A Trans-Diagnostic Cognitive-Behavioural Conceptualisation of the Positive and Negative Roles of Social Media Use in Adolescents' Mental Health and Wellbeing

Running head: Social media use and adolescent mental health

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Abstract

Whilst research into the association between social media and mental health is growing, clinical interest in the field has been dominated by a lack of theoretical integration and a focus on pathological patterns of use. Here we present a trans-diagnostic cognitive-behavioural conceptualisation of the positive and negative roles of social media use in adolescence, with a focus on how it interacts with common mental health difficulties. Drawing on clinical experience and an integration of relevant theory / literature, the model proposes that particular patterns of social media use be judged as helpful / unhelpful to the extent that they help / hinder the adolescent from satisfying core needs, particularly those relating to acceptance and belonging. Further, it introduces several key interacting processes, including purposeful / habitual modes of engagement, approach / avoidance behaviours, as well as the potential for social media to exacerbate / ameliorate cognitive biases. The purpose of the model is to act as an aide for therapists to collaboratively formulate the role of social media in young people's lives, with a view to informing treatment, and ultimately, supporting the development of interventions to help young people use social media in the service of their needs and values.

Keywords: Anxiety, depression, formulation, young people, social media.

Key Learning Aims:

1. To gain an understanding of a trans-diagnostic conceptualisation of social media use and its interaction with common mental health difficulties in adolescence.
2. To gain an understanding of relevant research and theory underpinning the conceptualisation.
3. To gain an understanding of core processes and dimensions of social media use, and their interaction with common mental health difficulties in this age group, for the purpose of assessment and formulation.
4. To stimulate ideas about how to include adolescent service user's online world/s in treatment (where indicated), both with respect to potential risks to ameliorate and benefits to capitalise upon.
5. To stimulate and provide a framework for clinically-relevant research in the field and the development of interventions to support young people to flourish online.

1. Introduction

Interest in the role of social media[1] (SM) use in young people's wellbeing and mental health has grown over the last decade, and a number of researchers have attempted to link the increase in mental health difficulties in this age-group with the uptake of SM, or digital screen use more generally (Twenge et al. 2018; Twenge and Campbell 2018). In the context of healthy ongoing debate (Orben and Przybylski 2020a; Twenge et al. 2020), however, a critical evaluation of the existing evidence base suggests a complex pattern of associations between SM use and wellbeing in children and adolescents, including effects that are relatively small in size, mediated / moderated by other factors, and of unclear direction of causality (Orben, Dienlin, and Przybylski 2019). In addition, alongside the more commonly considered *negative* effects of SM, a number of *positive* effects of SM have also been posited (Uhls, Ellison, and Subrahmanyam 2017), with some evidence even suggesting that online opportunities and risks may be closely linked (Hollis, Livingstone, and Sonuga-Barke 2020; Livingstone and Helsper 2010). Consequently, there is an emerging consensus that *how* an individual engages with SM (and digital technologies more generally) is likely to be more important than *how much*, i.e. frequency, intensity or duration (Blum-Ross and Livingstone 2018; Nesi, Telzer, and Prinstein 2020; Orben, Weinstein, and Przybylski 2020), and relatedly, that there is a need to identify digital contexts and patterns of online interactions that are differentially linked to positive and negative outcomes (Granic, Morita, and Scholten 2020).

[1] For the purpose of this paper we define social media relatively broadly to include applications, platforms and other technologies that have been classified by Kaplan and Haenlein (2010) as medium or high with respect to 'social presence' and 'media richness'. This definition includes social network sites such as FaceBook and MySpace, content communities such as YouTube and Instagram, virtual social and game worlds such as Second Life and World of Warcraft, but does not include blogs/micro-blogs or collaborative projects such as Wikipedia.

This more nuanced perspective and evaluation of SM's relative risks and benefits has been slow to filter into mainstream clinical and educational literature, guidelines or practice. Thus, when it comes to the online world, much of the work within applied psychology has, to date, traditionally focused on extreme and highly problematic patterns of use, i.e. the field has adopted a 'concern-centric' approach (Orben, Weinstein, et al. 2020), although this is arguably changing (Aboujaoude 2010; Kuss and Lopez-Fernandez 2016; Wang et al. 2019). Further, a number of professional bodies have published guidelines on how to manage the online world of children and adolescents, and these have focused almost exclusively on the putative *negative* effects of SM use, despite the potential value in harnessing its benefits also (AAP Council on Communications and Media 2016; Dubicka and Theodosiou 2020; Viner, Davie, and Firth 2019).

Against the backdrop of this growing interest it has been argued that the area lacks a firm theoretical foundation, despite the essential role that this plays in the development and integration of a field (Granic et al. 2020; Orben 2018; Orben, Weinstein, et al. 2020). In actuality, a number of theoretical models of SM use (and digital technology use more generally) *do* exist; however, these have typically emerged from within the fields of computer-mediated communication and media, developmental and organisational psychology, rather than *clinical* psychology, and as such, have tended to be non-clinical in nature, often concentrating on more *general* variables such as (for example) motivations for technology uptake, use or continued use, e.g. the *Uses and Gratifications* theory (Ruggiero 2000), the *Extended Theory of Planned Behaviour* (Baker 2010), LaRose and Eastin's (2004) *Social Cognitive Theory of Internet Uses and Gratifications*, the *Technology Acceptance Model* (Marangunić and Granić 2015), and the *Technology Integration Model* (Shaw, Ellis, and Ziegler 2018).

A number of other models have focused on how the online world creates novel channels for communication and the implications of this for the user's sense of self, their sense of others, as well as the nature of their social interactions, e.g. the *Co-construction Model* (Subrahmanyam and Šmahel 2011), the *Self-Effects Model* (Valkenburg 2017), the *Differential Susceptibility to Media Effects Model* (Valkenburg and Peter 2013) and the *Social Information Processing Theory* (Walther 1992, 2015). Whilst some of these have potential implications for clinical practice, and have informed our thinking as well as much of the literature that we draw upon, such links to clinical practice are typically implicit rather than explicit. Where an *explicit* clinical perspective has been taken in the construction of a SM use model, this has tended to focus on *extreme* patterns of use, such that the primary issue relates to problematic technology and / or SM use itself (Caplan 2005; Davis 2001; Turel and Qahri-Saremi 2016; Wegmann and Brand 2019).

Thus, we would argue that whilst existing models and theoretical frameworks of SM use are highly informative, with a rich body of research underpinning them, they are of limited utility (as they stand) to the typical mental health clinician working in a general community mental health setting who wants *practical* guidance on how to harness the benefits and ameliorate the harms of SM use. For example, they do not lend themselves readily to the identification of targets for intervention, and because of their complexity and limitations in scope, are not suitable for sharing with service users themselves. Thus, we would argue that for a model to be of maximum clinical utility it should be intelligible and useful to the therapist *and* the client alike, bridging the gap between theory and practice, model and formulation, facilitating a *shared* understanding of the individual's presenting difficulties in an empowering way that opens up opportunities for behavioural change (Division of Clinical Psychology 2011). [See Ngai, Tao, and Moon (2015) also for a review on theories, constructs and conceptual frameworks that have been drawn upon (more broadly)

within the SM literature, and McFarland and Ployhart (2015b), Meier and Reinecke (2020) and Yang, Holden, and Ariati (2021) for useful frameworks to conceptualise and systematise existing research].

In response to this gap in the literature, this paper describes a trans-diagnostic cognitive-behavioural conceptualisation of the positive and negative effects of SM use on mental health and wellbeing in adolescents, with a focus on social / inter-personal processes and their interaction with common mental health difficulties, such as anxiety and depression. Drawing on our combined clinical experience of working with young people, an integration of the extant evidence base and existing theoretical frameworks of SM use and common mental health difficulties, its aim is not to pathologise everyday patterns of SM use, but instead, to achieve the following: (i) to act as a model for clinicians to integrate and make sense of relevant research *from a clinical perspective*, (ii) to act as an aide for clinicians to collaboratively formulate (and share) with young people the role of SM in their mental health difficulties, both in terms of risks to negotiate as well as benefits to harness, in order to (iii) direct treatment (where indicated), and (iv) in the long-term, inform the development of strategies and / or interventions to help individuals shape their online lives in a healthy way that is in line with their needs, goals and values. Consistent with these aims we recognise that the conceptualisation is an early working model to be updated iteratively as key components are either supported or refuted through empirical testing

The paper begins with a brief overview of social processes and SM use in adolescence in order to locate and contextualise the focus of the conceptualisation, before exploring the existing literature on the links between SM use and mental health. It then presents an overview of the *main* theoretical foundations from which the conceptualisation explicitly draws, before presenting a precis of the conceptualisation, as well as a more in-depth

consideration of each of its core components. Finally, we close with a discussion of the implications of the model for clinical practice.

2. Social processes and social media use in adolescence

Adolescence, defined here as the period between 10 and 24 years of age, is a broad window of development bridging childhood and adulthood, which is characterised by profound biological, psychological and social change (Blakemore 2018; Johnson, Blum, and Giedd 2009). It is a period of great opportunity and promise, but also vulnerability, with approximately three quarters of all lifetime psychological disorders emerging by the end of this stage (Kessler et al. 2007).

One of the primary challenges for adolescence, many have posited, is identity formation, a profoundly social process by which the young person must typically individuate from a family unit and establish a coherent identity that is embedded within a network of peer connections (Erikson 1968; Granic et al. 2020). Whilst there is great inter-individual variation in trajectories between adolescents, during this period the individual commonly faces a multitude of external challenges that must be negotiated, from leaving the family home and learning to live independently, to earning a wage and establishing peer friendships as well as sexual and romantic partners (Sawyer et al. 2018). In parallel, the adolescent is also confronted with a myriad of internal / biological changes, from the development of secondary sexual characteristics under hormonal control, to a protracted process of brain maturation (Andrews, Ahmed, and Blakemore 2020).

Critically, some of the last areas of the brain to mature during development are located within the 'social brain', i.e. networks thought to underpin social cognitive processes such as perspective taking, emotional regulation and the management of peer influence (Andrews et al. 2020). Psychologically, this is reflected in a period of heightened social

sensitivity, during which peer influence and vulnerability to the negative effects of social isolation and peer rejection are elevated (Orben, Tomova, and Blakemore 2020; Tomova, Andrews, and Blakemore 2021), with social interactions playing a crucial role in the development of identity (Granic et al. 2020; Ragelienė 2016a). Indeed, a wealth of research has linked the quality and nature of peer interactions in adolescence with a range of psychological, educational, physical health and behavioural outcomes (Almquist 2009; Almquist and Östberg 2013; Menting et al. 2015; Modin, Östberg, and Almquist 2011).

Risk-taking, novelty-seeking, impulsivity, exploration and experimentation are also elevated during adolescence relative to adulthood, with social factors thought to play a crucial role (Tomova et al. 2021). For example, adolescents are more likely than adults to take risks when in the presence of peers (Gardner and Steinberg 2005; Shepherd et al. 2011), and this effect is more pronounced when the peers report a preference for risk-taking behaviour (Bingham et al. 2016). Two distinct but interacting psychological processes have been hypothesised as important to an understanding of adolescent risk-taking: impulsivity and sensation-seeking. Thus, according to the Life-span Wisdom Model (Romer 2010; Romer, Reyna, and Satterthwaite 2017), there is a gradual reduction in risk-taking and impulsivity between childhood and adulthood, which is underpinned by the development of executive function skills and a maturation of the prefrontal cortex (Green, Fry, and Myerson 1994). This protracted development of self-regulatory skills is thought to underpin some of the more maladaptive impulsive behaviours commonly seen in childhood and early adolescence. In parallel, there is an increase in sensation-seeking that follows an inverted U-shape function and peaks around adolescence. This coincides with increased activity in limbic and prefrontal dopaminergic networks associated with reward-sensitivity (Chambers, Taylor, and Potenza 2003; Romer and Hennessy 2007). In contrast to the afore-mentioned process, whilst conferring additional risk, this is thought to be partially adaptive, driving an exploration of

the environment that is critical for learning (Romer 2010; Romer et al. 2017) and in some contexts may be optimal (Lloyd et al. 2020). Thus, risk-taking and exploration / learning may be two sides of the same coin.

Against this backdrop of heightened risk-taking and peer-influence, it is not surprising that a number of authors have hypothesised the potentially transformative impact of SM (and the internet more generally) on young people's social interactions, and by inference, identity formation (Granic et al. 2020; Subrahmanyam and Šmahel 2011) and social and emotional wellbeing; see Spies Shapiro and Margolin (2014) for a review, and Crone and Konijn (2018) also. Thus, the latest (pre-Covid) worldwide census data (from January to March 2010) suggest that Generation Z (aged 16 to 23 years at present) are the heaviest SM users of all, currently using SM for an average of 2.7 hours each day across an average of 8.5 SM accounts (GlobalWebIndex 2020). Further, adolescents with a diagnosed 'mental disorder' are more likely to use SM every day and for longer than those without a diagnosis (NHS Digital 2017). Whilst Amy Orben has written articulately about the repeating cycle of panic that follows the emergence of any new technology (Orben 2020b), SM undoubtedly offers novel opportunities for social experimentation, exploration and connection, but also, fresh challenges and risks, which at the very least, argue for close attention to be given to the online lives of young people presenting to mental health services.

Drawing on a contextual approach that recognises the complex interaction that occurs between the individual, their pattern of SM use and the nature of the technology with which they are engaging (as well as the broader social context in which this occurs) (Vanden Abeele 2020; Nesi et al. 2020), the cognitive-behavioural conceptualisation we present does not assume radically different processes during adolescence (relative to other life stages), but instead, acknowledges that key social processes may be *particularly* pertinent and play a more central role for this age group. Thus, issues of acceptance and belonging and the

balance between individual and group identity affect us all, irrespective of life stage. Likewise, the online world opens up novel ways of interacting with others for the adolescent and adult alike, with all the potential risks and benefits that these bring. Whilst a comprehensive review of research into such risks and benefits lies beyond the remit of this paper, we provide a brief overview of some of the key concepts and processes implicated below. Where available this draws on studies undertaken with adolescents; however, in view of the relative paucity of such research we also draw from a wider body of literature that includes studies undertaken with adults.

3. Social media use and mental health

Interpretation of existing research into the association between SM use and mental health is complicated by the fact that extant studies have explored an array of SM constructs (from self-reported time spent on *any* SM site, to defined behaviours undertaken on *specific* platforms) and mental health constructs (from specific disorders, to general risk factors for psychopathology), which are likely to exhibit distinct patterns of association. In response, Meier and Reinecke (2020) developed two organising frameworks to *"systematize conceptual and operational approaches"* (p.1) to computer-mediated communication (CMC) (including SM use) and mental health research.

The first framework, which focused on CMC, defined four 'channel-centred' levels of analysis, which included the device (e.g. smartphone), type of application (e.g. SM), application brand (e.g. Facebook), and application / brand feature (e.g. private messaging), in addition to two 'communication-centred' levels of analysis, which included the nature of the interaction (e.g. active vs. passive engagement) as well as the message / communication itself. The second framework, which focused on mental health, distinguished between

psychopathology (which they broke down further into *internalising* and *externalising* psychopathology, e.g. anxiety and aggression, respectively), and psychological wellbeing.

With respect to the existing evidence base into the association between SM use and mental health / wellbeing, a great deal has focused on the level of application or application brand (channel-centred research), e.g. time spent on SM, frequency of use, or intensity of use (Meier and Reinecke 2020). Within this research, however, the majority of studies have drawn on single-platform data, such as studies of Facebook use or cross-platform data that do not differentiate between platforms, thereby precluding identification of differential effects based on platform brand, let alone brand features (Schønning et al. 2020).

Systematic reviews and meta-analyses of overall levels of SM use (i.e. application level analyses) are relatively consistent, however, with evidence for a weak association between higher usage and poorer mental health (Abi-Jaoude, Naylor, and Pignatiello 2020; Orben 2020a), including symptoms of depression, anxiety and general distress (Abi-Jaoude et al. 2020; Keles, McCrae, and Grealish 2019; McCrae, Gettings, and Purssell 2017; Orben 2020a). In a *meta*-review of meta-analyses within the field, Meier and Reinecke (2020) found that individuals who used social network sites more intensely reported more internalising psychopathology, with an effect size in the range of $r \approx 0.05\text{-}0.2$. Evidence therein however, did not support associations between overall levels of social network site use and *wellbeing* / *life satisfaction* (as opposed to psychopathology), and no meta-analyses were found to have explored SM's link to *externalising* psychopathology. See Valkenburg, Meier, and Beyens (n.d.) also.

With respect to directions of causality, although relatively rare (Orben 2020a), where longitudinal or experimental methods have been employed, the evidence is mixed, suggesting possible bidirectional / reciprocal effects; thus, whilst high levels of SM use may impact negatively on mental health, poorer mental health may also drive increased SM use (Aalbers

et al. 2019; Frison and Eggermont 2017; Hunt et al. 2018; Mosquera et al. 2020; Orben and Przybylski 2019).

3.2. Putative mechanisms underlying the proposed harms of SM use

A number of mechanisms underlying associations between SM use and poorer mental health have been hypothesised. One common idea, known as the *social displacement* hypothesis, proposes that online activity competes for time that would otherwise be spent engaged in what is *presumed* to be healthier or more productive activities, such as sleeping, studying or socialising, the latter with potential implications for social development. However, evidence for the *social displacement* hypothesis is weak (Hall, Kearney, and Xing 2019; Valkenburg and Peter 2007), and it is likely that for *some*, SM actually *facilitates* social interactions, both online and offline (Valkenburg and Peter 2007)*;* more on this below. Further, one study concluded that SM in fact displaces neutral or unpleasant activities rather than pleasurable or rewarding ones (Hall, Johnson, and Ross 2019).

In contrast, evidence for sleep disruption and/or displacement of sleep amongst heavy SM users (Scott, Biello, and Woods 2019), and heavy digital screen users more generally, is relatively robust (Orben and Przybylski 2020b), although reported effect sizes are small (Orben and Przybylski 2020b). This is of potential interest here since sleep disturbance has been linked to a number of social difficulties (Gordon, Mendes, and Prather 2017), as well as a wide range of mental health disorders during adolescence (Tarokh, Saletin, and Carskadon 2016). However, once again, experimental evidence indicates a potential bidirectional causal relationship (Bartel, Scheeren, and Gradisar 2019; Exelmans and Van den Bulck 2016; Tavernier and Willoughby 2014).

Perhaps the most commonly explored ‘communication-centred’ factors linked to negative outcomes are online social comparisons, and potentially relatedly, passive use. Thus,

social comparisons theory (Festinger 1954) proposes that our sense of self is derived, in part, from how we judge ourselves to be doing in comparison to others, and high levels of online upward social comparisons have been linked to poor self-esteem and symptoms of anxiety and depression (Kelly et al. 2018; Liu et al. 2017b; Schmuck et al. 2019; Tibber, Zhao, and Butler 2020; Vogel et al. 2014, 2015; Wang et al. 2017), potentially in a causal manner (Vogel et al. 2014). Further, in a meta-review by Meier and Reinecke (2020), the authors reported a small association between higher social comparisons on social network sites and symptoms of depression (r=0.23; 95% CIs=0.12;0.34), which was greater for *upward* social comparisons (r=0.33; 95% CIs=0.20;0.47), i.e. comparisons made with those perceived as better off than oneself.

With respect to *passive* SM use (e.g. scrolling or browsing), it has been proposed that this is linked to more negative outcomes than active use (e.g. self-disclosure and online exchanges with others), with the association potentially being causal (Frison and Eggermont 2016, 2017; Kim and Lee 2011; Shaw et al. 2015; Verduyn et al. 2015, 2017; Wang 2013; Wenninger, Krasnova, and Buxmann 2014). In fact, the negative effects of passive use and social comparisons may be linked, since passive use is itself associated with higher levels of social comparisons and associated feelings of envy (Appel, Gerlach, and Crusius 2016; Krasnova et al. 2015; Tandoc, Ferrucci, and Duffy 2015; Verduyn et al. 2015, 2017).

Consistent with the validity of an active / passive distinction, in their meta-review Meier and Reinecke (2020) found that whilst active 'interactions' on social network sites (e.g. replying, commenting and liking) were related to positive wellbeing (r=0.14, 95% CIs=0.08;0.2), more passive 'content consumption' (e.g. browsing, searching, monitoring) was linked to negative wellbeing (r=-0.14, 95% CIs=-0.2;-0.8). However, the authors reported that the evidence for associations between interaction level factors (including active versus passive use) and *psychopathology* (rather than *wellbeing*) was *"scarce and*

inconsistent" (p.19). Relatedly, a recent paper reviewing the literature on active / passive use failed to find evidence for its association with wellbeing or mental health, leading the authors to conclude that such a distinction may be too coarse (Valkenburg, Driel, and Beyens n.d.). Other authors have similarly critiqued a simple active / passive dichotomy (Kross et al. 2021; Meier et al. 2020), suggesting that precisely *what* is being actively / passively engaged with in such interactions may be crucial (Valkenburg, Driel, et al. n.d.).

Speaking to this, in their overview of the literature, Yang et al. (2021) proposed that passive viewing of one's *own* profile may actually *increase* self-esteem, most probably because of the heavily curated nature of online profiles (including one's own), which means that the self is portrayed in a positive light (Gonzales and Hancock 2011). In addition, they noted that even where passive use *does* lead to social comparisons, the *nature* of these social comparisons may be critical. Thus Yang et al. (2021) suggested that whilst *judgemental* comparisons, e.g. comparing one's attractiveness or wealth to others', are typically associated with negative outcomes, *non-judgemental* comparisons, e.g. of opinions and perspectives for informational purposes, may actually lead to mental health benefits (Park and Baek 2018). Thus, passive use may be problematic specifically in instances where it leads to *judgemental* social comparisons.

Another possible mechanism of interest driving the association between SM use and poor mental health, which has received relatively little research attention to date, involves the potential for the nature of online communication to amplify or exacerbate maladaptive cognitions and / or facilitate problematic behaviours associated with pre-existing mental health difficulties and / or specific personality structures (Chohan and D'Souza 2020). For example, online symptom-checking may fuel health anxiety (Doherty-Torstrick, Walton, and Fallon 2016; McMullan et al. 2019), links have been made between SM use (particularly appearance-related interactions and upward comparisons) and body dissatisfaction / body

image disturbance (Hogue and Mills 2019; Holland and Tiggemann 2016; Meier and Reinecke 2020; Sidani et al. 2016), and exposure to online self-harm material may increase suicidality (Arendt, Scherr, and Romer 2019; Memon et al. 2018).

Finally, SM users may also be exposed to a number of *explicit* online risks, including those of a criminal nature (El Asam and Katz 2018), such as fraud, identity-theft, abuse and harassment, grooming, exploitation, radicalisation as well as exposure to age-inappropriate material, reputational damage, and cyber-bullying (Baccarella et al. 2018; Department for Education 2019; Sheldon, Rauschnabel, and Honeycutt 2020; Kaveri Subrahmanyam and Šmahel 2011d). However, whilst the online world has broadened opportunities for such exploitation and abuse, the relative isk and frequency of such risks on- and offline should be considered. For example, a meta-analysis found that traditional (i.e. offline) bullying was twice as common as online bullying (Modecki et al. 2014).

3.3. Putative mechanisms underlying the proposed benefits of SM use

Whilst the benefits of SM use have typically received much less attention to date, in research as well as the popular media, a number of health benefits have been documented. Inverting some of the proposed *harms* of SM use, many of these have focused on SM's potential to *facilitate* social developmental processes, e.g. through opportunities for identity experimentation, self-expression and social connection etc., rather than *displacement* of such opportunities (Subrahmanyam and Šmahel 2011a, 2011c).

Much research has, in particular, focused on the potential for SM use (and the use of digital technologies more broadly) to lead to an accumulation of social resources or cultivation of a sense of connectedness. For example, with respect to 'channel-centred' studies focusing on analyses at the level of device and application, Meier and Reinecke (2020) showed in their meta-review that individuals who used SM more intensely reported

higher levels of social capital and social support. Relatedly, in a meta-analysis Liu, Ainsworth, and Baumeister (2016) reported a positive association between general social network site use and social capital (r=0.32, 95% CIs=0.27;0.37). Despite this, surprisingly few studies have, to date, extended these findings to directly test a mediating role for such SM-driven accumulation of social capital in mental health and wellbeing (Lomanowska and Guitton 2016). There are exceptions, however; for example, in a study of 300 Korean adults, increases in social connectedness were found to mediate the effects of SM use on subjective wellbeing (Ahn and Shin 2013).

Despite the relative robustness of findings as to the potential for SM use to result in the accumulation of social capital / social support, for a number of reasons the association is unlikely to be straightforward. First, it is likely underpinned by multiple (potentially interacting) pathways, with the potential for bidirectional causality. For example, whilst feelings of disconnection may drive greater SM use, engagement with SM sites may itself cultivate feelings of connection, such that seemingly contradictory findings may emerge, even within the same data-set (Sheldon, Abad, and Hinsch 2011).

Second, individual-level factors, i.e. attributes of the user, may moderate such associations. For example, whilst the *social enhancement* (or *"Rich Get Richer"*) theory proposes that individuals who are popular and / or socially resourceful offline build their popularity and social connections further through online interactions, the *social compensation* (or *"Poor Get Richer"*) *theory* suggests that individuals who are less popular and / or less socially resourceful offline compensate for this through their online interactions (Zywica and Danowski 2008). The *social compensation* theory may be particularly relevant to the field of mental health. Thus, there is evidence to suggest that individuals who struggle socially and / or with their mental health, including those who are low in self-esteem (Ellison, Steinfield, and Lampe 2007), socially anxious (Indian and Grieve 2014), socially isolated or excluded

(Andrade and Doolin 2016; Khosravi, Rezvani, and Wiewiora 2016), lacking in social / familial support (Keresteš and Štulhofer 2020), or else struggle with social communication (Mazurek 2013), may stand to benefit the most from online engagement in terms of improved wellbeing and / or the accumulation of social capital. For these individuals, SM may provide opportunities for connection and support, self-disclosure and identity experimentation that would otherwise be unattainable or else feel unsafe / unmanageable in the offline world (Bonetti, Campbell, and Gilmore 2010).

Third, social capital is a broad, multifaceted construct; for example, as a minimum Putnam (2001) and others have distinguished between *bridging* social capital (i.e. 'weak ties' between distantly connected people) and *bonding* social capital (i.e. 'strong ties' between close family or friends), and these may differ in their strength and / or patterns of association with SM use (Liu et al. 2016). For example, Yang et al. (2021) mapped a complex pattern of associations between SM use and wellbeing that was dependent on whether engagement was with 'strong ties' or 'weak ties', and whether associated engagement was active in nature, or passive. Further, they distinguished between two forms of *active* SM engagement: (i) active interaction / directive communication, in which the user directly interacts or communicates with others, and (ii) active *broadcasting*, which they define as *"actively producing or sharing texts, photos, and videos to an unspecified audience"* (p.5). Reviewing the evidence, Yang et al. (2021) concluded that benefits to mental health are most likely when individuals use SM specifically in order to engage with close associates in an *active / interactive* manner (Seo, Kim, and Yang 2016), a pattern that they suggested is likely mediated by increased social support. Thus, being *active* online may not suffice; instead, active and purposeful interaction may be optimal for benefits to be accrued.

Examples of active / interactive patterns of engagement that been linked to social capital and/or wellbeing include the use of SM to meet new people or stay connected with

offline contacts (Ellison et al. 2007), self-disclosure (Gonen and Aharony 2017; Liu et al. 2016) and active replying to others (Liu et al. 2016). For example, one study had participants increase their posting behaviour on Facebook over the course of a week; relative to a control group that received no instructions, at the end of the study the experimental group reported reductions in loneliness that were driven by a greater sense of connection with friends (große Deters and Mehl 2013). Further, increased perceived online support has been found to mediate effects of active Facebook use on (less) depressed mood and lower levels of loneliness (Frison and Eggermont 2016; Seo et al. 2016). One possibility is that such active social engagement facilitates the cultivation of intimacy and building of connectedness (Lomanowska and Guitton 2016).

Finally, as a counter to SM's potential to increase exposure to tangible risks and harms, SM use may also provide opportunities for access to concrete rewards and benefits, including (amongst other things) opportunities for learning (Bruguera, Guitert, and Romeu 2019), financial revenue and career opportunities (Tang, Gu, and Whinston 2012), access to news (Nielsen and Schrøder 2014) and entertainment, peer support and specialist knowledge (Naslund et al. 2016). Relatedly, SM may also play a supportive or curative role for some with pre-existing mental health difficulties, e.g. through mental health initiatives, online support and provision of specialist information (Luxton, June, and Fairall 2012; Moorhead et al. 2013; Naslund et al. 2016; Kaveri Subrahmanyam and Šmahel 2011c).

4. Theoretical underpinnings

The primary theoretical foundations of the conceptualisation are drawn from cognitive behavioural approaches such as Cognitive Behavioural Therapy (CBT) and cognitive behavioural theory (Beck 1976). Thus, at the core of the conceptualisation lies a cross-sectional CBT formulation (McDonough et al. 1997), on to which additional components are

'bolted' or integrated. This decision was driven by our primary aim of making the conceptualisation of maximum *practical* utility to clinicians working in young people's mental health settings. Thus, CBT has a strong evidence-base supporting it, and has demonstrated great flexibility in its application to a wide range of mental health difficulties (Fordham et al. 2021), such that the approach has come to dominate mental health services, including in young people's services in the UK, as well as further afield. It is our hope that insights and approaches to emerge from the conceptualisation can be integrated easily into existing practices by clinicians currently working face-to-face with young people.

In addition, however, because of our shift away from a *causationist* approach, which assumes SM to be *inherently* harmful or beneficial (Orben 2020b) towards a more *contextualist* approach, which recognises the crucial significance of interactions between the technology, the individual and their behaviour, and further, emphasises the importance of the *function* or *consequences* of use (Nesi et al. 2020), we also drew upon third-wave cognitive behavioural approaches, particularly Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, and Wilson 1999), which shares such a *functional contextualist* perspective (Hayes et al. 2016a). This was particularly helpful in guiding our understanding of, and focus on, the *function* of online behaviours (including approach and avoidance behaviours) over their topography (or form), as well as our integration of the notion of mindful engagement, which is very much in keeping with recent trends to incorporate mindfulness-based concepts and practices within mainstream cognitive behavioural therapies (Baer 2018).

In addition to drawing on these two foundational approaches to understand core psychological processes, we turned to relevant theoretical literature to inform our understanding of how the individual and the technology interact, since these are largely unexplored within the CBT tradition. Whilst we drew on a large range of theory, we will describe three theories that *heavily* underpin our conceptualisation, and in particular, shaped

our understanding of the three core aspects of the human-technology interaction as we see them: (i) what drives an individual's engagement with the technology (*uses and gratifications* theory) (Kircaburun et al. 2020), (ii) how features of the technology invite or *afford* different patterns of engagement (the *transformation* framework) (Nesi, Choukas-Bradley, Prinstein 2018a, 2018b) [see Karahanna et al. (2018) also], as well as (iii) the consequences of this interaction for mental health (the *interpersonal connections behaviour* framework, and an extension thereof) (Clark, Algoe, and Green 2018).

In selecting particular theories / frameworks to inform our conceptualisation of the human-technology interaction we drew on our understanding and synthesis of relevant literature, as well as our combined *personal* experience of theories, hypotheses and frameworks that have proved to be of use in understanding SM use (and the clinical implications thereof) in the young people that we work with. Thus, our decisions as to what to include or exclude was driven primarily by our overarching aim of making the conceptualisation of maximum practical and clinical utility. Consequently, where possible we also prioritised theory that: (i) took a developmental perspective, focusing specifically on young people's engagement, or else was highly applicable to this age group, and (ii) was of *broad* clinical relevance to understanding *everyday* patterns of use, in contrast, for example, to more specialist theories that have focused solely on pathological patterns of use.

Whilst we do not provide an introduction to CBT or third-wave cognitive-behavioural approaches here, since these approaches are likely to be familiar to the common mental health practitioner as well as readers of this journal [see Beck (1995) and Hayes et al. (1999) however], we briefly introduce below the main frameworks that informed our understanding of human-computer interactions within the conceptualisation.

4.1. Uses and Gratifications theory

The *Uses and Gratification* theory (U&G) seeks to explain how and why people engage with media (Katz, Blumler, and Gurevitch 1973), with a greater focus on the *human* side of the *human-technology* interaction. Aside from being well-established, with a substantial and wide research base to support it (Lev-On 2017), U&G is inherently empowering and of clinical utility, since it posits that users are (primarily) *active* agents (rather than *passive* recipients) of information that are motivated to seek out specific media in goal-directed ways in order to satisfy (i.e. gratify) needs and desires. [See LaRose and Eastin (2004) however, for details of how SM *habits* may also be integrated into a U&G-based model of SM use].

U&G also proposes that such motivations will vary as a function of inter-individual differences in a range of social and psychological factors (Kircaburun et al. 2020), making it well suited to an idiographic -i.e. case formulation- approach that highlights personal agency and focuses on the workability of use for the individual. For example, findings from one study of college students suggested that individuals who are more anxious in face-to-face interactions and find offline socialising less rewarding may turn to SM as a 'compensatory' strategy, i.e. to connect with others and satisfy social needs (Papacharissi and Rubin 2000). In contrast, individuals who are less anxious in offline (face-to-face) interactions and find these more rewarding may be drawn to SM more for non-social purposes, e.g. for entertainment and information-seeking .

Critically, U&G also distinguishes between gratifications *sought*, meaning the intended purpose/s for which the media is used (e.g. to connect with others), which we will use interchangeably with the term 'motivations', and gratifications *obtained,* meaning the actual consequences of use (e.g. increased feelings of loneliness and disconnection) (Palmgreen 1984), which we will use interchangeably with the term 'consequences'. For this reason, the U&G is also well suited to a functional contextual approach that emphasises the

consequences of use in determining helpful versus unhelpful patterns of use (see Sections 4.4. and 5.2.6 below). For example, research has shown that self-reported satisfaction with social network site use is high when gratifications *obtained* exceed gratifications *sought*, i.e. when SM use effectively satisfies the individual's needs (Bae 2018).

Though not specific to adolescents or social media, U&G has been used to conceptualise young people's SM use in a number of studies. For example, Cheung, Chiu, and Lee (2011) showed that amongst adolescents / emerging adults, the primary motivations that predict an intention to use Facebook are *social* in nature, including a desire for social connectivity, social enhancement and social presence, suggesting that young people turn to SM, predominantly in order to gratify social needs. Seen through a developmental lens, such social motivations for SM use may be particularly pertinent for young people (Ciranka and van den Bos 2019) because they map onto key preoccupations and developmental challenges faced, e.g. those relating to peer acceptance, social connectedness, romantic and sexual exploration, and social identity formation (Ciranka and van den Bos 2019; Sebastian et al. 2010; Spies Shapiro and Margolin 2014). Further, the SM environment may afford opportunities for agency and experimentation in relation to such development needs and desires (Šmahel and Subrahmanyam 2011) that are more difficult to access in the *offline* world because of constraints imposed by parents, college and other systemic factors, as well as perceived barriers relating to the self (Valkenburg and Peter 2008). However, as noted, the SM environment also brings a number of risks and challenges, such that gratifications *sought* and gratifications *obtained* need not be perfectly aligned (Bae 2018).

With respect to associations between motivations and mental health outcomes, existing research in the area is scant (particularly in young people), and has traditionally relied on cross-sectional data that preclude causal inferences (Yang et al. 2021). Nonetheless, there is some evidence to suggest that interpersonal / relational motivations for SM use, such

as maintaining relationships and a sense of connectedness, may be linked to benefits in terms of reduced psychopathology, including lower levels of depression (Wright et al. 2013) and anxiety (Reichelt 2019), as well as improved wellbeing, including higher levels of social support satisfaction (Wright et al. 2013), lower levels of loneliness (Teppers et al. 2014), positive social adjustment (Yang and Brown 2013) and life satisfaction (Adnan and Mavi 2015). It is likely that this is because social benefits are more likely to be accrued when SM use is purposefully engaged with for this purpose.

Such interpersonal / relational motivations may be contrasted to non-social (or even socially avoidant) motivations, several of which have been linked to *poorer* outcomes. For example, in a single population sample of adults, Perugini and Solano (2021) showed that whist the use of SM to maintain relationships and seek information was associated with *better* well-being, its use to pass the time or for exhibitionism (arguably linked to social comparisons through a heightened awareness of relative status) was associated with *poorer* wellbeing. Relatedly, Yang et al. (2021) distinguished between two classes of SM motivations: (i) *enhancement* motivations, such as for maintaining existing relationships or seeking entertainment, which function to enhance positive or neutral states, and (ii) *compensation* motivations, such as meeting new people online, which (may) function to avoid negative affective states and compensate for perceived deficits. Whilst Yang et al. (2021) proposed that such enhancement and compensation motivations may be associated with positive and negative outcomes, respectively, they noted that evidence for this is weak, and further, may reflect socially anxious individuals being driven by compensation motivations, rather than the opposite direction of causality.

4.2. The transformation framework

The *transformation framework* was developed as a comprehensive framework to describe the implications of the SM environment for the establishment and maintenance of peer relationships in adolescence, integrating findings from across multiple disciplines within a clinical and developmental perspective (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b). Whilst a comprehensive review of the literature underpinning the *transformation framework* lies beyond the remits of this paper, it is important to acknowledge –as the authors do - that the framework draws heavily upon (and synthesises) large bodies of research from within the fields of computer-mediated communication, media psychology, developmental psychology and organisational psychology, some of which we have signposted the reader to in the introduction; see Subrahmanyam and (Šmahel 2011), Valkenburg (2017) and Walther (1992, 2015) for example. The *transformation framework* builds on these ideas, however, by relating these processes to the specific challenges of adolescent development and peer relationships, in both dyadic (Nesi, Choukas-Bradley, and Prinstein 2018a) and group (Nesi, Choukas-Bradley, and Prinstein 2018b) contexts. [see Karahanna et al. (2018) also].

According to the *transformation framework* the SM environment represents a unique and novel social context, distinct from face-to-face interactions, with a number of consequences for the nature of cognitive, behavioural and interpersonal processes that it affords (Moreno and Uhls 2019; Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b). Thus, whilst online and offline worlds interact, the online world does not merely *reflect* offline processes, but has the potential to *transform* it, offering a distinct set of opportunities and risks (Nesi et al. 2020). Specifically, the framework proposes that SM communication is characterised by a number of features, including temporal delays in social exchanges (*asynchronicity*), the creation of an indefinite trace or history of the communication (*permanence*), access and exposure to potentially large and / or open audiences (*publicness*), ease of access and engagement (*availability*), reduced availability of cues, including facial

cues (*cue absence*), countable social metrics, such as likes and shares (*quantifiable*), and the potential to share photographic and video material (*visualness*). Different SM platforms will vary on a continuum with respect to each of these dimensions, and consequently, will afford different patterns of engagement (Karahanna et al. 2018; Moreno and Uhls 2019); see Eshraghian and Hafezieh (2017) for a review of the application of affordance theory to SM research. For example, one of the key appeals of Snapchat is that messages are only available for a defined / brief period of time (*low permanence*). Different tools or setting options *within* a given platform may also vary with respect to these feature dimensions. For example, Snapchat has now evolved to include longer-lasting and archival functionalities, including the 'Snapchat Story' feature, with putative impacts on the nature of user engagement (Cardell, Douglas, and Maguire 2017).

Critically, the framework proposes that as a result of these characteristics, social interactions are transformed when they occur online, as noted, both with respect to dyadic and group communication. Specifically, they commonly: (i) change the frequency or immediacy of interactions (e.g. facilitation of high-speed messaging between individuals in a friendship group), (ii) amplify experiences and demands (e.g. intensification of an online dispute because of its public nature and the sheer volume of potential content), (iii) qualitatively change the nature of the experience (e.g. bullying may be perceived as harsher because of the anonymity of the perpetrator), (iv) facilitate *compensatory* behaviours, i.e. behaviours that may be more challenging in the offline world (e.g. social interactions may feel safer than offline interactions because of the *asynchronicity* in communication), and (v) provide opportunities for completely new behaviours and experiences (e.g. connection to specialist interest groups with people from far afield) (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b).

The *transformation framework* does not imply that these effects are inherently positive *or* negative, but instead bring a range of potential risks *and* benefits. Nonetheless, and critical here with respect to impacts on mental health, Nesi and colleagues propose that, for some, a number of problematic interpersonal -or *'depressogenic'*- processes *may* be amplified or increased in frequency within the context of online interactions (Nesi, Choukas-Bradley, and Prinstein 2018b, 2018a). These include: social comparisons, co-rumination [defined as an excessive discussion of / rumination on problems and stressors with others (Rose 2002)], reassurance-seeking and feedback-seeking (Nesi and Prinstein 2015). To take one example, (judgemental) social comparisons (and relatedly, negative self-image) may be facilitated online by the *visualness, publicness, quantifiableness* and *availability* of the SM environment, which essentially provides a highly detailed and easily accessible window onto others' lives (Fardouly, Pinkus, and Vartanian 2017; Marengo et al. 2018). Further, the *asynchronicity* of the communication may also encourage heavy editing / engineering of photographs and self-representations (Kasch 2013), such that the impression garnered is likely to be highly curated and idealised. Adolescents may be particularly vulnerable to such processes by virtue of their heightened sensitivity to peer influence (Ciranka and van den Bos 2019) and peer rejection (Sebastian et al. 2010), as well as the fluid / developing nature of their identity (Spies Shapiro and Margolin 2014).

Conversely, several of the SM features explored may serve to afford more *positive* interactions and behaviours –both *compensatory* and *novel* (Nesi, Choukas-Bradley, and Prinstein 2018b, 2018a). For example, the *cue absence* and *asynchronicity* of SM platforms may reduce the intensity of social interactions, and allow for communication to be slowed down, rehearsed and reflected upon (Bonetti et al. 2010; Harman et al. 2005; Michikyan, Subrahmanyam, and Dennis 2014; Valkenburg and Peter 2008). This may be of particular benefit to individuals who struggle in more traditional face-to-face social settings.

As another example of how design features may facilitate positive behaviour and mental health, whilst the *permanence, availability* and *quantifiable* nature of many platforms may facilitate the spread and uptake of problematic behaviours such as self-harm (George 2019), it also has the potential to amplify *prosocial* interactions (Erreygers et al. 2019; Tsvetkova and Macy 2015). Indeed, there is evidence that with respect to *online* interactions amongst adolescents, *pro*social behaviours may in fact be more common than *anti*social ones (Erreygers et al. 2017; Lister 2007). This is crucial since we know that heightened sensitivity to peer influence and peer rejection during adolescence is true of *pro*social as well as *anti*social behaviour (Andrews et al. 2020). Thus, the very same features of online communication that carry risks also open up opportunities and potential benefits (Hollis et al. 2020; Livingstone and Helsper 2010).

4.3. Extension of the transformation framework

In addition to the core features of SM platforms proposed by the *transformation framework* (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b), which we have summarised above, we would suggest that SM platforms typically exhibit a number of *additional* design features, the primary function of which is to compete for users' attention and maximise engagement (Alter 2017; Hill 2018; Lewis 2017; Zuboff 2015), with potential implications for -and impacts on- the user's 'response state', i.e. their cognitive, emotional and excitative state during engagement (Valkenburg and Peter 2013), the nature of their engagement (i.e. online behaviour), and potentially, their mental health. These additional features include: (i) filtering algorithms, which selectively propagate information that is trending, (ii) intermittent status updates and notifications (Bosker 2016; Lindström et al. 2021), and (iii) infinite scrolling and automatic play / replay content features (Noë et al. 2019).

In terms of the implications of these features for the response state of the SM user and their pattern of engagement, the nature of (i) filtering algorithms means that users are more likely to be exposed to information (e.g. posts and news stories) that they have previously accessed or else are trending within their network (Ciampaglia et al. 2018), which by its very nature is likely to elicit strong emotional responses and high levels of arousal / excitation (*amplifying and sensationalising*). Thus, even if SM algorithms are not *purposefully* designed to amplify the emotional or excitative state of its users, the reality is that because emotional material increases attentional capture and user engagement (Brady, Gantman, and Van Bavel 2020; Kozyreva, Lewandowsky, and Hertwig 2020; Tufekci 2013), there will be an algorithmic pull towards material that is controversial, extreme, polarised (Van Bavel et al. 2021), divisive and / or likely to elicit strong moral emotions such as outrage (Crockett 2017; Goldenberg and Gross 2020). For example, messages that elicit fear, disgust and surprise or include 'moral-emotional' words are more likely to spread (Brady et al. 2017; Vosoughi, Mohsenvand, and Roy 2017). Further, immoral acts are more likely to be encountered online and elicit stronger moral outrage than similar acts learnt about in person or through other more traditional forms of media (Brady et al. 2017).

With respect to (ii), intermittent status updates and notifications (Bosker 2016; Lindström et al. 2021), because of the uncertainty and unpredictability of social interactions, these will typically follow a variable-ratio reward schedule that will reinforce levels of engagement, i.e. increase usage, through basic operant conditioning processes (*reinforcing*). Finally, with respect to (iii) infinite scrolling, and relatedly, automatic play / replay content (Noë et al. 2019), these features maximise attentional capture and allow users to endlessly absorb material with minimal decision points and stopping cues, and hence minimal cognitive engagement with the decision process (*absorbing*) (LaRose 2010; Noë et al. 2019).

In terms of the implications of these for mental health, the *reinforcing* and *absorbing* nature of the experience may increase the likelihood of automatic / habitual patterns of engagement (Eyal and Hoover 2014), which are potentially linked to negative mental health outcomes through a number of casual pathways. Whilst these processes (and the links between them) are explained in greater depth in Section 5.2.7, it may suffice to note at this point, that when attention and behaviour is strongly captured by the media itself (*reinforcing and absorbing*), because of the limited capacity of attentional resources, attention to other cues beyond the screen (both internal and external) will be diminished, including those that may signal a potential benefit to stopping engagement, e.g. feelings of anger or fear triggered by an online interaction. Engagement thus becomes automatic or habitual, conditions under which it is easy to see how problematic patterns of use may emerge (Aarts, Verplanken, and Knippenberg 1998; Bae 2018; LaRose 2010; LaRose, Lin, and Eastin 2003; Verplanken, Aarts, and Van Knippenberg 1997).

With respect to the *amplifying* and *sensationalising* nature of the experience, this may feed negative emotions and exacerbate cognitive distortions / information processing biases, such as negativity biases, which lay at the core of many mental health difficulties and feed unhelpful cycles of thoughts, feelings / sensations and behaviours (Abramson, Metalsky, and Alloy 1989; Riskind 1997). Again, whilst we explore these processes in greater depth in Section 5.2.3, as a simple example, exposure to trending material that is highly emotive and triggering, e.g. graphic details of violent crime, may serve to confirm the beliefs of an anxious individual as to the dangerous nature of the world, thereby reinforcing negativity biases and increasing perceived threat (see Vignette 1 for example).

These *reinforcing*, *absorbing*, *amplifying* and *sensationalising* processes are also likely to interact. Thus, in their Differential Susceptibility to Media Effects Model (DSMM), Valkenburg and Peter (2013) propose that the effects of media (including impacts on

behaviour and emotion, and by implication mental health) may be most pronounced and long-lasting when 'cognitive, emotional and excitatory sliders, are high' (p.229). Such a state might be expected, we would argue, when the user is highly absorbed and engaged in the technology, and further, consuming and / or interacting (in a relatively uncritical way) with material that is highly emotionally evocative. Once again, there may be an algorithmic pull towards such states, though this is likely to vary across platforms and platform utilities.

4.4. The interpersonal-connections-behaviour framework

The *interpersonal-connections-behaviour* framework proposes a simple but powerful idea: that SM use is (in large part) beneficial or harmful to the individual to the extent that it promotes or frustrates core desires for acceptance and belonging, respectively (social gratifications *obtained*) (Clark et al. 2018). [See Verduyn et al. (2017) also]. Whilst the framework was not designed *specifically* with adolescence in mind, we would argue that it is *particularly* relevant to this age-group. Thus, acceptance and belonging and avoidance of rejection act as powerful motivators for behaviour during adolescence and are linked to key developmental challenges (Eisenberger, Lieberman, and Williams 2003; Tomova et al. 2021). Further, as noted, social motivations for SM use (gratifications *sought*) appear to be particularly important in driving this age group's intention to engage with the technology (Cheung et al. 2011).

In their review of evidence supporting the *interpersonal-connections-behaviour* framework, Clark et al. (2018) suggested that negative outcomes are more likely when SM engagement is superficial and characterised by interaction patterns that are unlikely to cultivate genuine intimacy and long-term satisfaction of core social needs, e.g. *"social snaking"* (p.33), and / or patterns of use that are likely to cultivate feelings of disconnection, e.g. *"lurking on stranger's profiles"* (p.33) (Clark et al. 2018). Thus, they draw on a body of

literature that highlights associations between *passive* patterns of use, e.g. scrolling, browsing and *judgemental* social comparisons, and poorer mental health / wellbeing. Conversely, Clark et al. (2018) highlight findings that link more active / interactive patterns of engagement, e.g. self-disclosure, online posting and direct exchanges with others, to better mental health / wellbeing, putatively through the accumulation of social capital and the cultivation of a greater sense of connectedness. We do not review these findings again here, but instead direct the reader back to Section 3.

4.5 Integration of core theory

Integrating the evidence base reviewed and core theories / theoretical frameworks discussed within a developmental perspective, we propose that SM engagement may be particularly beneficial or helpful to the adolescent where use results in *increased* satisfaction of core needs (gratifications *obtained*), particularly those relating to developmentally pertinent needs of acceptance and belonging. Further, we propose that such satisfaction of needs is most likely to occur when: (i) the individual's motivations for use (gratifications *sought*) are primarily for social enhancement purposes, with a focus on cultivating and maintaining deep and genuine connections, (ii) the nature of the user's online engagement is aligned with such enhancement motivations (e.g. engagement is active / interactive and non-judgemental), and relatedly, (iii) platforms used by the individual afford / support such patterns of engagement. Finally, SM may also be beneficial to mental health where it supports an amelioration of cognitive biases, e.g. negativity biases.

In contrast, SM engagement may be particularly harmful or unhelpful to the adolescent where use results in *decreased* satisfaction of core needs (gratifications *obtained*), particularly those relating to developmentally pertinent needs of acceptance and belonging, (e.g. increased feelings of loneliness or disconnection). Further, we propose that this may be

most likely when: (i) the individual's motivations for use are (at least in part) social in nature (gratifications *sought*), *but* (ii) satisfaction of these needs is *not* supported by the individual's actual online engagement (e.g. engagement is passive and judgemental, characterised in large part by social comparisons), and relatedly, (iii) the platforms which the individual uses do not afford helpful patterns of engagement, or else actively afford unhelpful patterns of engagement. SM engagement may also be harmful or unhelpful to the adolescent where the individual's motivations for use (gratifications *sought*) directly conflict with satisfaction of core needs relating to belonging and acceptance, for example where SM use is (predominantly and persistently) motivated by compensatory motivations relating to escape or avoidance. Finally, SM may also be harmful where it feeds into existing cognitive biases that perpetuate unhelpful patterns of thoughts and feelings.

5. The conceptualisation

5.1. Overview

As noted, at the core of the conceptualisation lies a cross-sectional CBT cycle (McDonough et al. 1997), which typically includes triggers, thoughts, feelings, sensations and behaviours (Figure 1). For simplicity, feelings and sensations are collapsed, and the initial trigger / input to the model is defined as SM use. Other additions include: (i) a box to represent *motivations for use*, (ii) a box to represent *information processing* (David, Miclea, and Opre 2004), which may be biased or relatively unbiased, and filters incoming (online *and* offline) information; (iii) a box to represent features and associated affordances of SM platforms (*platform affordances*), which may influence engagement with SM and how information is processed; (iv) a box to represent *consequences* or outputs of the model (i.e. gratifications *obtained*), with (v) feedback loops connecting consequences to motivations /

SM use (as well as the user's *mode* of engagement), and finally, (vi) a box to represent the *mode* of SM engagement, i.e. whether engagement is intentional / purposeful, or automatic / habitual.

Considering *unhelpful* patterns of SM use first, the individual has various *motivations* for engaging with the technology, which are underpinned by needs, including social needs, that they hope to gratify. Incoming information derived from these online interactions (*social media use*) is filtered by *information processing* biases (Beck et al. 1979; Wells 1997), which drive and perpetuate unhealthy cycles of thoughts, feelings, and behaviours, and ultimately, a number of negative consequences. To take a hypothetical -though relatively typical- example, consider a young SM user (let's call her Yma) who goes online in order to connect with her peers (*motivation)* and reads a friend's online post about a recent holiday. When filtered through a *negativity bias,* this might elicit negative automatic thoughts such as *"other people's lives are better than mine"* or *"I'm not good enough"*, driving a dip in mood, and as a result, a compulsion to socially withdraw and monitor others' posts for confirmation / disconfirmation of this belief (*avoidance behaviour*) (Beck et al. 1979; Wells 1997). Whilst this cycle is reminiscent of offline interactions, it may be exacerbated online by the features and associated *affordances* of the SM platform, e.g. the fact that the material is highly visual, constantly accessible, and linked to social metrics such as likes and shares (*availability, visualness, quantifiable*). Further, the *reinforcing* and *absorbing* nature of the experience, which is intended to hijack attention and maximise usage, may activate an automatic / habitual mode of engagement, which reduces Yma's capacity to effectively self-monitor and critically evaluate presented material (e.g. recognise that the friend's profile is likely to be heavily curated). As a result, cognition takes a 'short-cut' or uses a heuristic, *information processing* is *biased,* and the whole cycle is perpetuated.

Conversely, healthy or non-problematic cycles of thoughts, feelings and behaviours are enabled by relatively veridical information processing. Returning to our hypothetical example, imagine that Yma reads the same holiday post when she is in a very different state of mind, and is able to process the information in a relatively *unbiased*, and more critical, fashion, able to recognise, for example, the heavily-curated nature of her friend's profile. Relatively free of a *negativity bias*, thoughts triggered in this very different context might be neutral, or perhaps even linked to a *positive* memory of a similar childhood holiday with a family friend, such that a feeling of warmth or gratitude is elicited. This, in turn, drives Yma to reach out to the childhood friend (*motivation*), searching for them online and sending them a personalised message to invite them to join their network (*approach behaviour*). In this context, the affordances of SM, e.g. its *availableness* and *publicness*, will have facilitated this positive cycle, making it easier for Yma to locate and connect with her childhood friend. However, this requires intentional / purposeful engagement with the technology (*mode*), in the absence of which the pull will be towards a passive scrolling of online material, which has itself been linked to higher levels of (judgemental) social comparisons and associated feelings of envy (Appel et al. 2016; Krasnova et al. 2015; Tandoc et al. 2015; Verduyn et al. 2015, 2017).

As a result of this cascade of thoughts, feelings / sensations and behaviours, a set of consequences follow, the nature of which ultimately determine whether, irrespective of the *motivation* for engagement, the original SM behaviour engaged in proves to be helpful or unhelpful. Thus, within the conceptualisation, aside from their impact on *information processing* biases (and associated exacerbation / amelioration of problematic patterns of thoughts, feelings, sensations and behaviours), patterns of SM use are associated with positive and negative mental health outcomes primarily as a function of their capacity to promote or frustrate (respectively) satisfaction of core needs for acceptance and belonging.

Returning to our previous example, in the unhelpful cycle the ultimate consequences of Yma's social withdrawal may be a greater sense of loneliness and isolation (and loss of social capital), indicating a lack of alignment between gratifications *sought* and gratifications *obtained*. This loneliness is likely to feed into, and perpetuate, a cycle of unhelpful thoughts and feelings (e.g. negative thoughts about self, others and the world), and may set up a vicious cycle whereby feelings of disconnection brought about by SM use increase Yma's motivation to engage with the technology further in order to seek connection and alleviate such feelings; see Perloff (2014). This pattern may also be facilitated by negative reinforcement, particularly where SM use provides *short-term* distraction from such difficult feelings.

In contrast, in the second scenario / helpful cycle, the potential gains include an increased sense of connectedness and belonging, and an accumulation of social capital, indicating a good alignment between gratifications *sought* and gratifications *obtained.* This sense of connectedness is likely to feed into -and perpetuate- a cycle of helpful thoughts and feelings (e.g. positive thoughts about self, others and the world). These consequences may also reinforce patterns of SM use, through positive and / or negative reinforcement loops. Here this is unlikely to be problematic, since engagement is linked in this instance to positive consequences; in a small minority of cases, however, there is the possibility that this may topple over into problematic patterns of use (Wartberg, Kriston, and Thomasius 2020).

Below we now go through each of the components of the model in greater depth, explaining how they interact with one another with reference to the relevant literature.

[FIGURE 1 APPROXIMATELY]

5.2.. Key components

5.2.1. Motivations for use

Drawing on U&G theory (Katz et al. 1973), at the top of the conceptualization lie *motivations for use,* i.e. gratifications *sought*, which drive initial engagement with the technology (*social media use).* The nature of these motivations may underlie decisions as to which platform/s or platform utilities to engage with, since each is characterised by a particular pattern of affordances (Brandtzæg and Heim 2009; Karahanna et al. 2018). However, other factors are also likely to play a role, e.g. which platforms are commonly used by the individual's peers.

Social motivations are prioritised in the conceptualisation, as noted, because of their heightened relevance to adolescents and the developmental challenges / preoccupations they face (Ciranka and van den Bos 2019; Sebastian et al. 2010; Spies Shapiro and Margolin 2014), because of their centrality in driving young people's engagement with the technology (Cheung et al. 2011), but also, because the proposed costs and benefits of use are closely tied to *social* consequences of engagement (see Section 5.2.7).

An important distinction is made between *enhancement* and *compensatory* motivations (Yang et al. 2021), which are likely to be differentially linked to approach and avoidance behaviours online, respectively, and consequently, positive and negative outcomes (see Section 5.2.6). However, it is unlikely that there will be a perfect mapping between motivations for, and outcomes of, use (Yang et al. 2021). Thus, gratifications *sought* and gratifications *obtained* need not be perfectly aligned. This could be for a variety of reasons, e.g. through a social skills deficit, or chance encounter with an unsupportive or hostile audience that impedes positive outcomes *despite* predominant enhancement motivations and approach behaviours; in addition, there is a risk (in some cases) that habitual behaviour may come to compete with more purposeful, goal-directed behaviour as repeated behaviours are

reinforced (LaRose and Eastin 2004; Palmgreen, Wenner, and Rosengren 1985; Ruggiero 2000). In addition, in our clinical experience we have seen how initial *compensat*ion motivations may slowly be replaced by *enhancement* motivations, particularly where initial online interactions are found to be rewarding and confidence is gained; see Vignette 2 for example.

5.2.2. Social media use

Once the individual has engaged with SM (driven by their particular set of motivations) this provides a source of information to be processed (e.g. text, images and video). Basic parameters of interest include dimensions such as frequency and duration of use, and perhaps more critically, patterns of online behaviour and types of SM platform used. A direct line connects the *SM use* and *behaviour* boxes (Figure 1) to indicate that SM engagement represents a subset of the broader category of (*on*- and *off*-line) behaviours, and further, that SM use is recursively activated at various points in the conceptualisation, generating further information that feeds into the model. Crucial to the formulation, no single parameter of use can be assumed to be *implicitly* helpful or unhelpful, but must instead be conceptualised within the broader context, e.g. with consideration of the individual's resources, vulnerabilities and life-circumstances (see Section 5.2.6).

5.2.3. Information processing biases

Before incoming information feeds into the core CBT cycle it is processed; however, because of the ambiguity of *all* data and the constructive nature of perception and cognition, this processing is prone to information processing biases including cognitive distortions, and relatedly, attentional biases (Harvey et al. 2004a). Central to cognitive-behavioural models of mental health difficulties, cognitive distortions may include: selective abstraction,

overgeneralisation, magnification / minimisation, personalising, catastrophising, mind-reading and fortune-telling (Beck et al. 1979; Wells 1997). In addition, Beck wrote of the 'primitive' characteristics of depressive thinking styles, which he deemed to be non-dimensional / global, absolutistic and moralistic, invariant, personalised or self-referential, polarised, character-diagnosis-like and irreversible in nature (Beck 1976; Beck et al. 1979).

Such processing biases play a trans-diagnostic role in the perpetuation of many mental health symptoms (Derakhshan 2020; Grant et al. 2020; Jopling et al. 2020). Negativity biases, in which ambiguous or neutral information is interpreted in an exaggeratedly negative or threatening way (Baumeister et al. 2001; Rozin and Royzman 2001) and negative or threatening information is preferentially attended to (Harvey et al. 2004a), may be particularly important to the development and maintenance of mental health symptoms, e.g. anxiety and low mood (Abramson et al. 1989; Riskind 1997), including in adolescents (Klein et al. 2018). Further, where information processing is characterised by catastrophisation and overgeneralisation, anticipated and perceived threat is high, driving anxiety (Sussman, Jin, and Mohanty 2020). A simple online example of this can be seen in cases of health anxiety, where online symptom checking may feed negative thoughts, negativity biases and catastrophic misinterpretation of bodily signals, sometimes referred to as 'Cyberchondria' (Doherty-Torstrick et al. 2016). In addition, (judgemental) social comparisons (both online and offline) will be exacerbated, and potentially more problematic, when underpinned by egocentric biases of 'self-reference' or 'personalisation' (Beck, 1976, p.92) , and may be elevated in adolescence (Riva et al. 2016)

Crucially however, these biases may be more or less pronounced (dichotomised for simplicity here as *biased processing* versus *relatively unbiased processing*), and vary both *between* individuals, as well as *within* the individual at different points in time. Returning to the example of Yma, if she is processing information in a highly biased way when she views

the peer's holiday photos, she will likely ignore the broader context of their life and only attend to particular –often superficial- characteristics of the information (*selective abstraction*), assume that this heavily curated identity is in fact largely representative of everyone else's lives (*overgeneralisation, magnification*), and consequently, draw unfavourable comparisons with her own life (*personalising*). At the extreme, for example if Yma's (state) self-esteem is very low and / or if she is feeling particularly vulnerable at the time, she may also take this as evidence of some fundamental inadequacy in her own nature (*catastrophising, magnification* and *character-diagnosis-like*).

In contrast, if Yma is having a good day and feeling confident she will be more likely to evaluate the information more critically within its broader context, and integrate it with other sources of information (including memories) about the friend, the SM environment, and the wider world (i.e. processing will be relatively *unbiased*). Thus, she may discern that the friend's profile is heavily curated, representing an idealised self that is neither characteristic of the individual, nor others' experiences more generally. Consequently, the negative effects of the post may be bypassed or at least ameliorated.

Whilst such biases may be similar in online and offline contexts, crucial to the model is the notion that the nature of SM communication (*platform affordances*) means that such biases may be exacerbated or ameliorated online (see Section 4.2 and 4.3, and Vignette 1).

5.2.4. Platform features and affordances

Within the conceptualisation design features of SM platforms, and their related affordances, interact with several aspects of the model. These are denoted by the grey dashed lines in Figure 1. First, as noted, platform design feeds directly into SM use / SM behaviours; thus, SM platforms are designed to capture users' attention and reinforce engagement with the technology (*reinforcing, absorbing*), such that users are compelled to be connected more

often and for longer (Alter 2017). In addition, in accordance with the core *transformation framework* (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b), certain maladaptive behaviours may be directly facilitated by the nature of SM communication (e.g. its *asynchronicity, visualness, publicness, availability, asynchronicity* etc.), including social comparisons, co-rumination, and reassurance and feedback-seeking, which are trans-diagnostic processes that are likely to perpetuate problematic cycles of thoughts, feelings and behaviours, and feed into pre-existing mental health difficulties (Çelik and Odaci 2013).

Second, SM use may amplify information processing and attentional biases. As discussed, platform algorithms typically compete for attention, connect like-minded users, and amplify sensationalist material that is trending (*reinforcing, sensationalising*) (Kaylor 2019), which is by its very nature biased, e.g. *catastrophising, magnifiying / minimising, overgeneralising* etc. (Allcott et al. 2020). This can lead to the creation of 'filter bubbles' and 'echo chambers' (Spohr 2017), which restrict the availability of contradictory perspectives, and reinforce established biases in thinking. As examples, such algorithms may increase exposure to depressogenic content and thinking for individuals who struggle with their mood (Radovic et al. 2017), anxiety-triggering material for individuals who experience anxiety (McMullan et al. 2019), and / or drive unrealistic, idealised expectations of beauty in those with eating disorders or body dysmorphia (Saiphoo and Vahedi 2019). As noted, such algorithms may also induce 'response states' that are more likely to drive engagement (Valkenburg and Peter 2013), and arguably, fuel problematic thoughts, feelings and sensations, e.g. high levels of arousal / excitability in individuals who struggle with anxiety.

It is important to note, however, that this SM-driven amplification of information processing biases is not inevitable. Thus, the exact same features of SM that have the potential to spread harmful information across networks of users with speed, e.g. its *permanence, publicness* and *availableness,* also have the potential to facilitate access to

multiple, alternative perspectives that may ameliorate some of these biases (Hollis et al. 2020). For example, SM -*when used critically and purposefully*- may connect users with accurate, specialist information including mental health support and resources (Hollis et al. 2020; Yonker et al. 2015) and expert-by-experience / peer-support groups (Naslund et al. 2014; Radovic et al. 2017). Where dyadic (and group) interactions are carefully and selectively engaged in, support and care may be elicited, reducing stress and negative affect, which in turn reduce cognitive biases (Yu 2016). Further, the *asynchronicity* of SM and the potential for unlimited composition time (Moreno and Uhls 2019) mean that there is the potential for users to pause before communicating, mentalise their audience and consider the consequences of their engagement.

However, all of these potential benefits require intentional / purposeful engagement, and this may be challenging for adolescents since mentalisation, self-regulation and emotion-regulation skills are continuing to develop over this period and may lag behind the development of other processes (Andrews et al. 2020; Moreno and Uhls 2019). The challenges posed may be greater still for young people with neurodevelopmental, social communication and / or mental health difficulties, for whom executive function and other skills may be less developed or simply atypical (Malloy-Diniz, Miranda, and Grassi-Oliveira 2017).

5.2.5. The core cognitive behavioural cycle

As noted, once filtered through information processing biases, information derived from SM engagement feeds into a standard (cross-sectional) CBT cycle comprised of thoughts, feelings / sensations and behaviours. Considering maladaptive cycles first, the model draws on a relatively standard case conceptualisation of mixed anxiety and depression or low self-esteem, since these are the symptoms most often described in studies of SM use,

and further, are the focus of common presentations in community mental health services. As one might expect given the social nature of the medium and the heightened sensitivity of adolescents to peer influence and social rejection (Orben, Tomova, et al. 2020), particular attention is given to *social / interpersonal* thoughts, emotions and behaviours (Jiménez Chafey, Bernal, and Rosselló 2009). Thus, negative automatic thoughts about self and others, e.g. *"I'm not good enough"* and *"other people's lives are better than mine"*, are triggered by online content or interactions, and drive feelings of low mood and envy. Feelings of anxiety are also activated, since as *per* Melanie Fennel's model of self-esteem, feelings and thoughts relating to a sense of inadequacy trigger predictions of rejection (*"they won't like me" or "people will think my post is stupid"* for example) (Fennell 1998), a pattern seen in day-to-day clinical practice even where the primary diagnosis is depression (Jiménez Chafey et al. 2009).

Predictions (and actual experiences) of rejection of this nature may be *particularly* pertinent in online interactions. Thus, common features of many SM platforms, e.g. the relative absence of face-to-face and other cues (*cue absence*) (Culnan and Markus 1987; Lapidot-Lefler and Barak 2012), potential exposure to large audiences across multiple contexts (*publicness*) (Marwick and boyd 2011) and the *amplifying / sensationalising* nature of the experience, may contribute to instigate well-documented disinhibition effects and reduced moral sensitivity / empathy, such that harsh and critical judgement as well as public shaming may be common (Ge 2020). Further, the *publicness*, *availability* and *permanence* of many online platforms mean that expectations from peers may be amplified online (Nesi, Choukas-Bradley, and Prinstein 2018a; Niland et al. 2015), and a lack of near immediate response from others may be interpreted as rejection (Katsumata et al. 2008), which is particularly painful for young people (Eisenberger et al. 2003). Resulting negative thoughts and feelings / sensations may then be perpetuated further by information processing biases

(Section 5.2.2), as well as a range of maladaptive or unhelpful behaviours, which ultimately decrease satisfaction of core needs.

Conversely, with respect to adaptive cycles of thoughts, feelings / sensations and behaviours, positive (or simply more realistic) appraisals of self (e.g. *"I'm okay"* or *"not everyone has to like what I say"*) drive feelings of confidence, and these, perpetuated by relatively unbiased processing, facilitate a number of helpful behaviours that increase satisfaction of core needs. The nature of these behaviours are described separately below. Once again, in this context, the very same features of SM associated with potential harms, e.g. its *availability*, *permanence* and *publicness*, may serve to facilitate positive engagement, providing opportunities for social connection and identity experimentation (for example) (Hollis et al. 2020) that may perpetuate positive beliefs about self, other and the world, and satisfy core needs relating to acceptance and belonging.

5.2.6. Types of behaviours and their maintaining role

Both online and offline behaviours must be considered in parallel, since they commonly interact in complex ways to impact on the nature of social interactions and mental wellbeing (Nesi, Choukas-Bradley, and Prinstein 2018a), with 'spillover effects' being common (Nesi et al. 2020). For example, social connections made in one context (online or offline) may shift to the other (Ellison et al. 2007), although problems such as arguments and disagreements may show similar patterns of transfer (George et al. 2020). Also, individuals may attempt to use online interactions to cope with (or escape from) difficult thoughts and feelings triggered by offline interactions, or compensate for challenges and / or short-comings experienced in the offline world (Zywica and Danowski 2008), and *vice versa*.

In addition to key problematic behaviours discussed previously (e.g. social comparisons, co-rumination and reassurance seeking), a broad distinction is made within the

model between social *approach* and social *avoidance / escape* behaviours, denoting movement *toward* and *away* from the world, respectively (Gable 2006; Gazelle and Rudolph 2004; Nikitin and Freund 2008). One might also consider approach and avoidance behaviours more generally, i.e. online engagement as an escape from painful thoughts and feelings, versus online engagement as a way of connecting with people and things that are valued (Hayes et al. 2016b). Such approach and avoidance behaviours have been proposed as trans-diagnostic factors (Fernández-Rodríguez et al. 2018; Hayes et al. 1999; Sportel et al. 2011), which, underpinned by largely independent Behavioural Activation and Behavioural Inhibition motivational systems (Carver 1996; Gable, Reis, and Elliot 2000), are implicated in a broad range of mental health conditions (Caspi et al. 1996; Contractor et al. 2013; Hayes et al. 2016b; Kimbrel, Mitchell, and Nelson-Gray 2010; Lahat et al. 2012; Serrano-Ibáñez et al. 2019).

Within the behavioural / cognitive-behavioural literature, avoidance has been linked to negative outcomes through multiple pathways, including preventing disconfirmation of negative beliefs and predictions, e.g. *"they won't like me"* or *"they'll reject me"* (Salkovskis 1991) and habituation to feared objects or outcomes, e.g. face-to-face social interactions (Ferster 1973; Lewinsohn 1975), and reducing access to positive reinforcers, e.g. positive social interactions (Gable 2006; Hayes et al. 1999). Conversely, approach behaviours facilitate fearful cognitions to be tested (and potentially disproven), enable habituation to feared objects or outcomes, increase exposure to positive reinforcers, and broaden the individual's behavioural repertoire (Harvey et al. 2004b; Hayes et al. 2016b).

Whilst withdrawal and avoidance are in no way specific to SM use (or the online world more generally), they may be exacerbated online and / or by online interactions, because of the ease with which one can access -or withdraw- to an alternative world that is immediately available at the click of a button (García-Oliva and Piqueras 2016)

(*availableness*). In parallel, the same feature, i.e. the *availableness* of the online world, also presents opportunities for engagement, both *compensatory* and *novel* (Hollis et al. 2020). Thus, whilst SM provides opportunities for increased connection and growth (*approach*), it can also facilitate a retreat from the social world and a pulling away from experience (*avoidance*). As noted previously, such social reinforcers and punishers are particularly strong drivers of adolescent behaviour (Spear 2011).

Critically, such behaviours can only be categorised as approach or avoidance when considered in the broader context, e.g. the individual's present mental state and learning history, in addition to the actual function of the behaviour (Hayes et al. 2016a). A critical factor is therefore the trajectory of the individual's behaviour *relative to their current context*: i.e. does the behaviour represent a movement toward or away from the world and their goals / values? For example, for an individual who is highly socially anxious or relatively socially inexperienced, the cultivation of relatively weak online social ties (e.g. sharing of videos or photos with minimal self-disclosure), might represent the only tolerable form of social engagement, and a safe intermediary step towards the cultivation of deeper social connections (see Vignette 2 for example). For this individual at this point in time, therefore, this would represent an *approach* behaviour. In contrast, for an individual who was previously gregarious and socially confident, similar online activity might represent a retreat from more intimate face-to-face interactions and painful thoughts and feelings that arise. For this individual at this point in time, therefore, this would represent an *avoidance* behaviour.

In support of the importance of such approach versus avoidance behaviours in determining the relative benefits and harms of SM use (and digital technology more generally), a recent longitudinal study of over 1000 participants showed that during the COVID-19 pandemic, individuals with an *approach* coping style reported *lower* levels of depression, an effect that was partially mediated by increased levels of social network site

use, and an associated accumulation of social support (Cheng, Lau, and Luk 2020). Conversely, individuals with an *avoidant* coping style reported *higher* levels of depression, and this was mediated by more time spent on internet gaming and (in turn) the experience of cyberbullying. The authors referred to these two pathways as the *social-capital-accrual* and *escape-from-self* hypotheses. Relatedly, whilst a longitudinal study of 256 adolescents reported that individuals using Facebook in order to make new friends (*approach*) was associated with decreased peer-related loneliness, its use as compensation for offline challenges (*avoidance*) was associated with increased loneliness (Teppers et al. 2014).

5.2.7. Consequences and feedback loops

Whilst the conceptualisation proposes that SM engagement may interact with common mental health symptoms relatively directly through an amplification or amelioration of *biased information processing* (with knock-on effects on thoughts, feelings / sensations and behaviours), the social consequences of engagement are of critical importance in determining impacts on wellbeing. Thus, as discussed, in accordance with the *interpersonal-connection-behaviours* framework (Clark et al. 2018) a defined pattern of SM use is (primarily) deemed to be helpful or harmful to the user to the extent that it helps or hinders the user from satisfying core needs, particularly those relating to belonging and acceptance (*consequences*). Satisfaction or dissatisfaction of social needs are then likely, as noted, to feed back into the core CBT cycle, perpetuating positive or negative beliefs (respectively) about the self, others and the world; for example, reciprocal links have been demonstrated between positive social relationships and self-esteem over time (Harris and Orth 2020). Further, there may also be more tangible rewards to emerge from such social connections, including emotional and practical support in times of need (Guo, Li, and Ito 2014; Williams 2019).

Whilst other consequences are also likely to be of relevance to mental health and wellbeing, e.g. satisfaction of *other* needs relating to autonomy and competence (Karahanna et al. 2018; Ryan and Deci 2017), or satisfaction of more aspirational needs underpinned by the individual's particular set of values (Bramwell and Richardson 2018), the conceptualisation focuses primarily on *social* needs relating to acceptance and belonging. This is for several reasons: first, research highlights the crucial role of such social processes in young people's lives and mental health (Orben, Tomova, et al. 2020; Tomova et al. 2021); second, their engagement is driven predominantly by social motivations (Cheung et al. 2011); and third, from our combined experience of working clinically with this age group, where SM use interacts markedly with their mental health, this is typically through such social pathways (see Vignettes 1-4 for example). Finally, there is also evidence to suggest that other needs and challenges of adolescence, e.g. those relating to identity formation, may (themselves) be closely related to acceptance and belonging. For example, adolescent identity development is positively associated with healthy peer attachment and quality of peer relationships, romantic relationship satisfaction, and reduced levels of loneliness, such that a need for acceptance and belonging may in fact underpin / lay at the core of identity formation (Ragelienė 2016b).

Finally, the consequences of the model also drive a number of feedback loops that reinforce general SM use and / or particular patterns / modes of engagement. Such feedback loops operate firstly through standard operant conditioning process, e.g. positive and negative reinforcement (Nadkarni and Hofmann 2012; Wegmann and Brand 2019); thus, computational modelling of SM use has shown that human behaviour on SM platforms follows basic principles of reward learning (Lindström et al. 2021). However, such reinforcement processes may be exacerbated online as a result of the near-constant availability of tangible feedback in the form of likes, comments and shares (*availability* and

quantifiability) delivered on a variable-ratio reward schedule (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b).

Reinforcement of SM engagement may be helpful, e.g. where social rewards (such as an increased feeling of connection) drive further *approach* behaviours, as these are likely to increase the probability that core needs will be satisfied, and hence that positive thoughts, feelings / sensations and behaviours will be perpetuated, building confidence and self-esteem. However, reinforcement of SM engagement can also be *unhelpful*, e.g. where it perpetuates a cycle of avoidance and withdrawal from the world, as this is likely to increase the probability that core needs will *not* be met, and hence that *negative* thoughts, feelings / sensations and behaviours will be perpetuated, and confidence / self-esteem will fall. In a minority of cases, such reinforcement may also lead to addictive or problematic patterns of use (Nadkarni and Hofmann 2012; Turel and Qahri-Saremi 2016; Turel and Serenko 2012); thus, even when SM behaviours are initially purposeful and goal-directed, with repetition and repeated reinforcement habits may form, such that engagement becomes relatively automatic, i.e. *"lack[ing] effortful attention […]intentionality, awareness, and/or controllability"* (p.197, LaRose 2010), with all the risks that this entails; see Section 5.2.8 and research on media *habits,* e.g. LaRose and Eastin (2004).

With respect to such reinforcement, it is also important to consider the short-term *as well as* the long-term consequences of use. Thus, it is well established that consequences that follow shortly after a behaviour acquire strong controlling functions, i.e. *short-term consequences dominate in the control of behaviour* (Ramnero and Torneke 2008). For example, SM use, or particular online behaviours, may be *negatively* reinforced through short-term distraction from aversive feelings of loneliness, disconnection or even (potentially) withdrawal (Cheung, Lee, and Lee 2013), or *positively* reinforced through transient or superficial interactions that trigger a momentary sense of pleasure, i.e. 'social

snacking' (p.33) (Clark et al. 2018) and (Krämer et al. 2018). In both cases, however, whilst the long-term consequences of use may be a decreased satisfaction of core needs relating to acceptance and belonging, the behaviour will still be reinforced since (as noted) short-term consequences typically dominate.

Another problematic feedback loop may be established through a parallel process that operates via its effect on *motivations*; thus, in their Transactional Model of Social Media and Body Image Concerns model, Perloff (2014) describes a process whereby the individual engages with appearance-focused SM content in order to seek reassurance and validation (gratifications *sought*), but as a result of online social comparative processes actually experiences an *increased* sense of body dissatisfaction (gratifications *obtained*). This leads to a greater motivation to engage with SM and seek reassurance online, such that a powerful feedback loop is set up. Relating this to our conceptualisation, where the consequences of use are a *decreased* sense of acceptance and belonging (or increased sense of disconnection) the user's motivation to engage in order to seek connection may be amplified. From a behaviourist perspective this may be conceptualised as an *establishing operation*, altering the rewarding experience of online interactions, just as thirst alters the rewarding experience of drinking a glass of water (Ramnero and Torneke 2008). Of course, the flipside side to this is that where needs of acceptance and belonging *are* met, motivations to use SM may remain stable or even decrease.

5.2.8. Mode of engagement

An over-arching component of the model is the user's *mode* of engagement; specifically, the extent to which SM is engaged with intentionally, purposefully and with awareness (i.e. mindfully), as opposed to automatically and habitually (i.e. mindlessly) (LaRose 2010). Mindfulness, which is often distinguished from states of 'automatic

inattentiveness' or 'automatic pilot' (Van Dam, Earleywine, and Borders 2010) can be defined as purposeful, non-judgemental, present-centred awareness (Bishop et al. 2006), and has been operationalised in both state and trait forms (Kiken et al. 2015). The concept (and practice) of mindfulness has become incorporated into mainstream cognitive behavioural therapies (Baer 2018), and when separated from the concept of mindfulness *meditation practice*, in its more prosaic day-to-day sense mindfulness can be conceptualised as something akin to an ongoing awareness of internal and external stimuli (Brown, Ryan, and Creswell 2007) and an associated 'acting with awareness' (Turel and Osatuyi 2017), thus sharing some features with the concept of meta-cognition (Hussain 2015).

Within the conceptualisation, intentional / purposeful SM engagement is typically associated with more positive outcomes. This is because of its potential to increase attentional control and enhance processing of internal and external signals, and thereby modulate cognitive, affective and physiological process that are central to self-regulation and emotional wellbeing (Schuman-Olivier et al. 2020; Vago and David 2012) [*"through attentional focus, individuals learn to become more aware of habit-linked, minimally conscious affective states and bodily sensations […], thus "de-automating" this largely habitual process"* (p.201, Houlihan and Brewer 2016)]. Thus, as indicated in Figure 1 by the (thicker) connecting arrows, intentional / purposeful engagement: (i) ameliorates information processing biases by enabling greater attentional control and access to internal and external signals that carry potentially relevant information (*information processing*) (Heppner et al. 2008), allowing the user to (ii) process / weigh up the potential benefits and costs of their behaviour using this information (*thoughts*), and consequently, (iii) respond in a manner that is in the service of their needs and values (*behaviours*), the net effect of which is (typically) to: (iv) reduce negative and increase positive affective states (*feelings / sensations*) and drive more adaptive cycles of thoughts, feelings and sensations. In simpler terms, a more intentional / purposeful

mode of engagement may increase the user's awareness of the consequences of their online behaviour and the material to which they are exposed, facilitate a more critical appraisal of the information with which they engage, and further, enable them to be more selective in *who* / w*hat* they chose to connect with / attend to.

In contrast, automatic / habitual engagement may increase the individual's susceptibility to attentional capture by the technology (*reinforcing, absorbing*), increasing information processing biases, and thereby perpetuate problematic cycles of thoughts, feelings / sensations and behaviours. Thus, when behaviour is automatic / habitual *"it is guided by automated cognitive processes [i.e. biased processing], rather than being preceded by elaborate decision processes"* (p.1355) (Aarts et al. 1998; LaRose 2010; Verplanken et al. 1997). At the extreme, this may lead the user to unreflectively drift into problematic or addictive patterns of use that do not serve their needs. In contrast, mindfulness may facilitate *"a space of awareness between craving and the problematic behaviour that would not otherwise occur"* (p.6, Owen et al. 2018). Again, in simpler terms, a more automatic / habitual mode of engagement will mean that the user is likely to be less aware of the consequences of their online behaviour and the material to which they are exposed, less critical of the information that they engage with, and further, less selective in *who* / *what* they connect with / attend to.

High levels of mindfulness have been linked to more veridical processing of day-to-day experience and a reduced reliance on prior beliefs and expectations, i.e. relatively *unbiased information processing* (Lakey et al. 2008) and through a bypassing (or amelioration) of such cognitive biases, reduced symptoms of anxiety and depression (Mayer, Polak, and Remmerswaal 2019; Schmertz, Masuda, and Anderson 2012). Further, the practice of mindfulness meditation has been linked to reduced negativity biases, rumination and the need for others' approval, potentially offering some protection against the impact of

judgemental social comparison processes (Kiken and Shook 2011; Ramel et al. 2004; Vago and Nakamura 2011) and a reduced reliance on some of the 'depressogenic' behaviours highlighted by the *transformation framework*, e.g. co-rumination, reassurance-seeking and feedback-seeking (Nesi, Choukas-Bradley, and Prinstein 2018b, 2018a).

Perhaps more importantly, there is evidence for the role of mindfulness in supporting behaviour change (Schuman-Olivier et al. 2020) and less compulsive / habitual patterns of behaviour (Wenk-Sormaz 2005), including with respect to the SM use and digital technologies more generally. For example, dispositional mindfulness has been shown to mediate associations between psychological maltreatment by parents, psychological symptoms, self-esteem and internet / Facebook addiction in university students (Arslan 2017; Eşkisu et al. 2020), moderates the effects of mobile phone addiction on high levels of rumination and poor sleep quality in a protective manner (Liu et al. 2017), and has been linked to less compulsive (mobile-phone-based) SM use amongst adolescents / emerging adults via a mediating pathway that involves self-esteem and social anxiety (Apaolaza et al. 2019). Further, mindfulness has been shown to moderate the association between SM use and 'burnout' in the workplace (Charoensukmongkol 2016), and in an artificial SM environment, protects against psychological distress, negative emotions and antisocial tendencies triggered by 'feeling left out' when receiving few likes (Poon and Jiang 2020). Thus, through a number of pathways a more mindful mode of engagement is likely to be associated with better outcomes.

6. Clinical implications

6.1. Assessment and formulation

Given the relative ubiquity of SM use, we think that, as a minimum, an exploration of service user's online world/s should constitute an integral part of the assessment process,

particularly for young people, for whom their online life may be as rich and vivid as their offline world. Whilst this should incorporate exploration of explicit online risks (particularly where impulsive or risky behaviour is indicated more generally, or where the individual is deemed vulnerable in some way), we hope that the conceptualisation will encourage clinicians to go further than this, and explore service users' patterns of use, online relationships and interactions more generally, and think about how these might interact with existing difficulties to both exacerbate and / or ameliorate symptoms.

Where SM use is seen as playing a significant role in the individual's life (e.g. as a precipitating, perpetuating or protective factor), these should be collaboratively integrated into an individualised conceptualisation, as *per* any CBT treatment. Thus, we are not proposing that the conceptualisation be used to inform a 'CBT for SM use' protocol, but that instead, the conceptualisation (or components of it where deemed relevant) be integrated into standard CBT formulations or case conceptualisations. At the core of the conceptualisation (Figure1) lies a standard cross-sectional CBT cycle, on to which all (or a subset of) the suggested additional components can essentially be 'bolted on' (*motivations for use*, *information processing*, *consequences*, *platform affordances* and *feedback loops*) to see if these increase the explanatory power / utility of the model. For example, building in an understanding of how SM platforms (*platform affordances*) can exacerbate cognitive biases and fuel problematic behaviour, e.g. social comparisons in depression, or online symptom checking in health anxiety and panic, may aid the individual's understanding of their difficulties and what is maintaining them, and critically, suggest targets for intervention (see Vignettes for example). Conversely, noting where SM represents an under-used resource for cultivation of social connection and identity exploration may highlight new directions for engagement.

6.2. Intervention

The primary function of a clinical model or formulation is to inform a treatment plan. Whilst, as we have noted, an *individualised* case conceptualisation should be constructed in collaboration with the young person, and the purpose of the proposed model is not to 'treat' (or pathologise) SM use, the model does suggest a number of potential likely foci for intervention that are associated with core SM-related precipitating, perpetuating and protective factors. These should be addressed at all stages of the treatment process, i.e. integrated into assessment, formulation, psycho-education and intervention.

With respect to psycho-education, using the conceptualisation that we have presented, standard cognitive behavioural psycho-education (e.g. exploration of the role of various behaviours in the perpetuation of core maladaptive cycles), may be integrated with SM literacy training (Livingstone and Helsper 2010; Torrent 2014) in order to help the young person understand how the technology interacts with their personal presenting difficulties (for better *and* for worse), and further, to help them develop "*the technical and cognitive competencies users need to use social media in an effective and efficient way for social interaction and communication on the web"* (p.4) (Daneels and Vanwynsberghe 2017).

According to Schreurs and Vandenbosch's (2021) Social Media Literacy model (SMILE), such SM literacy serves as both a *moderator* in the association between SM use and mental health / wellbeing, as well as a *predictor*; see Valkenburg and Peter (2013) also. With respect to its role as a *moderator*, SMILE proposes that the literate user is more aware of the potential negative impacts of their use, as well as certain online material, and as such, is better equipped to regulate their emotional and behavioural responses to it. SMILE also proposes that the literate user will be better equipped to "focus on the scarce positive aspects" of otherwise negative online experiences (p.324) (Schreurs and Vandenbosch 2021), presumably thereby driving a more adaptive cycle of thoughts, feelings, sensations and

behaviours. With respect to the role of SM literacy as a *predictor* of mental health / wellbeing, SMILE proposes that literate users are more likely to be exposed to more positive / less harmful online material through a more critical and intentional evaluation of *who* and *what* to engage with, as well as selective attention towards more positive material. Considered within our conceptualisation, such cultivation of SM / psychological literacy might be seen as equipping and incentivising the user to engage with the technology in a more critical and purposeful way (*intentional / purposeful mode of engagement*), with all the benefits that this entails, e.g. greater weighing of contextual information, greater control over attention and behaviour, more critical evaluation of material / amelioration of processing biases etc.

Potential topics for exploration within such psycho-education / SM literacy training include the heavily curated nature of the online world, i.e. the 'highlights reel' (Madden et al. 2013) or 'positivity bias' as a phenomenon (Schreurs and Vandenbosch 2021), characteristics of SM platforms and their implications for the nature of online interactions (Nesi, Choukas-Bradley, and Prinstein 2018a, 2018b), e.g. the high prevalence of low quality information / misinformation online (Agarwal, Gupta, and Kraut 2008), and the nature (and implications) of well-documented online psychological phenomena such as online disinhibition (Suler 2004).

In terms of possible foci for active intervention, as with any CBT treatment protocol a good place to start is raising awareness of core processes identified in the conceptualisation, since we cannot begin to change that which we are not aware of. This might involve noticing and identifying typical patterns of SM use and tracking their impact, with a view (once again) to encouraging more mindful and critical engagement, e.g. journaling, thought recording, activity scheduling and behavioural experiments.

With respect to behaviours, values-based work might be introduced to explore where the individual's SM use (and behaviour more generally) is in line with their needs, values and aspirations, and where discrepancies are identified, strategies incorporated to effect behavioural change (Hayes, Strosahl, and Wilson 2003). For example, the use of activity scheduling and graded exposure may be particularly useful to help the individual overcome cycles of avoidance and withdrawal, e.g. encouraging individuals to take (meaningful, values-congruent) risks in social interactions and cultivate social connections (see Vignette 2). The SM environment may be a particularly helpful starting place to initiate this work since its *publicness* and *availableness* means that small steps towards social engagement can be easily implemented. In addition, the relative *asynchronicity* of the online world (or much of it) allows social interactions to be slowed down, reflected upon, and brought to therapy sessions to discuss in a way that is not possible in real-time, face-to-face social interactions. Also, the young person may have interests, skills and resources that are specific to (or enhanced by) the online world, and which can be drawn upon in the service of their values.

With respect to specific platform affordances, where these are deemed to be interacting problematically with presenting issues, alternatives may be explored. As an example, for someone with low self-esteem that is triggered or perpetuated by judgemental social comparisons an alternative SM platform that is less *public, visual, permanent, asynchronous* and *quantifiable*, might be explored as a way of maintaining social connections, whilst minimising the potential risks of such interactions (see Vignettes 3 and 4 for example).

With respect to consequences and reinforcement loops included in the conceptualisation, these may be helpfully explored through a functional analysis of the individual's SM use. In this regard, drawing out the long-term consequences of usage patterns may highlight activity that is reinforced by 'short-term gain', at the cost of 'long-

term pain' (Rizvi 2019). Further, understanding what is driving / maintaining problematic engagement with SM (including motivations and reinforcement loops) may inform appropriate interventions. For example, if engagement is driven by a fear of missing out (Przybylski et al. 2013), cutting down on SM use might be helpful as it removes a major trigger, whereas if a need for connection is driving engagement, reducing use is unlikely to be helpful unless alternative means of socialising are devised.

Finally, given the proposed overarching role of mindful / purposeful (versus mindless / habitual) modes of engagement within the conceptualisation, some introduction to mindfulness skills training might also be indicated. This would enable the individual to become more aware of relevant internal and external signals, including thoughts, feelings, sensations and behavioural intentions related to their SM use, track the consequences of use, and encourage more intentional / purposeful engagement.

7. Conclusions

In conclusion, this paper described a trans-diagnostic cognitive-behavioural conceptualisation of the positive and negative roles of SM use in adolescent mental health and wellbeing, with a focus on how SM interacts with common mental health difficulties seen in every day practice in community mental health settings. Further, it provided ideas for how this conceptualisation might be drawn upon in clinical practice, with case vignettes and suggestions for integration into cognitive-behavioural assessment and intervention. Whilst some of the components of the conceptualisation are firmly rooted in the extant literature, others are more speculative; nonetheless, the conceptualisation is presented as a *foundation* for future exploration, including a testing of key components and predictions to emerge from the conceptualisation, as well an assessment of its practical utility in day-to-day clinical practice.

Like it or not, SM (and digital technology more generally) is here to stay, and has come to transform most, if not all, aspects of our lives, as well as the lives of the people we see clinically. We hope therefore that this paper will -at the very least- convince the reader that keen attention to the online worlds of the young people we see clinically is essential if we are to gain a thorough understanding of the full range of difficulties and challenges, rewards and opportunities that they face and can draw upon in their lives.

Vignette 1: Sonja was a young lady in her late-teens who was highly anxious, withdrawn and avoidant [*maladaptive core CBT cycle*]. Over the course of therapy it became clear that some of her concerns about leaving the house related to an unrealistic appraisal of the risk of being murdered on the streets of her city, which she estimated as being 10% likely over the course of any given year [*biased processing*]. Further exploration of this belief and its origins indicated that it was perpetuated, in part, by her SM feed, which often featured gruesome and sensationalist stories that would elicit strong reactions and many shares within her network [*biased processing, fed by amplifying and sensationalising features of her experience*]. In response to this, we spent one of our sessions exploring the role of SM and her online experience in driving some of these beliefs and underlying cognitive distortions [*psycho-education / SM literacy training]*, e.g. *magnification* and *catastrophisation*, and together identified alternative, more reliable sources of online information to help Sonja assess the genuine level of risk posed [*intentional / purposeful engagement supporting relatively unbiased processing*]. Further, in later sessions we explored how Sonja could meet with friends she'd initially met online in face-to-face contexts in a way that was safe, but also manageable given her current level of anxiety [*social approach behaviours supported by intentional / purposeful engagement*]. In the process she was able to gradually overcome her cycle of avoidance [*cultivation of social approach behaviours, resulting in satisfaction of core needs relating to belonging and acceptance and positive reinforcement*], and test out some of her beliefs about how others would perceive and respond to her in person [*amelioration of information processing biases*].

Vignette 2: Phil was in his early twenties and had a diagnosis of ASD. He was socially anxious, withdrawn and depressed when I met him [*maladaptive core CBT cycle*]. He was

also not in employment, education or training (NEET), and had very few face-to-face interactions, preferring to spend most of his time online in chat-rooms and on SM [*compensatory motivation and avoidant pattern of* offline *interactions, likely strengthened by negative reinforcement*]. I spent many weeks trying to gently encourage Phil to connect with *offline* social activities and interest groups in his community, with the hope that his would break a cycle of avoidance and expose him to positive reinforcers. However, none of these groups seemed to 'stick'. In parallel however, Phil's *online* life began to flourish, and he became part of an online network of individuals from around the world who were united by a common specialist interest [*transition to approach pattern of* online *engagement*]. I encouraged Phil to pursue this further, and experiment with cultivating greater closeness with some of his new found friends, e.g. through expressions of interest in *their* world [*intentional / purposeful pattern of engagement and cultivation of social approach behaviours*]. Several sessions later Phil informed me that the whole group intended to meet in person and attend a convention abroad, which was dedicated to their specialist interest [*transfer of online to offline social connections*]. Despite my own initial concerns, Phil found part-time work and saved the money necessary to cover his expenses, and made the trip towards the end of our work together. Through the process his confidence grew considerably and his mood improved, with consequent impacts on his offline relationships too [*positive reinforcement of social approach behaviours and generalisation*], including within his family [*leading to satisfaction of core needs relating to belonging and acceptance*].

Vignette 3: Sam had been bullied (offline) at secondary school and college, and never felt like she fit in. Now in her early twenties, she felt anxious when separated from people who were closest to her, and struggled with fears of rejection [*maladaptive core CBT cycle*]. Sam noticed that using SM made her feel worse because she compared herself (unfavourably) to

others [*likely automatic / habitual patterns of use, e.g. scrolling, and high levels of judgemental social comparisons*] and felt like she was being excluded from various social events and gatherings [*leading to feelings of disconnection and isolation*]. Consequently, she had at one point closed all her SM accounts and stopped connecting with others online [*avoidance behaviour*]. However, Sam realised that since leaving college SM had been one of the main ways that she had managed to maintain contact with her peers, such that her isolation grew [*loss of potential avenues for social connection and satisfaction of core needs related to acceptance and belonging*]. As part of a much larger piece of work, Sam and I thought about how she might re-engage with her online world, but in a way that was in the service of her needs and values [*intentional / purposeful pattern of engagement*], i.e. cultivating and maintaining friendships with others whilst trying not to get drawn into social comparisons [*cultivation of social approach behaviours*]. In relation to this we explored the curated nature of the online world, and thought about what parts of the self people tend to share or hide online, as well as the impact this had on Sam's self-confidence [*psycho-education / SM literacy training]*. We also thought about how the affordances of different SM platforms [*e.g. the visualness, publicness and quantifiable nature of platforms like Instagram*] might help or hinder Sam in the changes she wanted to make in her online life [*values clarification*], and helped her begin to make some of these changes [*cultivation of intentional / purposeful engagement*].

Vignette 4: Maria was a black British girl in her late teens who had been very depressed and accessed services following a suicide attempt. Whilst Maria was highly intelligent and valued her academic ability, her low mood was beginning to impact on her performance at college, which perpetuated negative thoughts and feelings about herself [*maladaptive core CBT cycle*]. Talking about issues of intersectionality, including class, gender and ethnicity helped

with engagement, but also fed into a co-constructed formulation that helped make sense of the origin (and impact) of some of her negative beliefs about herself, others and the world. Through Socratic Questioning and exploration of her values [*values clarification*], Maria became increasingly aware of the consequences of her online *and* offline behaviours and how they took her toward or away from her values. In particular, Maria noticed a tendency to compare herself online to "pretty white wealthy girls" who seemed to be living lives that were closed to her [*high levels of social comparisons*], which also perpetuated negative beliefs about herself and impacted on her mood [*feelings of disconnection and isolation*]. Over the course of our sessions together we explored the costs and benefits of alternative online spaces [*psycho-education / SM literacy training, including on platform affordances*] that Maria might access in order to connect with others who she could relate to better [*cultivation of social approach behaviours*], for example people who "looked like [her]" and had shared values. By gradually changing her patterns of SM use [*cultivation of intentional / purposeful pattern of engagement*] Maria began to be exposed to the stories of others, more like herself, who had succeeded in different areas of their lives. As a result, Maria started to feel a greater sense of connection [*satisfaction of core needs relating to acceptance and belonging*] and grew more hopeful about herself and her future.

Key Practice Points:

1. When working with adolescents always consider their online life at the assessment and formulation stage, and where indicated, during treatment.
2. When exploring service users' online life, consider the nature and function of the behaviours they engage in, with particular attention to social approach and social avoidance behaviours.
3. When exploring service users' online life, consider the nature and design of platforms that they use, since each will have a different set of affordances, with potential implications for formulation and treatment.
4. When integrating service users' online life into treatment, consider potential benefits to capitalise upon as well as risks to navigate.

Further reading:

Orben, Amy. 2020a. "Teenagers, Screens and Social Media: A Narrative Review of Reviews and Key Studies." *Social Psychiatry and Psychiatric Epidemiology*.

Nesi, Jacqueline, Sophia Choukas-Bradley, and Mitchell J. Prinstein. 2018a. "Transformation of Adolescent Peer Relations in the Social Media Context: Part 1—A Theoretical Framework and Application to Dyadic Peer Relationships." *Clinical Child and Family Psychology Review* 21(3):267–94.

Nesi, Jacqueline, Sophia Choukas-Bradley, and Mitchell J. Prinstein. 2018b. "Transformation of Adolescent Peer Relations in the Social Media Context: Part 2—Application to Peer Group Processes and Future Directions for Research." *Clinical Child and Family Psychology Review* 21(3):295–319.

References

Aalbers, George, Richard J. McNally, Alexandre Heeren, Sanne de Wit, and Eiko I. Fried. 2019. “Social Media and Depression Symptoms: A Network Perspective.” *Journal of Experimental Psychology: General* 148(8):1454–62.

AAP Council on Communications and Media. 2016. “Media and Young Minds.” *Pediatrics.* 138(5):e20162591.

Aarts, Henk, Bas Verplanken, and Ad Knippenberg. 1998. “Predicting Behavior From Actions in the Past: Repeated Decision Making or a Matter of Habit?” *Journal of Applied Social Psychology* 28(15):1355–74.

Vanden Abeele, Mariek M. P. 2020. “Digital Wellbeing as a Dynamic Construct.” *Communication Theory*.

Abi-Jaoude, Elia, Karline Treurnicht Naylor, and Antonio Pignatiello. 2020. “Smartphones, Social Media Use and Youth Mental Health.” *Canadian Medical Association Journal* 192(6):E136–41.

Aboujaoude, Elias. 2010. “Problematic Internet Use: An Overview.” *World Psychiatry* 9(2):85–90.

Abramson, Lyn Y., Gerald I. Metalsky, and Lauren B. Alloy. 1989. “Hopelessness Depression: A Theory-Based Subtype of Depression.” *Psychological Review* 96(2):358–72.

Adnan, Hamedi M., and Samira Rahimi Mavi. 2015. “Facebook Satisfaction, Life Satisfaction: Malaysian Undergraduate Experience.” *Jurnal Komunikasi: Malaysian Journal of Communication* 31(2):649–71.

Agarwal, Ritu, Anil K. Gupta, and Robert Kraut. 2008. “The Interplay between Digital and Social Networks.” *Information Systems Research* 19(3):243–52.

Ahn, Dohyun, and Dong Hee Shin. 2013. “Is the Social Use of Media for Seeking Connectedness or for Avoiding Social Isolation? Mechanisms Underlying Media Use and Subjective Well-Being.” *Computers in Human Behavior* 29(6):2453–62.

Allcott, Hunt, Luca Braghieri, Sarah Eichmeyer, and Matthew Gentzkow. 2020. “The Welfare Effects of Social Media.” *American Economic Review* 110(3):629–76.

Almquist, Y. 2009. “Peer Status in School and Adult Disease Risk: A 30-Year Follow-up Study of Disease-Specific Morbidity in a Stockholm Cohort.” *Journal of Epidemiology and Community Health* 63(12):1028–34.

Almquist, Ylva B., and Viveca Östberg. 2013. “Social Relationships and Subsequent Health-Related Behaviours: Linkages between Adolescent Peer Status and Levels of Adult Smoking in a Stockholm Cohort.” *Addiction* 108(3):629–37.

Alter, Adam. 2017. *Irresistible - the Rise of Addictive Technology and the Business of Keeping Us Hooked*. First. New York, NY: Penguin Press.

Andrade, Antonio Díaz, and Bill Doolin. 2016. “Information and Communication Technology and the Social Inclusion of Refugees.” *MIS Quarterly: Management Information Systems* 40(2):405–16.

Andrews, Jack L., Saz Ahmed, and Sarah-Jayne Blakemore. 2020. “Navigating the Social Environment in Adolescence: The Role of Social Brain Development.” *Biological Psychiatry*.

Apaolaza, Vanessa, Patrick Hartmann, Clare D’Souza, and Ainhize Gilsanz. 2019. “Mindfulness, Compulsive Mobile Social Media Use, and Derived Stress: The Mediating Roles of Self-Esteem and Social Anxiety.” *Cyberpsychology, Behavior, and Social Networking* 22(6):388–96.

Appel, Helmut, Alexander L. Gerlach, and Jan Crusius. 2016. “The Interplay between Facebook Use, Social Comparison, Envy, and Depression.” *Current Opinion in*

Psychology 9:44–49.

Arendt, Florian, Sebastian Scherr, and Daniel Romer. 2019. "Effects of Exposure to Self-Harm on Social Media: Evidence from a Two-Wave Panel Study among Young Adults." *New Media & Society* 21(11–12):2422–42.

Arslan, Gökmen. 2017. "Psychological Maltreatment, Forgiveness, Mindfulness, and Internet Addiction among Young Adults: A Study of Mediation Effect." *Computers in Human Behavior* 72:57–66.

El Asam, Aiman, and Adrienne Katz. 2018. "Vulnerable Young People and Their Experience of Online Risks." *Human–Computer Interaction* 33(4):281–304.

Baccarella, Christian V., Timm F. Wagner, Jan H. Kietzmann, and Ian P. McCarthy. 2018. "Social Media? It's Serious! Understanding the Dark Side of Social Media." *European Management Journal* 36(4):431–38.

Bae, Mikyeung. 2018. "Understanding the Effect of the Discrepancy between Sought and Obtained Gratification on Social Networking Site Users' Satisfaction and Continuance Intention." *Computers in Human Behavior* 79:137–53.

Baer, Ruth. 2018. "Mindfulness Practice." Pp. 389–402 in *Process Based CBT - The Science and Core Clinical Competencies of Cognitive Behavioral Therapy*, edited by S. C. Hayes and S. G. Hofmann. Oakland, CA: Context Press.

Baker, RK. 2010. "Predicting Adolescents' Use of Social Networking Sites from an Extended Theoryof Planned Behaviour Perspective - Google Search." *Computers in Human Behavior* 1591–97. Retrieved January 22, 2020 (https://www.google.com/search?client=firefox-b-d&q=Predicting+adolescents'+use+of+social+networking+sites+from+an+extended+theoryof+planned+behaviour+perspective).

Bartel, K., R. Scheeren, and M. Gradisar. 2019. "Altering Adolescents' Pre-Bedtime Phone

Use to Achieve Better Sleep Health." *Health Communication* 34(4):456–62.

Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs. 2001. "Bad Is Stronger than Good." *Review of General Psychology* 5(4):323–70.

Van Bavel, Jay J., Steve Rathje, Elizabeth Harris, Claire Robertson, and Anni Sternisko. 2021. "How Social Media Shapes Polarization." *Trends in Cognitive Sciences*.

Beck, A. 1976. *Cognitive Therapy and the Emotional Disorders*. Michigan: International Universities Press.

Beck, Aaron T., A. John Rush, Brian F. Shaw, and Gary Emery. 1979. *Cognitive Therapy of Depression*. 1st Editio. New York, NY: Guilford Press.

Beck, J. 1995. *Cognitive Therapy, Basics and Beyond*. New York: The Guilford Press.

Bingham, C. Raymond, Bruce G. Simons-Morton, Anuj K. Pradhan, Kaigang Li, Farideh Almani, Emily B. Falk, Jean T. Shope, Lisa Buckley, Marie Claude Ouimet, and Paul S. Albert. 2016. "Peer Passenger Norms and Pressure: Experimental Effects on Simulated Driving among Teenage Males." *Transportation Research Part F: Traffic Psychology and Behaviour* 41:124–37.

Bishop, Scott R., Mark Lau, Shauna Shapiro, Linda Carlson, Nicole D. Anderson, James Carmody, Zindel V. Segal, Susan Abbey, Michael Speca, Drew Velting, and Gerald Devins. 2006. "Mindfulness: A Proposed Operational Definition." *Clinical Psychology: Science and Practice* 11(3):230–41.

Blakemore, Sarah-Jayne. 2018. *Inventing Ourselves: The Secret Life of the Teenage Brain*. First. Doubleday.

Blum-Ross, A., and S. Livingstone. 2018. "The Trouble with 'Screen Time' Rules." Pp. 179–88 in *DIGITAL PARENTING - The Challenges for Families in the Digital Age*, edited by G. M, C. Ponte, and A. Jorge. Borås: The International Clearinghouse on Children, Youth and Media.

Bonetti, Luigi, Marilyn Anne Campbell, and Linda Gilmore. 2010. “The Relationship of Loneliness and Social Anxiety with Children’s and Adolescents’ Online Communication.” *Cyberpsychology, Behavior, and Social Networking* 13(3):279–85.

Bosker, Bianca. 2016. “The Binge Breaker.” *The Atlantic*, November.

Brady, William J., Ana P. Gantman, and Jay J. Van Bavel. 2020. “Attentional Capture Helps Explain Why Moral and Emotional Content Go Viral.” *Journal of Experimental Psychology: General* 149(4):746–56.

Brady, William J., Julian A. Wills, John T. Jost, Joshua A. Tucker, Jay J. Van Bavel, and Susan T. Fiske. 2017. “Emotion Shapes the Diffusion of Moralized Content in Social Networks.” *Proceedings of the National Academy of Sciences of the United States of America* 114(28):7313–18.

Bramwell, Kate, and Thomas Richardson. 2018. “Improvements in Depression and Mental Health After Acceptance and Commitment Therapy Are Related to Changes in Defusion and Values-Based Action.” *Journal of Contemporary Psychotherapy* 48(1):9–14.

Brandtzæg, Petter Bae, and Jan Heim. 2009. “Why People Use Social Networking Sites.” Pp. 143–52 in *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*. Vol. 5621 LNCS. Springer, Berlin, Heidelberg.

Brown, Kirk Warren, Richard M. Ryan, and J. David Creswell. 2007. “Mindfulness: Theoretical Foundations and Evidence for Its Salutary Effects.” *Psychological Inquiry* 18(4):211–37.

Bruguera, Carles, Montse Guitert, and Teresa Romeu. 2019. “Social Media and Professional Development: A Systematic Review.” *Research in Learning Technology* 27.

Caplan, Scott E. 2005. “A Social Skill Account of Problematic Internet Use.” *Journal of Communication* 55(4):721–36.

Cardell, Kylie, Kate Douglas, and Emma Maguire. 2017. "'Stories': Social Media and Ephemeral Narratives as Memoir." Pp. 157–72 in *Mediating Memory: tracing the limits of memoir. Routledge Interdisciplinary Perspectives on Literature*, edited by B. Avieson and F. J. S. Giles. New York, NY: Routledge.

Carver, Charles S. 1996. "Emergent Integration in Contemporary Personality Psychology." *Journal of Research in Personality* 30(3):319–34.

Caspi, Avshalom, Terrie E. Moffitt, Denise L. Newman, and Phil A. Silva. 1996. "Behavioral Observations at Age 3 Years Predict Adult Psychiatric Disorders: Longitudinal Evidence from a Birth Cohort." *Archives of General Psychiatry* 53(11):1033–39.

Çelik, Çiğdem Berber, and Hatice Odaci. 2013. "The Relationship between Problematic Internet Use and Interpersonal Cognitive Distortions and Life Satisfaction in University Students." *Children and Youth Services Review* 35(3):505–8.

Chambers, R. Andrew, Jane R. Taylor, and Marc N. Potenza. 2003. "Developmental Neurocircuitry of Motivation in Adolescence: A Critical Period of Addiction Vulnerability." *American Journal of Psychiatry* 160(6):1041–52.

Charoensukmongkol, Peerayuth. 2016. "Mindful Facebooking: The Moderating Role of Mindfulness on the Relationship between Social Media Use Intensity at Work and Burnout." *Journal of Health Psychology* 21(9):1966–80.

Cheng, Cecilia, Yan Ching Lau, and Jeremy W. Luk. 2020. "Social Capital–Accrual, Escape-from-Self, and Time-Displacement Effects of Internet Use during the COVID-19 Stay-at-Home Period: Prospective, Quantitative Survey Study." *Journal of Medical Internet Research* 22(12).

Cheung, Christy M. K., Pui Yee Chiu, and Matthew K. O. Lee. 2011. "Online Social Networks: Why Do Students Use Facebook?" *Computers in Human Behavior* 27(4):1337–43.

Cheung, Christy MK, Zach WY Lee, and Matthew KO Lee. 2013. “Understanding Compulsive Use Of Facebook Through The Reinforcement Processes.” Pp. 1–12 in *Proceedings of the 21st European Conference on Information Systems*.

Chohan, Usman W., and Aron D’Souza. 2020. “The Joys & Ills of Social Media: A Review.” *SSRN Electronic Journal*.

Ciampaglia, Giovanni Luca, Azadeh Nematzadeh, Filippo Menczer, and Alessandro Flammini. 2018. “How Algorithmic Popularity Bias Hinders or Promotes Quality.” *Scientific Reports* 8(1).

Ciranka, Simon, and Wouter van den Bos. 2019. “Social Influence in Adolescent Decision-Making: A Formal Framework.” *Frontiers in Psychology* 10(AUG):1915.

Clark, Jenna L., Sara B. Algoe, and Melanie C. Green. 2018. “Social Network Sites and Well-Being: The Role of Social Connection.” *Current Directions in Psychological Science* 27(1):32–37.

Contractor, Ateka A., Jon D. Elhai, Kendra C. Ractliffe, and David Forbes. 2013. “PTSD’s Underlying Symptom Dimensions and Relations with Behavioral Inhibition and Activation.” *Journal of Anxiety Disorders* 27(7):645–51.

Crockett, M. J. 2017. “Moral Outrage in the Digital Age.” *Nature Human Behaviour* 1(11):769–71.

Crone, Eveline A., and Elly A. Konijn. 2018. “Media Use and Brain Development during Adolescence.” *Nature Communications* 9(588):1–10.

Culnan, M. J., and M. Markus. 1987. “Information Technologies.” Pp. 420–43 in *Handbook of organizational communication: An interdisciplinary perspective*, edited by F. M. Jablin, L. L. Putnam, K. H. Roberts, and L. W. Porter. Thousand Oaks, CA: Sage.

Van Dam, Nicholas T., Mitch Earleywine, and Ashley Borders. 2010. “Measuring Mindfulness? An Item Response Theory Analysis of the Mindful Attention Awareness

Scale.” *Personality and Individual Differences* 49(7):805–10.

Daneels, Rowan, and Hadewijch Vanwynsberghe. 2017. “Mediating Social Media Use: Connecting Parents’ Mediation Strategies and Social Media Literacy.” *Cyberpsychology* 11(3 Special Issue).

David, Daniel, Mircea Miclea, and Adrian Opre. 2004. “The Information-Processing Approach to the Human Mind: Basics and Beyond.” *Journal of Clinical Psychology* 60(4):353–68.

Davis, R. A. 2001. “Cognitive-Behavioral Model of Pathological Internet Use.” *Computers in Human Behavior* 17(2):187–95.

Department for Education. 2019. *Teaching Online Safety in School: Guidance Supporting Schools to Teach Their Upils How to Stay Safe Online, within New and Existing School Subjects*.

Derakhshan, Nazanin. 2020. “Attentional Control and Cognitive Biases as Determinants of Vulnerability and Resilience in Anxiety and Depression.” Pp. 261–74 in *Cognitive Biases in Health and Psychiatric Disorders*. Elsevier.

Division of Clinical Psychology. 2011. *Good Practice Guidelines on the Use of Psychological Formulation*. London, England.

Doherty-Torstrick, Emily R., Kate E. Walton, and Brian A. Fallon. 2016. “Cyberchondria: Parsing Health Anxiety From Online Behavior.” *Psychosomatics* 57(4):390–400.

Dubicka, Bernadka, and Louise Theodosiou. 2020. *Technology Use and the Mental Health of Children and Young People*.

Eisenberger, Naomi I., Matthew D. Lieberman, and Kipling D. Williams. 2003. “Does Rejection Hurt? An FMRI Study of Social Exclusion.” *Science* 302(5643):290–92.

Ellison, Nicole B., Charles Steinfield, and Cliff Lampe. 2007. “The Benefits of Facebook ‘Friends:’ Social Capital and College Students’ Use of Online Social Network Sites.”

Journal of Computer-Mediated Communication 12(4):1143–68.

Erikson, E. H. 1968. *Identity: Youth and Crisis*. New York, NY: W. W. Norton & Company.

Erreygers, Sara, Heidi Vandebosch, Ivana Vranjes, Elfi Baillien, and Hans De Witte. 2017. "Nice or Naughty? The Role of Emotions and Digital Media Use in Explaining Adolescents' Online Prosocial and Antisocial Behavior." *Media Psychology* 20(3):374–400.

Erreygers, Sara, Heidi Vandebosch, Ivana Vranjes, Elfi Baillien, and Hans De Witte. 2019. "Feel Good, Do Good Online? Spillover and Crossover Effects of Happiness on Adolescents' Online Prosocial Behavior." *Journal of Happiness Studies* 20(4):1241–58.

Eshraghian, F., and N. Hafezieh. 2017. "Affordance Theory in Social Media Research: Systematic Review and Synthesis of the Literature." Pp. 1–12 in *25th European Conference on Information Systems (ECIS)*.

Eşkisu, Mustafa, Zekeriya Çam, Sedat Gelibolu, and Kyler Ray Rasmussen. 2020. "Trait Mindfulness as a Protective Factor in Connections between Psychological Issues and Facebook Addiction among Turkish University Students." *Studia Psychologica* 62(3):213–31.

Exelmans, Liese, and Jan Van den Bulck. 2016. "The Use of Media as a Sleep Aid in Adults." *Behavioral Sleep Medicine* 14(2):121–33.

Eyal, N., and R. Hoover. 2014. *Hooked: How to Build Habit-Forming Products*. New York, NY: Penguin.

Fardouly, Jasmine, Rebecca T. Pinkus, and Lenny R. Vartanian. 2017. "The Impact of Appearance Comparisons Made through Social Media, Traditional Media, and in Person in Women's Everyday Lives." *Body Image* 20:31–39.

Fennell, Melanie J. V. 1998. "Cognitive Therapy in the Treatment of Low Self-Esteem." *Advances in Psychiatric Treatment* 4(5):296–304.

Fernández-Rodríguez, Concepción, Dolores Paz-Caballero, Sonia González-Fernández, and Marino Pérez-álvarez. 2018. “Activation vs. Experiential Avoidance as a Transdiagnostic Condition of Emotional Distress: An Empirical Study.” *Frontiers in Psychology* 9(SEP).

Ferster, C. B. 1973. “A Functional Anlysis of Depression.” *The American Psychologist* 28(10):857–70.

Festinger, Leon. 1954. “A Theory of Social Comparison Processes.” *Human Relations* 7:117–40.

Fordham, Beth, Thavapriya Sugavanam, Katherine Edwards, Paul Stallard, Robert Howard, Roshan Das Nair, Bethan Copsey, Hopin Lee, Jeremy Howick, Karla Hemming, and Sarah E. Lamb. 2021. “The Evidence for Cognitive Behavioural Therapy in Any Condition, Population or Context: A Meta-Review of Systematic Reviews and Panoramic Meta-Analysis.” *Psychological Medicine* 51(1):21–29.

Frison, Eline, and Steven Eggermont. 2016. “Exploring the Relationships Between Different Types of Facebook Use, Perceived Online Social Support, and Adolescents’ Depressed Mood.” *Social Science Computer Review* 34(2):153–71.

Frison, Eline, and Steven Eggermont. 2017. “Browsing, Posting, and Liking on Instagram: The Reciprocal Relationships Between Different Types of Instagram Use and Adolescents’ Depressed Mood.” *Cyberpsychology, Behavior, and Social Networking* 20(10):603–9.

Gable, S. L., H. T. Reis, and A. J. Elliot. 2000. “Behavioral Activation and Inhibition in Everyday Life.” *Journal of Personality and Social Psychology* 78(6):1135–49.

Gable, Shelly L. 2006. “Approach and Avoidance Social Motives and Goals.” *Journal of Personality* 74(1):175–222.

García-Oliva, Carlos, and José A. Piqueras. 2016. “Experiential Avoidance and

Technological Addictions in Adolescents." *Journal of Behavioral Addictions* 5(2):293–303.

Gardner, Margo, and Laurence Steinberg. 2005. "Peer Influence on Risk Taking, Risk Preference, and Risky Decision Making in Adolescence and Adulthood: An Experimental Study." *Developmental Psychology* 41(4):625–35.

Gazelle, Heidi, and Karen D. Rudolph. 2004. "Moving Toward and Away From the World: Social Approach and Avoidance Trajectories in Anxious Solitary Youth." *Child Development* 75(3):829–49.

Ge, Xiaoyu. 2020. "Social Media Reduce Users' Moral Sensitivity: Online Shaming as a Possible Consequence." *Aggressive Behavior* ab.21904.

George, Madeleine. 2019. "The Importance of Social Media Content for Teens' Risks for Self-Harm." *Journal of Adolescent Health* 65(1):9–10.

George, Madeleine J., Michaeline R. Jensen, Michael A. Russell, Anna Gassman-Pines, William E. Copeland, Rick H. Hoyle, and Candice L. Odgers. 2020. "Young Adolescents' Digital Technology Use, Perceived Impairments, and Well-Being in a Representative Sample." Pp. 180–87 in *Journal of Pediatrics*. Vol. 219. Mosby Inc.

GlobalWebIndex. 2020. *Social - GlobalWebIndex's Flagship Report on the Latest Trends in Social Media*.

Goldenberg, Amit, and James J. Gross. 2020. "Digital Emotion Contagion." *Trends in Cognitive Sciences* 24(4):316–28.

Gonen, Sivan, and Noa Aharony. 2017. "Relations between Privacy Behaviors and Social Capital on Facebook." *Libri* 67(2):103–18.

Gonzales, Amy L., and Jeffrey T. Hancock. 2011. "Mirror, Mirror on My Facebook Wall: Effects of Exposure to Facebook on Self-Esteem." *Cyberpsychology, Behavior, and Social Networking* 14(1–2):79–83.

Gordon, Amie M., Wendy Berry Mendes, and Aric A. Prather. 2017. “The Social Side of Sleep: Elucidating the Links Between Sleep and Social Processes.” *Current Directions in Psychological Science* 26(5):470–75.

Granic, Isabela, Hiromitsu Morita, and Hanneke Scholten. 2020. “Beyond Screen Time: Identity Development in the Digital Age.” *Psychological Inquiry* 31(3):195–223.

Grant, S. S., A. M. Huskey, J. A. Faunce, and B. H. Friedman. 2020. “Negative Memory Biases in Health and Psychiatric Disorders.” Pp. 173–91 in *Cognitive Biases in Health and Psychiatric Disorders*. Elsevier.

Green, Leonard, Astrid F. Fry, and Joel Myerson. 1994. “Discounting of Delayed Rewards: A Life-Span Comparison.” *Psychological Science* 5(1):33–36.

große Deters, Fenne, and Matthias R. Mehl. 2013. “Does Posting Facebook Status Updates Increase or Decrease Loneliness? An Online Social Networking Experiment.” *Social Psychological and Personality Science* 4(5):579–86.

Guo, Yu, Yiwei Li, and Naoya Ito. 2014. “Exploring the Predicted Effect of Social Networking Site Use on Perceived Social Capital and Psychological Well-Being of Chinese International Students in Japan.” *Cyberpsychology, Behavior, and Social Networking* 17(1):52–58.

Hall, Jeffrey A, Rebecca M. Johnson, and Elaina M. Ross. 2019. “Where Does the Time Go? An Experimental Test of What Social Media Displaces and Displaced Activities’ Associations with Affective Well-Being and Quality of Day.” *New Media & Society* 21(3):674–92.

Hall, Jeffrey A., Michael W. Kearney, and Chong Xing. 2019. “Two Tests of Social Displacement through Social Media Use.” *Information, Communication & Society* 22(10):1396–1413.

Harman, Jeffrey P., Catherine E. Hansen, Margaret E. Cochran, and Cynthia R. Lindsey.

2005. “Liar, Liar: Internet Faking but Not Frequency of Use Affects Social Skills, Self-Esteem, Social Anxiety, and Aggression.” *Cyberpsychology and Behavior* 8(1):1–6.

Harris, Michelle A., and Ulrich Orth. 2020. “The Link between Self-Esteem and Social Relationships: A Meta-Analysis of Longitudinal Studies.” *Journal of Personality and Social Psychology* 119(6):1459–77.

Harvey, Alison G., Edward Watkins, Warren Mansell, and Roz Shafran. 2004a. “Attention.” Pp. 25–72 in *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. Oxford: Oxford University Press.

Harvey, Alison G., Edward Watkins, Warren Mansell, and Roz Shafran. 2004b. “Behaviour.” Pp. 239–69 in *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. New York: Oxford University Press.

Hayes, S. C., K. D. Strosahl, and K. G. Wilson. 1999. *Acceptance and Commitment Therapy: An Experiential Approach to Behavior Change.* New York, NY: Guildford Press.

Hayes, S. C., K. D. Strosahl, and K. G. Wilson. 2003. “Valuing.” Pp. 204–34 in *Acceptance and Commitment Therapy - An Eperiential Approach to Behaviour Change*. Guildford Press.

Hayes, S. C., K. G. Wilson, E. V. Gifford, V. M. Follette, and K. Strosahl. 2016a. “Analytic Goals and the Varieties of Scientific Contextualism.” Pp. 100–116 in *THE ACT IN CONTEXT - The Canonical Papers of Steven C. Hayes*. New York: Taylor & Francis.

Hayes, S. C., K. G. Wilson, E. V. Gifford, V. M. Follette, and K. Strosahl. 2016b. “Experiential Avoidance and Behavioral Disorders: A Functional Dimensional Approach to Diagnosis and Treatment.” Pp. 161–71 in *THE ACT IN CONTEXT - The Canonical Papers of Steven C. Hayes*. New York: Taylor & Francis.

Heppner, Whitney L., Michael H. Kernis, Chad E. Lakey, W. Keith Campbell, Brian M.

Goldman, Patti J. Davis, and Edward V. Cascio. 2008. “Mindfulness as a Means of Reducing Aggressive Behavior: Dispositional and Situational Evidence.” *Aggressive Behavior* 34(5):486–96.

Hill, Matthew. 2018. “Panorama - Smartphones: The Dark Side.”

Hogue, Jacqueline V., and Jennifer S. Mills. 2019. “The Effects of Active Social Media Engagement with Peers on Body Image in Young Women.” *Body Image* 28:1–5.

Holland, Grace, and Marika Tiggemann. 2016. “A Systematic Review of the Impact of the Use of Social Networking Sites on Body Image and Disordered Eating Outcomes.” *Body Image* 17:100–110.

Hollis, Chris, Sonia Livingstone, and Edmund Sonuga-Barke. 2020. “Editorial: The Role of Digital Technology in Children and Young People’s Mental Health – a *Triple* -edged Sword?” *Journal of Child Psychology and Psychiatry* 61(8):837–41.

Houlihan, Sean Dae, and Judson A. Brewer. 2016. “The Emerging Science of Mindfulness as a Treatment for Addiction.” Pp. 191–210 in *Mindfulness and Buddhist-Derived Approaches in Mental Health and Addiction*, edited by E. Shonin, W. Van Gordon, and M. D. Griffiths. New York, NY: Springer.

Hunt, Melissa G., Rachel Marx, Courtney Lipson, and Jordyn Young. 2018. “No More FOMO: Limiting Social Media Decreases Loneliness and Depression.” *Journal of Social and Clinical Psychology* 37(10):751–68.

Hussain, Dilwar. 2015. “Meta-Cognition in Mindfulness: A Conceptual Analysis.” *Psychological Thought* 8(2):132–41.

Indian, Michaelle, and Rachel Grieve. 2014. “When Facebook Is Easier than Face-to-Face: Social Support Derived from Facebook in Socially Anxious Individuals.” *Personality and Individual Differences* 59:102–6.

Jiménez Chafey, María I., Guillermo Bernal, and Jeannette Rosselló. 2009. “Clinical Case

Study: CBT for Depression in a Puerto Rican Adolescent: Challenges and Variability in Treatment Response." *Depression and Anxiety* 26(1):98–103.

Johnson, Sara B., Robert W. Blum, and Jay N. Giedd. 2009. "Adolescent Maturity and the Brain: The Promise and Pitfalls of Neuroscience Research in Adolescent Health Policy." *The Journal of Adolescent Health : Official Publication of the Society for Adolescent Medicine* 45(3):216–21.

Jopling, Ellen, Jessica Wilson, Matthew Burke, Alison Tracy, and Joelle LeMoult. 2020. "Positive Interpretation Bias across the Psychiatric Disorders." Pp. 99–117 in *Cognitive Biases in Health and Psychiatric Disorders*. Elsevier.

Kaplan, Andreas M., and Michael Haenlein. 2010. "Users of the World, Unite! The Challenges and Opportunities of Social Media." *Business Horizons* 53(1):59–68.

Karahanna, Elena, Sean Xin Xu, Yan Xu, and Nan Zhang. 2018. "The Needs-Affordances-Features Perspective for the Use of Social Media." *MIS Quarterly: Management Information Systems* 42(3):737–56.

Kasch, David. 2013. *UCLA UCLA Electronic Theses and Dissertations Title Social Media Selves: College Students' Curation of Self and Others through Facebook*.

Katsumata, Yotaro, Toshihiko Matsumoto, Masahiko Kitani, and Tadashi Takeshima. 2008. "Electronic Media Use and Suicidal Ideation in Japanese Adolescents." *Psychiatry and Clinical Neurosciences* 62(6):744–46.

Katz, Elihu, J. G. Blumler, and M. Gurevitch. 1973. "Uses and Gratifications Research ." *The Public Opinion Quarterly* 37(4):509–23.

Kaylor, Brian. 2019. "Likes, Retweets, and Polarization." *Review & Expositor* 116(2):183–92.

Keles, Betul, Niall McCrae, and Annmarie Grealish. 2019. "A Systematic Review: The Influence of Social Media on Depression, Anxiety and Psychological Distress in

Adolescents." *International Journal of Adolescence and Youth* 1–15.

Kelly, Yvonne, Afshin Zilanawala, Cara Booker, and Amanda Sacker. 2018. "Social Media Use and Adolescent Mental Health: Findings From the UK Millennium Cohort Study." *EClinicalMedicine* 6:59–68.

Keresteš, Gordana, and Aleksandar Štulhofer. 2020. "Adolescents' Online Social Network Use and Life Satisfaction: A Latent Growth Curve Modeling Approach." *Computers in Human Behavior* 104:106187.

Kessler, Ronald C., G. Paul Amminger, Sergio Aguilar-Gaxiola, Jordi Alonso, Sing Lee, and T. Bedirhan Ustün. 2007. "Age of Onset of Mental Disorders: A Review of Recent Literature." *Current Opinion in Psychiatry* 20(4):359–64.

Khosravi, Pouria, Azadeh Rezvani, and Anna Wiewiora. 2016. "The Impact of Technology on Older Adults' Social Isolation." *Computers in Human Behavior* 63:594–603.

Kiken, Laura G., Eric L. Garland, Karen Bluth, Olafur S. Palsson, and Susan A. Gaylord. 2015. "From a State to a Trait: Trajectories of State Mindfulness in Meditation during Intervention Predict Changes in Trait Mindfulness." *Personality and Individual Differences* 81:41–46.

Kiken, Laura G., and Natalie J. Shook. 2011. "Looking up: Mindfulness Increases Positive Judgments and Reduces Negativity Bias." *Social Psychological and Personality Science* 2(4):425–31.

Kim, Junghyun, and Jong Eun Roselyn Lee. 2011. "The Facebook Paths to Happiness: Effects of the Number of Facebook Friends and Self-Presentation on Subjective Well-Being." *Cyberpsychology, Behavior, and Social Networking* 14(6):359–64.

Kimbrel, Nathan A., John T. Mitchell, and Rosemery O. Nelson-Gray. 2010. "An Examination of the Relationship between Behavioral Approach System (BAS) Sensitivity and Social Interaction Anxiety." *Journal of Anxiety Disorders* 24(3):372–78.

Kircaburun, Kagan, Saleem Alhabash, Şule Betül Tosuntaş, and Mark D. Griffiths. 2020. "Uses and Gratifications of Problematic Social Media Use Among University Students: A Simultaneous Examination of the Big Five of Personality Traits, Social Media Platforms, and Social Media Use Motives." *International Journal of Mental Health and Addiction* 18(3):525–47.

Klein, Anke M., Leone de Voogd, Reinout W. Wiers, and Elske Salemink. 2018. "Biases in Attention and Interpretation in Adolescents with Varying Levels of Anxiety and Depression." *Cognition and Emotion* 32(7):1478–86.

Kozyreva, Anastasia, Stephan Lewandowsky, and Ralph Hertwig. 2020. "Citizens Versus the Internet: Confronting Digital Challenges With Cognitive Tools." *Psychological Science in the Public Interest* 21(3):103–56.

Krämer, Nicole C., Gale Lucas, Lea Schmitt, and Jonathan Gratch. 2018. "Social Snacking with a Virtual Agent – On the Interrelation of Need to Belong and Effects of Social Responsiveness When Interacting with Artificial Entities." *International Journal of Human Computer Studies* 109:112–21.

Krasnova, Hanna, Thomas Widjaja, Peter Buxmann, Helena Wenninger, and Izak Benbasat. 2015. "Why Following Friends Can Hurt You: An Exploratory Investigation of the Effects of Envy on Social Networking Sites among College-Age Users." *Information Systems Research* 26(3):585–605.

Kross, Ethan, Philippe Verduyn, Gal Sheppes, Cory K. Costello, John Jonides, and Oscar Ybarra. 2021. "Social Media and Well-Being: Pitfalls, Progress, and Next Steps." *Trends in Cognitive Sciences* 25(1):55–66.

Kuss, Daria J., and Olatz Lopez-Fernandez. 2016. "Internet Addiction and Problematic Internet Use: A Systematic Review of Clinical Research." *World Journal of Psychiatry* 6(1):143.

Lahat, A., K. Pérez-Edgar, K. A. Degnan, A. E. Guyer, C. W. Lejuez, M. Ernst, D. S. Pine, and N. A. Fox. 2012. “Early Childhood Temperament Predicts Substance Use in Young Adults.” *Translational Psychiatry* 2(9):e157.

Lakey, Chad E., Michael H. Kernis, Whitney L. Heppner, and Charles E. Lance. 2008. “Individual Differences in Authenticity and Mindfulness as Predictors of Verbal Defensiveness.” *Journal of Research in Personality* 42(1):230–38.

Lapidot-Lefler, Noam, and Azy Barak. 2012. “Effects of Anonymity, Invisibility, and Lack of Eye-Contact on Toxic Online Disinhibition.” *Computers in Human Behavior* 28(2):434–43.

LaRose, Robert. 2010. “The Problem of Media Habits.” *Communication Theory* 20(2):194–222.

LaRose, Robert, and Matthew S. Eastin. 2004. “A Social Cognitive Theory of Internet Uses and Gratifications: Toward a New Model of Media Attendance.” *Journal of Broadcasting & Electronic Media* 48(3):358–77.

LaRose, Robert, Carolyn A. Lin, and Matthew S. Eastin. 2003. “Unregulated Internet Usage: Addiction, Habit, or Deficient Self-Regulation?” *Media Psychology* 5(3):225–53.

Lev-On, Azi. 2017. “Uses and Gratifications: Evidence for Various Media.” Pp. 1–9 in *The International Encyclopedia of Media Effects*. Wiley Blackwell.

Lewinsohn, Peter M. 1975. “Engagement in Pleasant Activities and Depression Level.” *Journal of Abnormal Psychology*.

Lewis, Paul. 2017. “‘Our Minds Can Be Hijacked’: The Tech Insiders Who Fear a Smartphone Dystopia.” *Guardian - Weekend Magazine Technology Special*, October.

Lindström, Björn, Martin Bellander, David T. Schultner, Allen Chang, Philippe N. Tobler, and David M. Amodio. 2021. “A Computational Reward Learning Account of Social Media Engagement.” *Nature Communications* 12(1).

Lister, Kelly M. 2007. “Aggression and Prosocial Behavior in Adolescents’ Internet and Face-to-Face Interactions.” Bowling Green State University.

Liu, Dong, Sarah E. Ainsworth, and Roy F. Baumeister. 2016. “A Meta-Analysis of Social Networking Online and Social Capital.” *Review of General Psychology* 20(4):369–91.

Liu, Qing-Qi, Zong-Kui Zhou, Xiu-Juan Yang, Geng-Feng Niu, Yuan Tian, and Cui-Ying Fan. 2017. “Upward Social Comparison on Social Network Sites and Depressive Symptoms: A Moderated Mediation Model of Self-Esteem and Optimism.” *Personality and Individual Differences* 113:223–28.

Liu, Qing Qi, Zong Kui Zhou, Xiu Juan Yang, Fan Chang Kong, Geng Feng Niu, and Cui Ying Fan. 2017. “Mobile Phone Addiction and Sleep Quality among Chinese Adolescents: A Moderated Mediation Model.” *Computers in Human Behavior* 72:108–14.

Livingstone, Sonia, and Ellen Helsper. 2010. “Balancing Opportunities and Risks in Teenagers’ Use of the Internet: The Role of Online Skills and Internet Self-Efficacy.” *New Media and Society* 12(2):309–29.

Lloyd, Alex, Ryan McKay, Catherine Sebastian, and Joshua Balsters. 2020. “Are Adolescents More Optimal Decision-Makers in Novel Environments? Examining Exploration and Learning in a Patch Foraging Paradigm.”

Lomanowska, Anna M., and Matthieu J. Guitton. 2016. “Online Intimacy and Well-Being in the Digital Age.” *Internet Interventions* 4:138–44.

Luxton, David D., Jennifer D. June, and Jonathan M. Fairall. 2012. “Social Media and Suicide: A Public Health Perspective.” *American Journal of Public Health* 102(SUPPL. 2):S195.

Madden, M., A. Lenhart, S. Cortesi, U. Gasser, M. Duggan, and A. Smith. 2013. *Teens, Social Media, and Privacy.* Washington, DC.

Malloy-Diniz, Leandro F., Débora M. Miranda, and Rodrigo Grassi-Oliveira. 2017. "Editorial: Executive Functions in Psychiatric Disorders." *Frontiers in Psychology* 8(SEP):1461.

Marangunić, Nikola, and Andrina Granić. 2015. "Technology Acceptance Model: A Literature Review from 1986 to 2013." *Universal Access in the Information Society* 14(1):81–95.

Marengo, D., C. Longobardi, M. A. Fabris, and M. Settanni. 2018. "Highly-Visual Social Media and Internalizing Symptoms in Adolescence: The Mediating Role of Body Image Concerns." *Computers in Human Behavior* 82:63–69.

Marwick, Alice E., and danah boyd. 2011. "I Tweet Honestly, I Tweet Passionately: Twitter Users, Context Collapse, and the Imagined Audience." *New Media & Society* 13(1):114–33.

Mayer, Birgit, Marike G. Polak, and Danielle Remmerswaal. 2019. "Mindfulness, Interpretation Bias, and Levels of Anxiety and Depression: Two Mediation Studies." *Mindfulness* 10(1):55–65.

Mazurek, Micah O. 2013. "Social Media Use among Adults with Autism Spectrum Disorders." *Computers in Human Behavior* 29(4):1709–14.

McCrae, Niall, Sheryl Gettings, and Edward Purssell. 2017. "Social Media and Depressive Symptoms in Childhood and Adolescence: A Systematic Review." *Adolescent Research Review* 2(4):315–30.

McDonough, P., G. J. Duncan, D. Williams, and J. House. 1997. "Income Dynamics and Adult Mortality in the United States, 1972 through 1989." *American Journal of Public Health* 87(9):1476–83.

McFarland, Lynn A., and Robert E. Ployhart. 2015. "Social Media: A Contextual Framework to Guide Research and Practice." *Journal of Applied Psychology* 100(6):1653–77.

McMullan, Ryan D., David Berle, Sandra Arnáez, and Vladan Starcevic. 2019. “The Relationships between Health Anxiety, Online Health Information Seeking, and Cyberchondria: Systematic Review and Meta-Analysis.” *Journal of Affective Disorders* 245:270–78.

Meier, Adrian, Alicia Gilbert, Sophie Börner, and Daniel Possler. 2020. “Instagram Inspiration: How Upward Comparison on Social Network Sites Can Contribute to Well-Being.” *Journal of Communication* 70(5):721–43.

Meier, Adrian, and Leonard Reinecke. 2020. “Computer-Mediated Communication, Social Media, and Mental Health: A Conceptual and Empirical Meta-Review.” *Communication Research* 009365022095822.

Memon, Aksha M., Shiva G. Sharma, Satyajit S. Mohite, and Shailesh Jain. 2018. “The Role of Online Social Networking on Deliberate Self-Harm and Suicidality in Adolescents: A Systematized Review of Literature.” *Indian Journal of Psychiatry* 60(4):384–92.

Menting, Barbara, Pol A. C. Van Lier, Hans M. Koot, Dustin Pardini, and Rolf Loeber. 2015. “Cognitive Impulsivity and the Development of Delinquency from Late Childhood to Early Adulthood: Moderating Effects of Parenting Behavior and Peer Relationships.” *Development and Psychopathology* 28(1):167–83.

Michikyan, Minas, Kaveri Subrahmanyam, and Jessica Dennis. 2014. “Can You Tell Who I Am? Neuroticism, Extraversion, and Online Self-Presentation among Young Adults.” *Computers in Human Behavior* 33:179–83.

Modecki, Kathryn L., Jeannie Minchin, Allen G. Harbaugh, Nancy G. Guerra, and Kevin C. Runions. 2014. “Bullying Prevalence Across Contexts: A Meta-Analysis Measuring Cyber and Traditional Bullying.” *Journal of Adolescent Health* 55(5):602–11.

Modin, Bitte, Viveca Östberg, and Ylva Almquist. 2011. “Childhood Peer Status and Adult Susceptibility to Anxiety and Depression. A 30-Year Hospital Follow-Up.” *Journal of*

Abnormal Child Psychology 39(2):187–99.

Moorhead, S. Anne, Diane E. Hazlett, Laura Harrison, Jennifer K. Carroll, Anthea Irwin, and Ciska Hoving. 2013. "A New Dimension of Health Care: Systematic Review of the Uses, Benefits, and Limitations of Social Media for Health Communication." *Journal of Medical Internet Research* 15(4):e85.

Moreno, Megan A., and Yalda T. Uhls. 2019. "Applying an Affordances Approach and a Developmental Lens to Approach Adolescent Social Media Use." *DIGITAL HEALTH* 5:205520761982667.

Mosquera, Roberto, Mofioluwasademi Odunowo, Trent McNamara, Xiongfei Guo, and Ragan Petrie. 2020. "The Economic Effects of Facebook." *Experimental Economics* 23(2):575–602.

Nadkarni, Ashwini, and Stefan G. Hofmann. 2012. "Why Do People Use Facebook?" *Personality and Individual Differences* 52(3):243–49.

Naslund, J. A., K. A. Aschbrenner, L. A. Marsch, and S. J. Bartels. 2016. "The Future of Mental Health Care: Peer-To-Peer Support and Social Media." *Epidemiology and Psychiatric Sciences* 25(2):113–22.

Naslund, John A., Stuart W. Grande, Kelly A. Aschbrenner, and Glyn Elwyn. 2014. "Naturally Occurring Peer Support through Social Media: The Experiences of Individuals with Severe Mental Illness Using YouTube" edited by L. De Haan. *PLoS ONE* 9(10):e110171.

Nesi, Jacqueline, Sophia Choukas-Bradley, and Mitchell J. Prinstein. 2018a. "Transformation of Adolescent Peer Relations in the Social Media Context: Part 1—A Theoretical Framework and Application to Dyadic Peer Relationships." *Clinical Child and Family Psychology Review* 21(3):267–94.

Nesi, Jacqueline, Sophia Choukas-Bradley, and Mitchell J. Prinstein. 2018b. "Transformation

of Adolescent Peer Relations in the Social Media Context: Part 2—Application to Peer Group Processes and Future Directions for Research." *Clinical Child and Family Psychology Review* 21(3):295–319.

Nesi, Jacqueline, and Mitchell J. Prinstein. 2015. "Using Social Media for Social Comparison and Feedback-Seeking: Gender and Popularity Moderate Associations with Depressive Symptoms." *Journal of Abnormal Child Psychology* 43(8):1427–38.

Nesi, Jacqueline, Eva H. Telzer, and Mitchell J. Prinstein. 2020. "Adolescent Development in the Digital Media Context." *Psychological Inquiry* 31(3):229–34.

Ngai, Eric W. T., Spencer S. C. Tao, and Karen K. L. Moon. 2015. "Social Media Research: Theories, Constructs, and Conceptual Frameworks." *International Journal of Information Management* 35(1):33–44.

NHS Digital. 2017. *Mental Health of Children and Young People in England*.

Nielsen, Rasmus Kleis, and Kim Christian Schrøder. 2014. "The Relative Importance of Social Media for Accessing, Finding, and Engaging with News." *Digital Journalism* 2(4):472–89.

Nikitin, Jana, and Alexandra M. Freund. 2008. "The Role of Social Approach and Avoidance Motives for Subjective Well-Being and the Successful Transition to Adulthood." *Applied Psychology* 57(SUPPL. 1):90–111.

Niland, Patricia, Antonia C. Lyons, Ian Goodwin, and Fiona Hutton. 2015. "Friendship Work on Facebook: Young Adults' Understandings and Practices of Friendship." *Journal of Community & Applied Social Psychology* 25(2):123–37.

Noë, Beryl, Liam D. Turner, David E. J. Linden, Stuart M. Allen, Bjorn Winkens, and Roger M. Whitaker. 2019. "Identifying Indicators of Smartphone Addiction Through User-App Interaction." *Computers in Human Behavior* 99:56–65.

Orben, Amy. 2018. "Cyberpsychology: A Field Lacking Theoretical Foundations." *PsyPAG*

The Quarterly 105(Open Access Version).

Orben, Amy. 2020a. “Teenagers, Screens and Social Media: A Narrative Review of Reviews and Key Studies.” *Social Psychiatry and Psychiatric Epidemiology*.

Orben, Amy. 2020b. “The Sisyphean Cycle of Technology Panics.” *Perspectives on Psychological Science* 174569162091937.

Orben, Amy, Tobias Dienlin, and Andrew K. Przybylski. 2019. “Social Media’s Enduring Effect on Adolescent Life Satisfaction.” *Proceedings of the National Academy of Sciences of the United States of America* 116(21):10226–28.

Orben, Amy, and Andrew K. Przybylski. 2019. “Screens, Teens, and Psychological Well-Being: Evidence From Three Time-Use-Diary Studies.” *Psychological Science* 30(5):682–96.

Orben, Amy, and Andrew K. Przybylski. 2020a. “Reply to: Underestimating Digital Media Harm.” *Nature Human Behaviour* 4(4):349–51.

Orben, Amy, and Andrew K. Przybylski. 2020b. “Teenage Sleep and Technology Engagement across the Week.” *PeerJ* 8:e8427.

Orben, Amy, Livia Tomova, and Sarah Jayne Blakemore. 2020. “The Effects of Social Deprivation on Adolescent Development and Mental Health.” *The Lancet Child and Adolescent Health* 4(8):634–40.

Orben, Amy, Netta Weinstein, and Andrew K. Przybylski. 2020. “Only Holistic and Iterative Change Will Fix Digital Technology Research.” *Psychological Inquiry* 31(3):235–41.

Owen, Bradford, Brian Heisterkamp, Annabell Halfmann, and Peter Vorderer. 2018. “Trait Mindfulness and Problematic Smartphone Use.” *Empirical Studies of Contemplative Practices* 181–205.

Palmgreen, P., L. Wenner, and K. Rosengren. 1985. “Uses and Gratifications Research: The Past Ten Years.” Pp. 11–37 in *Media gratification research*, edited by K. Rosengren, L.

Wenner, and P. Palmgreen. Beverly Hills, CA: SAGE Publications Ltd.

Palmgreen, Philip. 1984. “Uses and Gratifications: A Theoretical Perspective.” *Annals of the International Communication Association* 8(1):20–55.

Papacharissi, Zizi, and Alan M. Rubin. 2000. “Predictors of Internet Use.” *Journal of Broadcasting and Electronic Media* 44(2):175–96.

Park, Sun Young, and Young Min Baek. 2018. “Two Faces of Social Comparison on Facebook: The Interplay between Social Comparison Orientation, Emotions, and Psychological Well-Being.” *Computers in Human Behavior* 79:83–93.

Perloff, Richard M. 2014. “Social Media Effects on Young Women’s Body Image Concerns: Theoretical Perspectives and an Agenda for Research.” *Sex Roles* 71(11–12):363–77.

Perugini, María Laura Lupano, and Alejandro Castro Solano. 2021. “Normal and Maladaptive Personality Traits as Predictors of Motives for Social Media Use and Its Effects on Well-Being.” *Psychological Reports* 124(3):1070–92.

Poon, Kai Tak, and Yufei Jiang. 2020. “Getting Less Likes on Social Media: Mindfulness Ameliorates the Detrimental Effects of Feeling Left Out Online.” *Mindfulness* 11(4):1038–48.

Przybylski, Andrew K., Kou Murayama, Cody R. Dehaan, and Valerie Gladwell. 2013. “Motivational, Emotional, and Behavioral Correlates of Fear of Missing Out.” *Computers in Human Behavior* 29(4):1841–48.

Putnam, Robert D. 2001. *Bowling Alone: The Collapse and Revival of American Community*. Second. Simon & Schuster Ltd.

Radovic, Ana, Theresa Gmelin, Bradley D. Stein, and Elizabeth Miller. 2017. “Depressed Adolescents’ Positive and Negative Use of Social Media.” *Journal of Adolescence* 55:5–15.

Ragelienė, Tija. 2016a. “Links of Adolescents Identity Development and Relationship with

Peers: A Systematic Literature Review." *Journal of the Canadian Academy of Child and Adolescent Psychiatry* 25(2):97–105.

Ragelienė, Tija. 2016b. "Links of Adolescents Identity Development and Relationship with Peers: A Systematic Literature Review." *Journal of the Canadian Academy of Child and Adolescent Psychiatry* 25(2):97–105.

Ramel, Wiveka, Philippe R. Goldin, Paula E. Carmona, and John R. McQuaid. 2004. "The Effects of Mindfulness Meditation on Cognitive Processes and Affect in Patients with Past Depression." *Cognitive Therapy and Research* 28(4):433–55.

Ramnero, Jonas, and Niklas Torneke. 2008. "Knowing Your ABCs." Pp. 47–59 in *The ABCs of Human Behavior - Behavioral Principles for the Practicing Clinician*. Oakland, CA: New Harbinger.

Reichelt, Alicia. 2019. "Social Media and Mental Health: Uses and Gratifications of Social Networking in Relation to Depression, Anxiety and Offline Relationships among Young Adults." University of Twente.

Riskind, John H. 1997. "Looming Vulnerability to Threat: A Cognitive Paradigm for Anxiety." *Behaviour Research and Therapy* 35(8):685–702.

Riva, Federica, Chantal Triscoli, Claus Lamm, Andrea Carnaghi, and Giorgia Silani. 2016. "Emotional Egocentricity Bias Across the Life-Span." *Frontiers in Aging Neuroscience* 8(APR):74.

Rizvi, S. L. 2019. "The Basics of the Chain Analysis." Pp. 1–22 in *Chain Analysis in Dialectical Behavior Therapy*. New York: Guildford Press.

Romer, Daniel. 2010. "Adolescent Risk Taking, Impulsivity, and Brain Development: Implications for Prevention." *Developmental Psychobiology* 52(3):263–76.

Romer, Daniel, and Michael Hennessy. 2007. "A Biosocial-Affect Model of Adolescent Sensation Seeking: The Role of Affect Evaluation and Peer-Group Influence in

Adolescent Drug Use." *Prevention Science* 8(2):89–101.

Romer, Daniel, Valerie F. Reyna, and Theodore D. Satterthwaite. 2017. "Beyond Stereotypes of Adolescent Risk Taking: Placing the Adolescent Brain in Developmental Context." *Developmental Cognitive Neuroscience* 27:19–34.

Rose, Amanda J. 2002. "Co-Rumination in the Friendships of Girls and Boys." *Child Development* 73(6):1830–43.

Rozin, Paul, and Edward B. Royzman. 2001. "Negativity Bias, Negativity Dominance, and Contagion." *Personality and Social Psychology Review* 5(4):296–320.

Ruggiero, Thomas E. 2000. "Uses and Gratifications Theory in the 21st Century." *Mass Communication and Society* 3(1):3–37.

Ryan, Richard M., and Edward L. Deci. 2017. "Basic Psychological Needs Theory: Satisfaction and Frustration of Autonomy, Competence, and Relatedness in Relation to Psychological Wellness and Full Functioning." Pp. 239–71 in *Self Determination Theory - Basic Psychological Needs in Motivation, Development, and Wellness*. 2017: Guilford Press.

Saiphoo, Alyssa N., and Z. Vahedi. 2019. "A Meta-Analytic Review of the Relationship between Social Media Use and Body Image Disturbance." *Computers in Human Behavior* 101:259–75.

Salkovskis, Paul M. 1991. "The Importance of Behaviour in the Maintenance of Anxiety and Panic: A Cognitive Account." *Behavioural Psychotherapy* 19(1):6–19.

Sawyer, Susan M., Peter S. Azzopardi, Dakshitha Wickremarathne, and George C. Patton. 2018. "The Age of Adolescence." *The Lancet Child and Adolescent Health* 2(3):223–28.

Schmertz, Stefan K., Akihiko Masuda, and Page L. Anderson. 2012. "Cognitive Processes Mediate the Relation Between Mindfulness and Social Anxiety Within a Clinical Sample." *Journal of Clinical Psychology* 68(3):362–71.

Schmuck, Desirée, Kathrin Karsay, Jörg Matthes, and Anja Stevic. 2019. "'Looking Up and Feeling Down'. The Influence of Mobile Social Networking Site Use on Upward Social Comparison, Self-Esteem, and Well-Being of Adult Smartphone Users." *Telematics and Informatics* 42:101240.

Schønning, Viktor, Gunnhild Johnsen Hjetland, Leif Edvard Aarø, and Jens Christoffer Skogen. 2020. "Social Media Use and Mental Health and Well-Being Among Adolescents – A Scoping Review." *Frontiers in Psychology* 11:1949.

Schreurs, Lara, and Laura Vandenbosch. 2021. "Introducing the Social Media Literacy (SMILE) Model with the Case of the Positivity Bias on Social Media." *Journal of Children and Media* 15(3):320–37.

Schuman-Olivier, Zev, Marcelo Trombka, David A. Lovas, Judson A. Brewer, David R. Vago, Richa Gawande, Julie P. Dunne, Sara W. Lazar, Eric B. Loucks, and Carl Fulwiler. 2020. "Mindfulness and Behavior Change." *Harvard Review of Psychiatry* 28(6):371–94.

Scott, Holly, Stephany M. Biello, and Heather Cleland Woods. 2019. "Social Media Use and Adolescent Sleep Patterns: Cross-Sectional Findings from the UK Millennium Cohort Study." *BMJ Open* 9(9):e031161.

Sebastian, Catherine, Essi Viding, Kipling D. Williams, and Sarah Jayne Blakemore. 2010. "Social Brain Development and the Affective Consequences of Ostracism in Adolescence." *Brain and Cognition* 72(1):134–45.

Seo, Mihye, Jinhee Kim, and Hyeseung Yang. 2016. "Frequent Interaction and Fast Feedback Predict Perceived Social Support: Using Crawled and Self-Reported Data of Facebook Users." *Journal of Computer-Mediated Communication* 21(4):282–97.

Serrano-Ibáñez, Elena R., Carmen Ramírez-Maestre, Rosa Esteve, and Alicia E. López-Martínez. 2019. "The Behavioural Inhibition System, Behavioural Activation System

and Experiential Avoidance as Explanatory Variables of Comorbid Chronic Pain and Posttraumatic Stress Symptoms." *European Journal of Psychotraumatology* 10(1).

Shaw, Ashley M., Kiara R. Timpano, Tanya B. Tran, and Jutta Joormann. 2015. "Correlates of Facebook Usage Patterns: The Relationship between Passive Facebook Use, Social Anxiety Symptoms, and Brooding." *Computers in Human Behavior* 48:575–80.

Shaw, Heather, David A. Ellis, and Fenja V. Ziegler. 2018. "The Technology Integration Model (TIM). Predicting the Continued Use of Technology." *Computers in Human Behavior* 83:204–14.

Sheldon, Kennon M., Neetu Abad, and Christian Hinsch. 2011. "A Two-Process View of Facebook Use and Relatedness Need-Satisfaction: Disconnection Drives Use, and Connection Rewards It." *Psychology of Popular Media Culture* 1(S):2–15.

Sheldon, P., P. A. Rauschnabel, and J. M. Honeycutt. 2020. "Section 1: The Dark Side of Personal Social Media Use." Pp. 3–85 in *The Dark Side of Social Media Use - Psychological, Managerial, and Societal Perspectives*. London: Academic Press, Elsevier.

Shepherd, Jennifer L., David J. Lane, Ryan L. Tapscott, and Douglas A. Gentile. 2011. "Susceptible to Social Influence: Risky 'Driving' in Response to Peer Pressure1." *Journal of Applied Social Psychology* 41(4):773–97.

Sidani, Jaime E., Ariel Shensa, Beth Hoffman, Janel Hanmer, and Brian A. Primack. 2016. "The Association between Social Media Use and Eating Concerns among US Young Adults." *Journal of the Academy of Nutrition and Dietetics* 116(9):1465–72.

Šmahel, Kaveri, and David Subrahmanyam. 2011. "Connecting Online Behavior to Adolescent Development: A Theoretical Framework." Pp. 27–40 in *Digital Youth - The Role of Media in Development*. New York, NY: Springer.

Spear, Linda Patia. 2011. "Rewards, Aversions and Affect in Adolescence: Emerging

Convergences across Laboratory Animal and Human Data." *Developmental Cognitive Neuroscience* 1(4):390–403.

Spies Shapiro, Lauren A., and Gayla Margolin. 2014. "Growing Up Wired: Social Networking Sites and Adolescent Psychosocial Development." *Clinical Child and Family Psychology Review* 17(1):1–18.

Spohr, Dominic. 2017. "Fake News and Ideological Polarization." *Business Information Review* 34(3):150–60.

Sportel, B. Esther, Maaike H. Nauta, Eva de Hullu, Peter J. de Jong, and Catharina A. Hartman. 2011. "Behavioral Inhibition and Attentional Control in Adolescents: Robust Relationships with Anxiety and Depression." *Journal of Child and Family Studies* 20(2):149–56.

Subrahmanyam, K., and D. Šmahel. 2011. "Connecting Online Behavior to Adolescent Development: A Theoretical Framework." Pp. 27–40 in *Digital youth: The role of media in development*.

Subrahmanyam, Kaveri, and David Šmahel. 2011a. "Constructing Identity Online: Identity Exploration and Self-Presentation." Pp. 59–80 in *Digital Youth - The Role of Media in Development*. New York, NY: Springer.

Subrahmanyam, Kaveri, and David Šmahel. 2011b. "Intimacy and the Internet: Relationships with Friends, Romantic Partners, and Family Members." Pp. 81–102 in *Digital Youth - The Role of Media in Development*. New York, NY: Springer.

Subrahmanyam, Kaveri, and David Šmahel. 2011c. "Technology and Health: Using the Internet for Wellness and Illness." Pp. 143–55 in *Digital Youth - The Role of Media in Development*. New York, NY: Springer.

Subrahmanyam, Kaveri, and David Šmahel. 2011d. "The Darker Sides of the Internet: Violence, Cyber Bullying, and Victimization." Pp. 179–200 in *Digital Youth - The Role*

of Media in Development. New York, NY: Springer.

Suler, John. 2004. "The Online Disinhibition Effect." *Cyberpsychology and Behavior* 7(3):321–26.

Sussman, Tamara J., Jingwen Jin, and Aprajita Mohanty. 2020. "The Impact of Top-down Factors on Threat Perception Biases in Health and Anxiety." Pp. 215–41 in *Cognitive Biases in Health and Psychiatric Disorders*. Elsevier.

Tandoc, Edson C., Patrick Ferrucci, and Margaret Duffy. 2015. "Facebook Use, Envy, and Depression among College Students: Is Facebooking Depressing?" *Computers in Human Behavior* 43:139–46.

Tang, Qian, Bin Gu, and Andrew Whinston. 2012. "Content Contribution for Revenue Sharing and Reputation in Social Media: A Dynamic Structural Model." *Journal of Management Information Systems* 29(2):41–76.

Tarokh, Leila, Jared M. Saletin, and Mary A. Carskadon. 2016. "Sleep in Adolescence: Physiology, Cognition and Mental Health." *Neuroscience and Biobehavioral Reviews* 70:182–88.

Tavernier, Royette, and Teena Willoughby. 2014. "Sleep Problems: Predictor or Outcome of Media Use among Emerging Adults at University?" *Journal of Sleep Research* 23(4):389–96.

Teppers, Eveline, Koen Luyckx, Theo A. Klimstra, and Luc Goossens. 2014. "Loneliness and Facebook Motives in Adolescence: A Longitudinal Inquiry into Directionality of Effect." *Journal of Adolescence* 37(5):691–99.

Tibber, Marc S., Jiayuan Zhao, and Stephen Butler. 2020. "The Association between Self-Esteem and Dimensions and Classes of Cross-Platform Social Media Use in a Sample of Emerging Adults – Evidence from Regression and Latent Class Analyses." *Computers in Human Behavior* 109:106371.

Tomova, Livia, Jack L. Andrews, and Sarah-Jayne Blakemore. 2021. “The Importance of Belonging and the Avoidance of Social Risk Taking in Adolescence.” *Developmental Review* 61:100981.

Torrent, J. 2014. “MIL and the Web 3.0.” Pp. 27–30 in *Global Citizenship in a Digital World*, edited by S. H. Culver and P. A. Kerr. International Clearinghouse on Children, Youth and Media at NORDICOM.

Tsvetkova, Milena, and Michael Macy. 2015. “The Contagion of Prosocial Behavior and the Emergence of Voluntary-Contribution Communities.” Pp. 117–34 in *Social Phenomena: From Data Analysis to Models*. Springer International Publishing.

Tufekci, Zeynep. 2013. “‘Not This One.’” *American Behavioral Scientist* 57(7):848–70.

Turel, Ofir, and Babajide Osatuyi. 2017. “A Peer-Influence Perspective on Compulsive Social Networking Site Use: Trait Mindfulness as a Double-Edged Sword.” *Computers in Human Behavior* 77:47–53.

Turel, Ofir, and Hamed Qahri-Saremi. 2016. “Problematic Use of Social Networking Sites: Antecedents and Consequence from a Dual-System Theory Perspective.” *Journal of Management Information Systems* 33(4):1087–1116.

Turel, Ofir, and Alexander Serenko. 2012. “The Benefits and Dangers of Enjoyment with Social Networking Websites.” *European Journal of Information Systems* 21(5):512–28.

Twenge, Jean M., and W. Keith Campbell. 2018. “Associations between Screen Time and Lower Psychological Well-Being among Children and Adolescents: Evidence from a Population-Based Study.” *Preventive Medicine Reports* 12:271–83.

Twenge, Jean M., Jonathan Haidt, Thomas E. Joiner, and W. Keith Campbell. 2020. “Underestimating Digital Media Harm.” *Nature Human Behaviour* 4(4):346–48.

Twenge, Jean M., Thomas E. Joiner, Megan L. Rogers, and Gabrielle N. Martin. 2018. “Increases in Depressive Symptoms, Suicide-Related Outcomes, and Suicide Rates

Among U.S. Adolescents After 2010 and Links to Increased New Media Screen Time." *Clinical Psychological Science* 6(1):3–17.

Uhls, Yalda T., Nicole B. Ellison, and Kaveri Subrahmanyam. 2017. "Benefits and Costs of Social Media in Adolescence." *Pediatrics* 140(Supplement 2):S67–70.

Vago, David R., and Silbersweig A. David. 2012. "Self-Awareness, Self-Regulation, and Self-Transcendence (S-ART): A Framework for Understanding the Neurobiological Mechanisms of Mindfulness." *Frontiers in Human Neuroscience* 6(OCTOBER 2012).

Vago, David R., and Yoshio Nakamura. 2011. "Selective Attentional Bias towards Pain-Related Threat in Fibromyalgia: Preliminary Evidence for Effects of Mindfulness Meditation Training." *Cognitive Therapy and Research* 35(6):581–94.

Valkenburg, Patti M. 2017. "Understanding Self-Effects in Social Media." *Human Communication Research* 43(4):477–90.

Valkenburg, Patti M., Irene I. van Driel, and Ine Beyens. n.d. "The Associations of Active and Passive Social Media Use With Well-Being: A Critical Scoping Review." *PsyArXiv Preprints* 1–37.

Valkenburg, Patti M., Adrian Meier, and Ine Beyens. n.d. "Social Media Use and Its Impact on Adolescent Mental Health: An Umbrella Review of the Evidence." *PsyArXiv Preprints*.

Valkenburg, Patti M., and J. Peter. 2013. "The Differential Susceptibility to Media Effects Model." *Journal of Communication* 63(2):221–43.

Valkenburg, Patti M., and Jochen Peter. 2007. "Online Communication and Adolescent Well-Being: Testing the Stimulation Versus the Displacement Hypothesis." *Journal of Computer-Mediated Communication* 12(4):1169–82.

Valkenburg, Patti M., and Jochen Peter. 2008. "Adolescents' Identity Experiments on the Internet." *Communication Research* 35(2):208–31.

Verduyn, Philippe, David Seungjae Lee, Jiyoung Park, Holly Shablack, Ariana Orvell, Joseph Bayer, Oscar Ybarra, John Jonides, and Ethan Kross. 2015. “Passive Facebook Usage Undermines Affective Well-Being: Experimental and Longitudinal Evidence.” *Journal of Experimental Psychology: General* 144(2):480–88.

Verduyn, Philippe, Oscar Ybarra, Maxime Résibois, John Jonides, and Ethan Kross. 2017. “Do Social Network Sites Enhance or Undermine Subjective Well-Being? A Critical Review.” *Social Issues and Policy Review* 11(1):274–302.

Verplanken, Bas, Henk Aarts, and Ad Van Knippenberg. 1997. “Habit, Information Acquisition, and the Process of Making Travel Mode Choices.” *European Journal of Social Psychology* 27(5):539–60.

Viner, Russell M., Max Davie, and Alison Firth. 2019. *The Health Impacts of Screen Time: A Guide for Clinicians and Parents*.

Vogel, Erin A., Jason P. Rose, Bradley M. Okdie, Katheryn Eckles, and Brittany Franz. 2015. “Who Compares and Despairs? The Effect of Social Comparison Orientation on Social Media Use and Its Outcomes.” *Personality and Individual Differences* 86:249–56.

Vogel, Erin A., Jason P. Rose, Lindsay R. Roberts, and Katheryn Eckles. 2014. “Social Comparison, Social Media, and Self-Esteem.” *Psychology of Popular Media Culture* 3(4):206–22.

Vosoughi, Soroush, Mostafa ‘Neo’ Mohsenvand, and Deb Roy. 2017. “Rumor Gauge: Predicting the Veracity of Rumors on Twitter.” *ACM Transactions on Knowledge Discovery from Data* 11(4):1–36.

Walther, Joseph B. 1992. “Interpersonal Effects in Computer-Mediated Interaction.” *Communication Research* 19(1):52–90.

Walther, Joseph B. 2015. “Social Information Processing Theory: Impressions and Relationship Development Online.” Pp. 573–88 in *Engaging Theories in Interpersonal*

Communication - Multiple Perspectives, edited by D. O. Braithwaite and P. Schrodt. Los Angeles, CA: SAGE Publications.

Wang, Jin-Liang, Hai-Zhen Wang, James Gaskin, and Skyler Hawk. 2017. "The Mediating Roles of Upward Social Comparison and Self-Esteem and the Moderating Role of Social Comparison Orientation in the Association between Social Networking Site Usage and Subjective Well-Being." *Frontiers in Psychology* 8:771.

Wang, Qianjin, Honghong Ren, Jiang Long, Yueheng Liu, and Tieqiao Liu. 2019. "Research Progress and Debates on Gaming Disorder." *General Psychiatry* 32(3).

Wang, Shaojung Sharon. 2013. "'i Share, Therefore i Am': Personality Traits, Life Satisfaction, and Facebook Check-Ins." *Cyberpsychology, Behavior, and Social Networking* 16(12):870–77.

Wartberg, Lutz, Levente Kriston, and Rainer Thomasius. 2020. "Internet Gaming Disorder and Problematic Social Media Use in a Representative Sample of German Adolescents: Prevalence Estimates, Comorbid Depressive Symptoms and Related Psychosocial Aspects." *Computers in Human Behavior* 103:31–36.

Wegmann, Elisa, and Matthias Brand. 2019. "A Narrative Overview About Psychosocial Characteristics as Risk Factors of a Problematic Social Networks Use." *Current Addiction Reports* 6(4):402–9.

Wells, Adrian. 1997. *Cognitive Therapy of Anxiety Disorders: A Practical Manual and Conceptual Guide*. First. Chichester: John Wiley & Sons Ltd.

Wenk-Sormaz, Heidi. 2005. "Meditation Can Reduce Habitual Responding." *Advances in Mind-Body Medicine* 21(3–4):33–49.

Wenninger, Helena, Hanna Krasnova, and Peter Buxmann. 2014. "ACTIVITY MATTERS: INVESTIGATING THE INFLUENCE OF FACEBOOK ON LIFE SATISFACTION OF TEENAGE USERS." *ECIS 2014 Proceedings*.

Williams, Joshua R. 2019. “The Use of Online Social Networking Sites to Nurture and Cultivate Bonding Social Capital: A Systematic Review of the Literature from 1997 to 2018.” *New Media & Society* 21(11–12):2710–29.

Wright, Kevin B., Jenny Rosenberg, Nicole Egbert, Nicole A. Ploeger, Daniel R. Bernard, and Shawn King. 2013. “Communication Competence, Social Support, and Depression among College Students: A Model of Facebook and Face-to-Face Support Network Influence.” *Journal of Health Communication* 18(1):41–57.

Yang, Chia-chen, Sean M. Holden, and Jati Ariati. 2021. “Social Media and Psychological Well-Being Among Youth: The Multidimensional Model of Social Media Use.” *Clinical Child and Family Psychology Review* 1–20.

Yang, Chia chen, and B. Bradford Brown. 2013. “Motives for Using Facebook, Patterns of Facebook Activities, and Late Adolescents’ Social Adjustment to College.” *Journal of Youth and Adolescence* 42(3):403–16.

Yonker, Lael M., Shiyi Zan, Christina V. Scirica, Kamal Jethwani, and T. Bernard Kinane. 2015. “‘Friending’ Teens: Systematic Review of Social Media in Adolescent and Young Adult Health Care.” *Journal of Medical Internet Research* 17(1):e4.

Yu, Rongjun. 2016. “Stress Potentiates Decision Biases: A Stress Induced Deliberation-to-Intuition (SIDI) Model.” *Neurobiology of Stress* 3:83–95.

Zuboff, Shoshana. 2015. “Big Other: Surveillance Capitalism and the Prospects of an Information Civilization.” *Journal of Information Technology* 30(1):75–89.

Zywica, Jolene, and James Danowski. 2008. “The Faces of Facebookers: Investigating Social Enhancement and Social Compensation Hypotheses; Predicting Facebook™ and Offline Popularity from Sociability and Self-Esteem, and Mapping the Meanings of Popularity with Semantic Networks.” *Journal of Computer-Mediated Communication* 14(1):1–34.