrolling, mainly provided a distraction from the emotion or emotional stimulus. Distraction is a primary way of using SM to cope with stress [103,158]. Regarding concentration strategies, active SM use supported the strategy subtype *concentrate-mixed* because messaging others allowed students to concentrate on their feelings and the causes, meaning, and reasons for their feelings. In terms of reappraisal, active SM use supported the strategy subtype *reappraisal-mixed* as messaging others would support reappraisal of the emotional response (e.g., its normal for the student to feel a negative emotion) and reappraising the emotional stimulus (e.g., a module is naturally challenging, and the student will not do well in it).

SM breaks for procrastination: an ER perspective. SM breaks can characterise procrastination when they involve relatively more *implicit ER processes*, *pro-hedonic ER motives*, *intra- and inter-personal ER processes*, and ER strategies solely in the *attentional deployment* category. The following paragraphs will explore these ER factors in detail using examples from the data and comparing findings with past literature.

SM breaks can characterise procrastination when they involve *implicit ER processes*. This is conceptually similar to *automatic* motivational processes in that the ER attempt is automatic and not consciously accessible to the individual; for example, when a motive (study task avoidance) was automatic, and regulation attempts were experienced more automatically during the enacting of distraction ER strategies [21]. These can be seen as maladaptive *habitual ER* [52,74]. Habit formation involves ER strategy selection and enaction (in this case, distraction), becoming unconscious through repetition due to near-constant access to SM and the rewarding short-term relief induced by procrastination. This finding supports prior literature that habitual ER using smartphones was less beneficial than when consciously engaging with smartphones to regulate negative emotions [88].

SM breaks can characterise procrastination involving *pro-hedonic ER motives* (engaging in SM breaks to maximise pleasure for its own sake). Procrastination breaks taken by students were often motivated to reduce immediate suffering (for example, boredom or frustration during studying). Pro-hedonic ER motives often relate to more dysfunctional ER strategy use and outcomes [105]. In this case, the motive was often task avoidance, which resulted in dysfunctional ER and adverse outcomes characteristic of procrastination.

SM breaks can characterise procrastination when they involve *intra-personal ER processes* during passive SM use. This finding is unsurprising as the behaviour is an isolated, non-interactive activity. In some cases, *intrinsic interpersonal ER* during active SM use (for example, messaging friends) was also a distraction that supported procrastination outcomes.

SM breaks can characterise procrastination when involving active and passive SM use that supports unvaried ER strategies. Unlike the greater diversity of ER strategies enacted in recovery instances, breaks for procrastination involved only ER strategies that fall within the *attentional deployment* strategy category [51], specifically the ER strategy of *distraction*. Active SM use (particularly conversation) and passive use (such as scrolling feeds) supported the strategy subtypes of *passive positive distraction* and *passive neutral distraction* during procrastination [156]. The higher levels of automaticity attached to distraction increase the rigidity of the strategy across situations through habit-formation (i.e., the development of habitual ER [73]), creating more limited, inflexible ER attempts. Past research suggests that an overreliance on distraction– also termed *emotion-focused* or *avoidance-coping* strategies – can be maladaptive in the long term for an individual's ability to regulate difficult negative emotions effectively [129]. Indeed, procrastination is often linked to task avoidance as a short-term strategy for downregulating negative emotions [111].

In summary, an ER perspective helps elucidate how the propensity of an SM break to act as recovery or procrastination is influenced by SM behaviours (active/passive use) and underlying behavioural factors (motivational and environmental). Namely, ER processes (implicit/explicit ER) underlying break initiation/execution, ER motives (pro-hedonic/instrumental-performance) during break initiation, and ER strategies (unvaried/varied) implemented through SM behaviours differentiate between breaks for recovery or procrastination.

Table 3. A summary of the behavioural and ER factors characterising an SM break as a form of recovery.
Factors are organised into initiation and execution phases.

SM breaks for recovery			
Initiation		Execution	
Behavioural	ER	Behavioural	ER
Controlled processes (motivational) Scheduled triggers: time-management-led (motivational), positive task-progress-led (environmental)	Instrumental-performance ER motive Explicit ER processes	Controlled processes (motivational)	Explicit ER processes Varied ER strategy categories, strategies, and subtypes (Cognitive change category: Reappraisal strategy: reappraisal-mixed; Attentional deployment category: Distraction strategy: passive positive distraction, passive neutral distraction; Concentration strategy: concentrate-mixed)

Table 4. A summary of the behavioural and ER factors characterising an SM break as a form of procrastination. Factors are organised into initiation and execution phases.

SM breaks for procrastination			
Initiation		Execution	
Behavioural	ER	Behavioural	ER
Automatic processes (motivational) Unscheduled triggers: state-led (motivational), notification-led (environmental)	Pro-hedonic ER motive Implicit ER processes	Automatic processes (motivational)	Implicit ER processes Unvaried ER strategy categories, strategies, and subtypes (Attentional deployment category: Distraction strategy: passive positive distraction, passive neutral distraction)

5. DISCUSSION

5.1 General Discussion

This study found that SM breaks as a form of recovery or procrastination can be distinguished by behavioural factors (motivational and related-environmental) during break initiation and execution. Tables 3 and 4 above summarise this, highlighting the distinguishing factors from the findings. Specifically, Table 3 shows that SM breaks for recovery were generally characterised by SM use that was more conscious in initiation (supported by scheduled triggers) and execution. Table 4 shows that SM breaks for procrastination were characterised by SM use that was more automatic in their initiation (supported by unscheduled triggers) and execution.

The findings suggest that an SM break supports recovery or procrastination depending on how *controlled* or *automatic* the processes underlying break initiation/execution are. This controlled/automatic distinction is rooted in dual-process theories (e.g., Systems 1 & 2, Reflective-Impulsive model), which posit that the mental processes guiding behaviour can be distinguished into two main processing streams: 1) *controlled*: an umbrella concept of processes

that are characterised by at least one of the following criteria: occurs consciously, occurs intentionally, cognitive-resource heavy, and are controllable; and: 2) *automatic:* an umbrella concept of processes that are characterised by at least one of the following criteria: occurs unconsciously, occurs unintentionally, are cognitively resource-efficient, and are uncontrollable [48,49,140]. Gardner [46] outlines how these mental processes underlying behaviour can be separated for the *initiation* and the *execution* of behaviour, whereby processes can either be *controlled* (involving non-habitual, conscious processes requiring considerable cognitive input), *automatic* (involving habitual impulses requiring little cognitive input), or a mix of both – for example, the behaviour of 'exercising in the gym' can be initiated automatically. However, the execution of the gym exercises requires conscious control [46].

SM breaks initiated or executed consciously acted as a healthy recovery behaviour. Media-based recovery outcomes are likely when an individual engages in conscious, voluntary digital media use [112,113,125]. This was the case for active SM use (e.g., students finding actively messaging others to be relatively conscious and support recovery) and passive SM use (e.g., students finding more conscious scrolling of SM feeds to support recovery) during breaks. This finding is possible because a central aspect of the recovery experience and well-being is the notion of *control* or *autonomy* – the perception of behaviour being of one's own volition [130]. Indeed, such behaviours satisfy the basic psychological need for *autonomy* as posited by *self-determination theory* (SDT) –with this need satisfaction shown to maintain or enhance vitality [125,126]. The link between conscious (rather than automatic) use and recovery is also supported by past literature on habitual phone checking being linked to a lower sense of meaningfulness due to a loss of autonomy in the interaction [88]. Controlled SM breaks that acted as a recovery behaviour were supported by scheduled break triggers (e.g., using a timer to initiate and end a break). A possible underlying explanation for the association between scheduled break triggers and higher recovery capacity is the nature of scheduled triggers, as they inherently involve pre-planning and a task-progress-oriented mindset relative to unscheduled triggers. Individuals with higher trait performance goal orientation have been shown to experience media use for recovery [118] and have a lower risk for procrastination [59]. Goal orientation may support higher levels of *control motivation* (the willingness to direct effort to behavioural control), a negative predictor of automaticity in media selection and procrastination [127]. The goal orientation afforded by scheduled triggers may thus provide greater control motivation, supporting recovery. The exception to this general finding was higher automaticity observed in break initiation during time-management-led triggers. The latter observation suggests that repeating a time-scheduled break routine over time may support the development of habitual break selection and initiation [47]. Whilst this is automatic, this can be considered a 'good technology habit' [2] given the trigger's association with recovery and as a practice that supports better self-regulatory control over SM use and feelings of autonomy [116].

SM breaks initiated or executed automatically acted as an unhealthy procrastination behaviour. This outcome was the case for active SM use (e.g., automatically initiating breaks after receiving message notifications resulting in procrastination) and passive SM use (e.g., automatically executing scrolling behaviours for prolonged periods). The immersive and time-distorting experience attributed to automatic processes during these breaks can be considered a form of *flow* which has been shown to support the development of uncontrolled technology use and habit formation [142]. Indeed, past literature confirms how active [57,123] and passive usage [5,155] are associated with automaticity, which in turn is linked to procrastination [97,99,127]. Automatic SM breaks that acted as a procrastination behaviour were supported by break triggers that were not pre-scheduled (e.g., breaks being triggered by negative states such as boredom).

The association between unscheduled SM triggers, automaticity in break initiation and procrastinatory risk is confirmatory by past research. However, this study is the first instance of

these associations being shown together during SM breaks. Regarding unscheduled triggers and higher automaticity, previous literature confirms that internal affective state-led and external notification-led technology triggers are experienced as habitual and automatic [9,37,54,123,127]. In terms of unscheduled triggers and procrastination risk, previous literature demonstrates that unscheduled state-led triggers (e.g., boredom, FOMO) and notification-led triggers (e.g., notifications) are associated with increased SM use for procrastination [3,123]. High levels of automaticity associated with such unscheduled triggers may support procrastination through low control motivation and increased habit strength [99,127]. The negative emotions underlying state-led triggers may reduce students' control motivation [131], and notification triggers under strong habitual control support automatic usage [6] – with both leading to self-control failure and a heightened risk of procrastination [116]. Unscheduled break triggers link to procrastination through *side-tracking* whose execution was experienced as automatic, similar to previously identified *checking habit* behaviours, which act as a gateway to other application uses or *next actions* [106]. Negative emotional states increasing the likelihood of engaging in notification-led breaks have not been previously identified. This finding suggests a problematic interaction between state-led and notification-led break triggers, whereby students place themselves at greater risk of procrastination through automatic breaks when experiencing negative emotional states related to their tasks and having unmanaged notifications – possibly leading to side-tracking behaviours.

5.2   SM breaks are an opportunity for emotional regulation

This study extends previous research investigating SM break-taking by applying an ER perspective [58]. Going beyond a purely behavioural perspective, we highlight how SM breaks for recovery and procrastination can be distinguished by ER factors, as summarised in Tables 3 and 4 above. Specifically, these tables show that a recovery or procrastinatory outcome from an SM break can be distinguished by the ER motives (instrumental-performance vs. pro-hedonic) during break initiation, the ER strategy categories, strategies and subtypes (varied vs. unvaried) implemented during break execution, and the ER processes (explicit vs. implicit) across the break.

   These findings provide evidence that SM breaks have a core function of regulating emotion. Students in this study engaged in SM breaks to regulate emotions – to reduce negative and increase positive emotions – that arise locally within their study session from tasks and other socio-informational and contextual reasons. This finding supports prior work suggesting that SM break-taking behaviour is driven by an individual's attempt to regulate their emotions [13], as evidenced by *emotional homeostasis* research by Mark [92], *uses and gratification* research on emotional needs triggering media multitasking [165,168], and *self-regulation theory* research on media multitasking for upregulating positive emotions [4,109,116].

6. LIMITATIONS AND FUTURE WORK

Several factors may reduce the generalisability of these findings. First, a large proportion of students recruited for this study were female. This skewed sample is reflective of the context in which participants were recruited. Firstly, this study prioritised other factors over gender in the inclusion/exclusion criteria, such as year-of-study and the absence of clinical emotional disorders or addictions. These would influence the proportion of experienced healthy and unhealthy SM breaks [35,124,152,166]. Second, the study relied upon an opportunity-based sampling strategy (convenience and snowballing). This approach resulted in a gender-biased sample, possibly because female students are more likely to engage in SM use [55,144] and are more likely to participate in psychological research due to overrepresentation in undergraduate subject pools [33,38].

Taking this gender bias into account, researchers should be cautious about generalising these findings beyond a healthy female undergraduate population. Whilst there is no existing evidence to suggest that gender influences the relationships between identified behavioural and ER factors with break outcomes, given that there is evidence to suggest gender differences in other measures of SM breaks (e.g., frequency and time spent multitasking [29,42,163]), we cannot claim a strong level of transferability of the current findings to healthy male or non-binary undergraduates. Future research should consider conducting larger-scale mixed-method user studies to explore SM break-taking with a more systematic sampling approach that results in a gender-balanced sample.

Second, there is also the question of the generalisability of the study findings beyond a study session context. For example, an important consideration is knowledge worker populations, e.g., adult office workers, who take SM breaks during work. Initial evidence suggests SM break patterns are broadly similar in office workers [43]. However, future research should also explore SM break-taking in these populations and contexts at a similar level of granularity to confirm the relationships between the break factors and outcomes identified in this study.

Third, this study did not consider the influence of individual differences. Past research suggests that personality [93] and other traits (e.g., lack of control, media multitasking level [104], technology self-efficacy, mindfulness, and self-regulation [95]) are shown to influence focus levels, susceptibility to distraction and technostress. Future research should consider whether these individual differences influence SM breaks as a recovery or procrastination behaviour.

Fourth, recall bias is possible when recollecting affective experiences using technologies [22] and social desirability bias in participants' responses [11]. Regarding recall bias, this study was not focused on measuring precise changes in affective states, but rather, broad shifts between positive-negative in recent study sessions examples that were salient to the participant. Regarding social desirability bias, the researcher aimed to minimise desirable responses by requesting specific stories and examples of SM breaks and probing for more information – both established techniques to limit socially desirable responses [11]. Nevertheless, future research should support data validation using more time-sensitive naturalistic observational or diary studies that measure SM break-taking behaviours 'in the moment' to ensure improved accuracy in participant responses (e.g., via automated application logging) [81].

Fifth, whilst this study provides a formative overview of the specific SM behaviours associated with recovery and procrastination during the independent study – it is essential to acknowledge the deficiencies of framing the results within the active/passive SM use dichotomy. As mentioned, this dichotomy is often critiqued for being too generalised and hiding nuances within active or passive SM use [143,146]. However, this study extended this dichotomy as recommended by previous reviews [146]. It outlines the underlying sub-usage styles and provides empirical evidence of a more nuanced relationship between active/passive SM behaviours and wellbeing through the identified behavioural and ER factors influencing

their propensity for recovery or procrastination. Further, this dichotomy lent well to exploring break-taking across different SM platforms. Whilst this open and explorative approach helped identify the initial broad behavioural and ER factors – it possibly hides nuances that may exist between different platforms. Future research could thus explicate links between specific SM behaviours, factors, and outcomes using developed sub-usage style measures (e.g., Kaye's SM use categories [67]) for specific platforms.

Sixth, the identified factors, their relationships to active/passive SM behaviours, and recovery/procrastination outcomes are tentative. Future research should test the model to establish causality. Lastly, the design implications to support healthy and reduce unhealthy breaks are general and do not identify specific intervention implementation details. Interventions can be implemented either as an *internal* (redesigning the SM platform itself) or *external* (tools that exist outside of the SM platform) form of support [87]. External digital self-control tools are abundant [89], and internal tools are relatively scarce – however, they are on the rise with SM companies such as TikTok, including new screentime management features [30]. Nevertheless, designing interventions according to both behavioural *and* ER principles is limited. Thus, future research could explore both digital and non-digital support forms and identify where design implications are most appropriate to implement.

7. IMPLICATIONS FOR DESIGN

This paper's descriptive model of SM breaks identifies behavioural and ER factors that influence a break's propensity for recovery or procrastination. Researchers can use these factors to design SM break-supportive interventions to support students to engage in healthy breaks and reduce unhealthy ones. It is important to note that these implications can be used to develop both digital (e.g., digital study tools, SM platform changes) and non-digital interventions (e.g., educational campaigns, booklets, or workshops for students entering university).

7.1 Designing to increase healthy recovery-promoting SM breaks

Targeting behavioural and ER factors can help to inform the design of an intervention to support taking healthy recovery-promoting SM breaks. An intervention could achieve this in the following ways:

7.1.1 Increase the controlled processes underlying SM break initiation.
An intervention could support the individual to take breaks initiated under controlled processes by *making time for traction* (explicitly planning time for SM breaks). Making time for traction involves the individual developing better planning of their study session (i.e., when they engage in breaks during the session). This strategy would increase the scheduled break triggers the individual is exposed to during their study/work session. Eyal [44] recommends creating a time-sensitive calendar (time-boxing) such that an individual knows what tasks to do, when, and for how long. Given that students will inevitably engage in breaks in learning environments, providing a scaffold around their SM usage might support them to initiate breaks more consciously [122]. Second, an intervention could support the individual in more mindful interactions [78,139], for example, by providing prompts to be more intentional when initiating breaks [32] or through SM mindfulness lessons.

7.1.2 Increase the engagement in instrumental-performance ER motives during SM break initiation. An intervention could support the individual in holding instrumental-performance motives by changing their associations between ER motives and ER goals in particular situations. For example, changing their beliefs that increasing positive emotional states with scheduled SM breaks will increase subsequent task performance, but doing so with unscheduled breaks will decrease subsequent task performance [138]. Second, an intervention could support

the individual in changing their attitude from an *avoidance mindset* (breaks help avoid aversive experiences, e.g., complex tasks) to an *accepting mindset* (breaks are helpful for temporarily dealing with aversive experiences, but they will return to the difficult task) [159]. Third, an intervention could support the individual in developing explicit goals when engaging in breaks from an ER perspective [21]

7.1.3 Increase the controlled processes during SM break execution. An intervention could support the individual to take breaks executed under controlled processes by supporting mindful usage [78,139]. This approach could include providing mindful-inducing prompts to support conscious usage during the execution of breaks [110,141] or through lessons teaching individuals how to use breaks more mindfully.

7.1.4 Increase the implementation of various controlled ER strategies during SM break execution. An intervention could support the individual in implementing a greater variety of ER strategies involving controlled processes (i.e., those that require top-down processes supporting selection, inhibition, and manipulation of information in working memory) by suggesting particular strategies such as reappraisal [21]. Second, an intervention could support the individual by suggesting active SM use that supports intrinsic interpersonal ER (as these build interpersonal connections and strategy repertoire [8]). Third, an intervention could support the individual by supporting them in more accurately matching ER strategies to ER goals. This approach is helpful because dysfunctional ER is often due to an individual having lower flexibility in matching ER strategies to particular ER goals [101,138].

7.2 Designing to decrease unhealthy procrastinatory SM breaks

Targeting behavioural and ER factors can help to inform the design of an intervention to reduce unhealthy procrastinatory SM breaks. An intervention could achieve this in the following ways:

7.2.1 Decrease the automatic processes underlying SM break initiation.
An intervention could support the individual to reduce breaks initiated under automatic processes by *hacking back external triggers* (managing possible external break triggers, particularly notifications). This strategy would decrease the amount of unscheduled triggers the individual is exposed to during their study/work session. Eyal [44] recommends asking oneself, "Is this trigger serving me, or am I serving it?" and then hacking back the external triggers that do not serve one's goals. Reducing external triggers can involve hacking back smartphones (removing underserving apps, removing apps that are not necessary on a smartphone, rearranging serving apps to reduce visual clutter, adjusting app notification settings) and desktops (reducing visual clutter by removing unnecessary external triggers, adjusting notification settings of underserving apps). Second, an intervention could support the individual in *mastering internal triggers* (developing more adaptive responses to internal triggering states). Eyal [44] recommends identifying the internal trigger, e.g., a negative emotional state, writing it down (including information about relevant contextual factors), and exploring the trigger in a curious and non-judgemental way until it subsides. Third, an intervention could support the individual in reprogramming unhealthy triggers to support healthier alternative non-SM habits. This reprogramming could involve using *implementation-intentions* (if-then statement plans) tailored to specific emotional situations, e.g., *If* I experience boredom from my task, *then* I should go for a walk [79].

7.2.2 Decrease the engagement in pro-hedonic ER motives during SM break initiation. An intervention could support the individual in reducing pro-hedonic ER motives by mastering internal triggers underlying such motives. SM breaks for procrastination likely support ER attempts that they are not consciously aware of, so making the ER motives explicit by

reflectively identifying the emotional state and whether to regulate it may reduce this form of procrastination.

7.2.3 Decrease the automatic processes underlying SM break execution. An intervention could support the individual to reduce breaks executed under automatic processes by helping them to identify harmful automatic patterns [84]. Second, an intervention could support the individual in less mindless SM use by including optional friction known as *microboundaries* into their SM break experience (for example, a variable pop-up notification asking them about their SM intentions which they must answer to continue using the platform) [31,110].

7.2.4 Decrease the implementation of unvaried automatic ER strategies during SM break execution. An intervention could support the individual in reducing their implementation of a singular set of strategies (often involving automatic processes, e.g., distraction) by breaking unhealthy ER strategy habits through cue exposure reduction (e.g. via promoting study session planning and hacking back external triggers), breaking maladaptive context-response associations by *counterconditioning* (creating new adaptive strategy responses to a cue), or by supporting inhibition of a maladaptive strategy response [154]. Second, an intervention could support the individual in their overall *ER flexibility*, that is, "the ability to implement ER strategies that are synchronized with contextual demands" [7:264] by assessing students' current ER flexibility during study sessions and helping them to identify ER strategies that would be beneficial to implement during breaks [7,53].

8. CONCLUSION

We were interested in understanding why SM breaks students take when studying can lead to positive or negative outcomes. We developed a detailed description of SM breaks when studying. This description identified the SM behaviours and underlying behavioural factors that characterise SM breaks as a recovery or procrastination behaviour. We also demonstrated how an ER perspective helps to understand further SM breaks as a recovery and procrastination behaviour. Based on these findings, we present design recommendations to develop digital tools supporting healthy SM break-taking and reducing unhealthy ones.

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Appendices

Appendix 1: Interview schedule

Introduction

Hi [*name*], thank you for taking time out of your day to participate in this study. My name is [name] and I am a researcher at the [anonymised]. My research is focused on understanding student's usage of social media during self-study sessions. The purpose of this interview is to gain an understanding of your experience of private study sessions and the role social media has within them. When I say 'self-study sessions' I refer to any *individual* study activities outside of formal academic teaching, such as lectures and seminars... for example, working on an individual assignment, or revising for an exam. Remember, there are no right or wrong answers to any of the questions, I am solely interested in learning about your experience.

So, I will now begin recording the session, are you ready?

Opening questions

1. What degree are you currently studying, how are you finding it?
2. What kind of work do you do for your degree, how are you finding it?

Core in-depth questions

1. Think back to your most recent private self-study session, could you talk me through what you did?
    a. What study-tasks did you perform in the session?
    b. Did you perform a mixture of tasks within a session? What does this look like?
    c. How did you feel about the different types of tasks?
2. Tell me about your use of social media for non-study purposes in that private self-study session
    a. [*Environmental factors prompt*] Tell me about the situation...
    b. [*Environmental factors prompt*] What triggered you to use social media in a private self-study session?
    c. [*Motivational factors prompt*] Why do you use social media over other possible activities?
    d. [*Motivational/ ER motive factors prompt*] What do you aim to achieve when using social media during self-study, and why?
    e. [*Capability factors prompt*] What social media platforms and features did you engage with and why not others?
    f. How do you feel after using social media? [relate this back to SM behaviours + situation]
    g. How long do you tend to use social media?
    h. How do you know when to stop using social media and get back to work?
    i. What do you tend to do after using social media?
    j. What are your thoughts on using social media as a break?
3. Could you talk me through a time when using social media for non-study purposes negatively impacted the private self-study session? / Could you talk me through a time when using social media for non-study purposes positively impacted the private self-study session?
    a. [*Environmental factors prompt*] Tell me about the situation...
    b. [*Environmental factors prompt*] What triggered the social media use?
    c. [*Motivational factors prompt*] Did you find choosing to go on X platform in this situation was something you did automatically? Could you explain this in more detail?
    d. [*Motivational factors prompt*] Why did you use social media in this situation?
    e. [*Motivational/ ER motive factors prompt*] What did you aim to achieve when using social media? And why?
    f. [*Capability factors prompt*] What features did you engage with and why not others?
    g. [*ER strategy prompt*] How did using social media negatively/positively impact the session?

Closure

So, we are coming to the end of the interview. Is there anything else you'd like to mention about private studying sessions, break-taking, or your use of social media when studying?

Great, so that's the end of the interview. I'll now stop recording the session.

Thank you for taking part, your responses were very informative. Your data will now be stored in a secure storage location and deleted upon completion of my thesis. Any information you provided will be pseudonymised in any future publications. After this meeting, I will send you a copy of the participant information sheet. Regarding compensation the amazon voucher will be sent to your email address towards the end of the month once the data collection period is completed. Do you have any questions for me?

It would also be extremely helpful, and I would highly encourage you to pass on the online questionnaire link to anyone you think would also like to take part in this study. If you have anyone in mind, please do send them the link, I just posted it in the comments section of this call.