Exploring Contemporary Screen Time in Australian Adolescents: A Qualitative Study

ABSTRACT

Issue addressed

Screen time, a highly prevalent behaviour, can be detrimental to adolescent health. To better understand this health-related behaviour, this study explores the nature of adolescents' contemporary screen engagement, adding to the currently limited body of qualitative research in this area.

Methods

Sixteen adolescents (9 girls and 7 boys) aged 13-17 years from a secondary school in Queensland, Australia participated in semi-structured one-on-one interviews. All interviews were transcribed verbatim, anonymised and thematically analysed using an inductive approach.

Results

Smartphone use was ubiquitous, occurring mostly at home, after school, and typically used for social, entertainment, and functional activities. Binge-watching and multi-screening emerged as common sedentary patterns of contemporary screen engagement, often performed solitary. Screen time appeared to be an important aspect of adolescents' social lives, while there were also some psychological, physical, and behavioural concerns. Family and friends were thought to influence adolescents' screen time either directly (co-participation) or indirectly (modelling), while social smartphone notifications were said to prompt habitual, frequent and prolonged screen engagement.

Conclusion

This study provided several new insights into the nature, functions, patterns, and benefits and concerns of adolescents' contemporary screen engagement. On the whole, adolescents engaged in a wide variety of screen-viewing practices, including newer digital media, mostly as a function to connect with friends and family.

So what?

It might be desirable for screen time reduction interventions and policies to take into account the underlying social and psychological factors, and habitual nature of contemporary screen engagement among adolescents.

Keywords: Adolescents; Social media; Qualitative methods; Health behaviours

1 INTRODUCTION

'Screen time' refers to the time spent in screen-based behaviours, including TV-viewing, recreational computer-use, video-gaming, and smartphone and tablet use.[1] Higher levels of sedentary screen time have been associated with negative health outcomes among adolescents, including unfavourable cardiometabolic risk factors, such as greater adiposity;[2] psychological issues, such as an increased risk of depression;[3] and behavioural problems, such as poor sleep quality.[4] Others have suggested that the effect of screen time on psychological well-being may be negligible[5] and, in some cases beneficial.[6] For instance, social media participation may enhance adolescents social support and connectedness, in addition to offering opportunities for community engagement.[7] Moreover, research investigating non-recreational time, such as computer use for homework, has reported positive associations with academic achievement and persistence.[8,9] Nevertheless, these potential benefits should be weighed alongside the known harmful effects of accruing longer time spent sedentary while using a screen.[10]

Australian public health guidelines recommend limiting sedentary recreational screen time for adolescents to ≤2h/day.[11] However, less than 20% of Australian adolescents (boys: 13%; girls: 17%) are meeting the guidelines.[12] These trends may cause a rise in public health and other concerns, especially now that digital media is increasingly part of adolescents' daily lives.[10] Moreover, such guidelines have been based on health-related evidence from more traditional forms of technology, such as TVs and computers, before the widespread introduction of mobile and touch screen formats.[13] It is critical to understand how adolescents use more contemporary forms of technology, such as smartphones and tablets.

The rising prevalence of screen time might be caused by increased ownership of modern screens, with recent poll research showing that almost all Australian adolescents (94%) have access to a smartphone or tablet.[14] As a result, this might have led to the proliferation of smartphone usage to the detriment of other screen-based devices (e.g., TV, computers).[15,16] This access to mobile technology has also generated a high consumption of internet content in the adolescent population.[17] For example, in

our recent longitudinal analysis of adolescents' screen time trends, we showed overall increases in screen time, with increases most pronounced in newer internet-based digital media, such as social networking and online communication.[18] Additionally, emerging patterns of contemporary screen engagement, such as the simultaneous usage of multiple screens (e.g., multi-tasking)[19] and prolonged uninterrupted screen time (e.g., binge-watching),[20] may also contribute to the growing prevalence of screen time among adolescents. However, qualitative research exploring the nature of adolescents' contemporary screen use, including the emerging patterns and contextual aspects of their screen engagement, is limited.

Qualitative research is important because it allows researchers to explore the meaning of people's behaviour from the participant's point of view and is important for the development of interventions and policy.[21] Specifically, qualitative interviews offer an opportunity to explore with adolescents to understand their media practices and what they seek from their digital experiences.[22]

Toh, Howie, Coenen, & Straker recently documented adolescents' perceptions of mobile touchscreen (smartphone and tablet) engagement.[23] That qualitative study showed that mobile touchscreen devices can be used to engage in a variety of activities, such as social networking, messaging friends, playing games, with growing evidence that these devices are increasingly part of adolescents' daily routines, mostly involving frequently checking the device and multitasking. However, little research has explored the context in which various screen-based behaviours occur. For example, less is known about when, where and with whom adolescents engage with screens. Among children, the after-school period has been linked to increased screen use,[24] while the home environment appears to be a substantial source of greater screen engagement.[25] It is important to develop a wider comprehension of adolescents' full range of contemporary screen engagement, in addition to understanding the context in which their screen behaviour occurs. Therefore, the present study aims to qualitatively explore the nature of and reasons for contemporary screen time among adolescents.

2 METHODS

This study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines[26] (see Supporting Information A). Ethical approval was obtained by the University of Southern Queensland Human Research Ethics Committee. Interviews were conducted in November 2018 and data were analysed between August and November 2019. Informed parental consent forms were obtained before data collection.

2.1 Recruitment Strategy

A convenience sample of adolescents aged 13-17 years was recruited from a secondary school in Queensland, Australia. The school was chosen based on previously established contact between the research group and the head (Principal) of the school. The research group did not have any pre-existing relationships with prospective participants. Initially, a face-to-face information session, led by the first author (GT, male), was held at the school, at which students (N = 150 in attendance) were invited to participate in a semi-structured one-on-one interview. During this information session, students were informed about the personal goals and interests of the research group, as well as the aims of the study. At the end of the session, information packs (including a parental consent form) were distributed to those students expressing an interest to participate (n = 30). They were requested to take the packs home to discuss their involvement with their parents/carers. Written parental consent was obtained for 28 adolescents (93% response). The reasons why two individuals declined to take part is unknown.

Adequate final sample size was guided by the concept of 'information power'.[27] Given the specificity of the sample, broad study aim and strong interview dialogue, a sample size of 16 participants was considered appropriate (information power), while the adequacy of the final sample size was evaluated continuously during the research process (data saturation). A participant list was randomly generated using purposive stratified sampling to ensure heterogeneity across school grade (age) and sex.

2.2 Procedures

2.2.1 Semi-structured one-on-one interview

A piloted interview guide was developed based on discussion within the research group and was used to inform interviews (see Supporting Information B). After the pilot interviews, the interview format was refined to allow for topics including the types and nature of screen engagement; reasons for engaging with screens; and perceptions and attitudes towards screens. Semi-structured one-on-one interviews were conducted by GT in classrooms and audio recorded. Key discussion points were also identified using handwritten notes during the interview.

2.2.2 Sociodemographic questionnaire

Before the individual interviews commenced, parents were asked to complete a brief questionnaire concerning demographic characteristics, including the highest education level, household income, and employment status.

2.3 Data Analysis

First, audio recordings (*M* duration = 27 min, range = 21-35 minutes) were transcribed verbatim and anonymised. Second, transcripts were saved and managed in NVivo (Version 12 Pro, QSR International, Victoria, Australia) and analysed using thematic analysis.[28] Following data familiarisation, GT, with experience in research on sedentary behaviour among adolescents, was responsible for the development of initial codes and themes. Coding and theme generation was iterative and refined throughout analysis using an inductive approach. Interpretations of themes were critically reviewed by all authors.[29]

3 RESULTS

3.1 Sample Characteristics

Nine girls and seven boys participated, with an average age of 15.6 ± 1.4 years. Other characteristics are presented in Table 1.

Table 1. Characteristics of the interview sample (*N* = 16)

Variables	Total
Gender (% male)	43.8
Age (Mean *SD*; years)	15.6 (1.4)
Number of People in Household (Mean *SD*)	4.3 (0.9)
Main Language (*n*, %)	
English	15 (93.8)
Other	1 (6.2)
Total Annual Household Income (*n*, %)	
> 78,000	13 (81.3)
52,000 – 77,999	2 (12.5)
41,600 – 51,999	1 (6.2)
Parents' Highest Level of Education (*n*, %)	
University or Territory Qualification	11 (68.8)
Technical or Trade School Certificate	1 (6.2)
Year 12 or Equivalent	3 (18.8)
High School	1 (6.2)
Parental Marital Status (*n*, %)	
Married	14 (87.6)
Separated/Divorced	1 (6.2)
Widowed	1 (6.2)
Home Access to Screen-Based Devices (*n*, %)	
Smartphone	16 (100.0)
Television	14 (87.5)
Tablet	13 (81.3)
Laptop Computer	13 (81.3)
Video Games Console	12 (75.0)

3.2 Themes

Four main themes emerged from the data:

I. *Contexts and functions of contemporary screen engagement* explores the extent and nature of adolescents' daily screen-based activities, in addition to the reasons for engaging in these activities;
II. *Experiences and patterns of contemporary screen engagement* focusses on adolescents' explicit experiences with newer digital media and common patterns of contemporary screen engagement;
III. *Benefits and concerns of contemporary screen engagement* captures adolescents' perceived benefits and negatives of screens and social media; and
IV. *Facilitators of contemporary screen engagement* describes the common enablers of adolescents' screen time. These themes, including sub-themes, are outlined and discussed below along with illustrative quotes.

3.2.1 Contexts and functions of contemporary screen engagement

Overall, screen engagement was high among participants, with many reporting time spent in a variety of screens, including smartphones, tablets, TVs, laptops and video-game consoles. Generally, screen time occurred throughout the day, including mornings, school hours, after school, before bed, and during weekends. This was undertaken mostly at home with less outside and in public spaces. The availability of screens was widespread among participants, with many reporting that they had access to a number of devices in their homes (see Table 1). Many participants also reported having unrestricted access to screens in their bedrooms (mainly smartphones, tablets and, for boys, video-game consoles), which encouraged high use in this location. The bedroom was the place they felt most uninterrupted and private to use their screen, particularly for social networking or communicating with their friends online.

There were clear differences in the contexts of screen engagement, in addition to how participants felt about why they engaged in screen time and what functions this may serve. Smartphones were ubiquitous and used for a variety of functions and activities, including those that were for social, entertainment, and functional purposes. Social activities included Facebook, engaging in group chats on WhatsApp, and video-calling family members on Skype. Activities for entertainment included watch shows/videos on Netflix/YouTube, play games, and listen to music on Spotify during free lessons, as a method of procrastinating or escaping from the demands of school work, or on school transport to relieve boredom and fill time. Functional activities included browsing the internet, checking the time or bank balance, setting an alarm, searching directions, taking videos or photographs, keeping parents updated during transport.

> "*I use my smartphone for everything; take photos, contact friends, watch YouTube videos, scroll through social media and play games*" (p13, girl, age 14)

In contrast, participants discussed using tablets (e.g., iPad) less frequently than smartphones, usually between once and three times per week, mainly used to watch videos/shows, or browse social media when a larger touchscreen was preferred. It was common for participants to describe the use of a family-owned tablet that was shared with either parents or siblings. TV-viewing appeared to be a popular family-based activity, mostly used as a means to watch movies in the evenings. However, a theme emerged that TVs were frequently engaged as a secondary device, often used passively in the background whilst using another device concurrently (see Theme II: *Experiences and patterns of contemporary screen engagement*). For laptop computers, many participants reported school-related activities, such as during school lessons, searching for information for assignments, communicating with classmates to consult on homework, and storing school homework. Last, video-gaming was reported extensively among boys, with many owning an internet-enabled console. This device was often used as an intermediate to connect and play with friends online. While video-game consoles were considered multifunctional, all boys used them just for gaming purposes.

Girls also reported time spent playing video-game, although unlike boys, this was usually operated using a smartphone rather than a dedicated video-game console.

There was a clear theme emerging around the social nature of screen engagement. Participants often discussed engaging with screens alongside their family and friends, although this differed for boys and girls and largely dependent on the type of screen being engaged. For example, it was common for girls to report co-viewing with their families whilst watching TV as it served as an important family activity to enhance family functioning and facilitate social interaction and emotional connection. In contrast, boys discussed demonstrating co-viewing behaviours indirectly, through the playing of online video-game with friends.

> "*I enjoy playing video-games with my friends online. We all get interested in a game and then we all start playing together*" (p5, boy, age 16)

It was clear from the data that participants were typically sedentary when engaging with screens. With the extensive availability of screens at home, participants felt they had more opportunities to sit to engage in sedentary screen time because of the comfortable nature of the surroundings. Many participants even discussed it was natural to sit whilst using screens, especially when engaging in conventional screen engagement such as TV-viewing. In contrast, some participants reported times when they are more likely to require physical movement when using screens, including playing active video-games on consoles such as Xbox Connect or PlayStation Move or engaging with apps that encouraged walking such as Pokémon GO.

> "*I think if I'm watching TV, it's second nature to just sit down*" (p13, girl, age 14)

3.2.2 Experiences and patterns of contemporary screen engagement

It was common for participants to describe experiences of *binge-watching* behaviours and *multi-screening*. The nature of and the reasons for engaging in these screen-related constructs are reported below.

Binge-watching. On the whole, participants displayed extensive binge-watching practices that extended beyond the use of TV sets, utilising more portable devices such as smartphones and tablets. Those who engaged in binge-watching did so on various platforms including internet-based video-on-demand streaming services. When probed, there was consensus that binge-watching was usually performed in a solitary context, at home (participants expressed limited opportunities to pursue other less sedentary activities), during the weekend, and involved little, if any movement. Interestingly, many participants appeared to withdraw to their bedrooms when engaging in binge-watching, reporting often utilising their smartphones or tablets. This was often justified based on seeking privacy and feeling less conspicuous among family members. It also emerged that tablets were preferred when the TV was occupied by family members, with the tablets enabling them to freely binge-watch their TV shows without being distracted.

> "*I am more likely to binge watch on my smartphone in my bedroom because it's less noticeable to my parents who might not like it*" (p13, girl, age 14)

Interestingly, participants spontaneously acknowledged that binge-watching can become problematic and potentially addictive. This was particularly seen in boys who illustrated several detrimental impacts of binge-watching on their physical and emotional well-being. For example, many statements indicated feelings of guilt, tiredness and restlessness following binge-watching. One boy shared:

> "*I feel really disgusted and sometimes guilty with what I've just done*" (p1, boy, age 17)

Further analysis indicated that binge-watching was often prompted by a fear of missing out; in that participants felt obliged to be part of an overarching, cultural conversation. Participants indicated that a popular TV series provides a topic for discussion among peer groups and that it was important to be able to share reactions and impressions of the series with friends. Participants also appeared to immerse themselves in TV series that provides entertainment and an escape from day-to-day life, which often occurred to avoid boredom. One girl explained:

> *"All my friends were watching it and I wanted to understand what they were referencing"* (p14, girl, age 15)

Multi-screening. The simultaneous usage of more than one screen emerged as a consistent pattern of screen engagement. TVs were most often used in combination with other screens, while video-game consoles were more likely to be used singly. The most frequent combinations of screens included TV-smartphone, TV-tablet, and laptop-smartphone. There was a perception among participants that multi-screening often occurred at home, during the weekend or after school, and involved little, if any, conscious effort.

Further analysis indicated some of the reasons for engaging with dual screens simultaneously. Several participants reported using smartphones as a function of filling time during TV adverts (commercials). Similarly, some felt as if their smartphones were extremely accessible and a useful tool for reducing boredom or providing a distraction if they disengaged from other screens. There were occasions when the TV was on but the program was predominantly being watched by another family member. In these instances, TV-viewing was a background behaviour with the majority of attention focussed towards a smartphone. Finally, participants reported watching TV whilst messaging friends, often with the purpose of discussing storylines and sharing reactions about a mutually favourite TV show.

"*I don't really get into TV, I like it as background noise so I'll sit in front of it but mainly I will have my phone*" (p16, boy, age 15)

3.2.3 Benefits and concerns of contemporary screen engagement

Collectively, participants discussed some potential social and psychological/mental benefits associated with screens and social media although these were often overshadowed by concerns as well. Many participants felt that social media was a valuable aspect of their social lives, used to connect with friends, share ideas, and develop relationships with extended family. Social media was also perceived as a platform to increase social support. This was particularly seen in girls, who strongly expressed a sense of connection and belonging when sharing or posting updates with their friends online. Similarly, participants believed that being involved in social group chats created feelings of being part of a friendship group, reducing isolation, and supporting the planning of mutual social events. One boy discussed:

"*I'm in a group chat with my friends, we talk all the time, I guess it's our way of connecting and planning events*" (p1, boy, age 17)

Interestingly, although many participants highlighted that screens allowed them to stay connected with friends and family, it was often acknowledged that these relationships were less meaningful and somewhat superficial, often describing them as lacking 'real' face-to-face interactions. Ironically, this led to many adolescents expressing that social media wasn't particularly '*social*' and can potentially bring about feelings of loneliness and separation from society.

"*I feel like screens negatively impact relationships because it's meant to be face-to-face and your supposed to share something, but if you are just texting all the time it's not really a relationship*" (p3, boy, age 17)

Some psychological benefits of screens and social media were also discussed. Participants felt that screen time provided some degree of emotional satisfaction, often as a function of watching entertaining media, following humorous social accounts or, for boys, playing exhilarating video-games as a source of relaxation and escape from the day-to-day stressors of school. For example, one boy shared: "*School is overwhelming and I just need to get away for a little bit*" (p6, boy, age 15). Others described an increase in psychological well-being when receiving positive affirmation from friends on social media. This was mostly driven by an influx of Facebook '*likes*' and positive comments when posting content on their personal feeds. This aspect, however, was described as potentially detrimental to emotional health, in that if participants received limited affirmation from peers, it could lead to feelings of stress, dissatisfaction and unfulfillment. Additionally, participants spoke of the social pressures associated with social media, in addition to the constant comparison among peers.

> "*I get really stressed about social media. Sometimes I'll post a picture and get stressed if I don't get many likes*" (p2, girl, age 16)

Some participants discussed how social media can positively influence health behaviours, including the promotion of physical activity, typically through modelling of peers or celebrity influencers. However, this was sometimes perceived as being detrimental in that some participants felt isolated or left out of activities being pursued by friends. Participants also felt that social media could be detrimental to adolescents' mental health, especially if exposed to inappropriate content, such as cyberbullying, upsetting news reports, and unsuitable images. Social media was described as a source of social comparison in which participants illustrated a constant pressure to fit in.

Several messages relating to physical health concerns of excessive sedentary screen engagement emerged, including postural pain, eyesight, and obesity. Late night screen engagement (watching videos on YouTube in bed) were linked with sleeping problems such as sleep onset latency and sleep disruption, with some suggesting that it was detrimental to their daily functions the following day.

> "*I don't sleep well because of screens. I just don't know how to stop. I am completely dead in the morning, I can't function and my brain is just on auto-pilot*" (p6, boy, age 15)

3.2.4 Facilitators of contemporary screen engagement

Facilitators of adolescents' screen time were classified into two broad thematic areas: social-environmental facilitators and device-based facilitators.

3.2.4.1 Social-environmental facilitators

Family and friends. All participants reported that their parents facilitated their screen engagement either directly, such as through co-participation, or indirectly, such as modelling their screen-based behaviours. Participants often cited that their parents, especially fathers, encouraged them to watch TV or movies with them, or more often as a family. This usually occurred during the evening whilst eating dinner, as a way of relaxing and winding down. Some participants expressed that they had mutual interests with their parents, such as a favourite TV show or sports event, meaning that they were more inclined to watch it together. For example:

> "*Actually, my mum and I like the exact same TV shows so it's good because we can just watch them together*" (p8, girl, age 16)

Some older participants expressed that their parents had become more lenient with how much time they could spend on screens compared to when they were younger. This was often cited as a reason for increased screen time. Other participants discussed how they felt more tempted to use screens when their family was engaged in screen time. For example, *"It depends on how much my family spend on their screens because if they're on their phones or iPads then I will be more tempted to do it*" (p16, boy, age 15). However, it did emerge that some parents discouraged their adolescents from spending time in recreational screen-based behaviours, although this was often displaced into other types of sedentary behaviours if it was felt that the activity

contributed to academic enrichment. For example, parents encouraged reading books, engaging in school homework, and practicing musical instruments.

Many adolescents also reported that their friends influenced their screen time. The influence of friends on boys' screen time appeared to be more direct, as a means of encouraging them to co-participate in (online) video-game playing. Whereas girls' screen time was more likely to be influenced by their friends indirectly, as a function of keeping updated with friends in group chats.

Social notifications. Many participants had a strong inclination to frequently check their smartphones throughout the day, and often receiving notifications from social media or other applications, which prompted them to check and use their smartphones. More often, participants reported receiving recurrent notifications from new messages, especially those from friend group chats, endlessly calling for their attention. These notifications were often recognised as being addictive and distracting, although participants generally felt obliged to check them as they wanted to keep updated with their friends. For example:

> "*It's just so addictive. When you hear a notification it's really hard not to look at it especially when it's a fun group chat with your friends and you don't want to miss out*" (p4, girl, age 17)

Despite attempts to turn off notifications, some participants admitted that they were actually more distracted and would eventually check for notifications themselves. Further analysis indicated that checking smartphones for notifications had become a habitual process, even when they were not notified with an audio or visual prompt on their smartphones. Also, many participants also spoke about how notifications, in the form of messages, served as a catalyst of extended, unplanned screen time. This was mostly described as a function to fill time before responding to the next message.

3.2.4.2 Device-based facilitators

It emerged that the availability of internet access can increase the time spent on screens. The ability to access mobile data meant that many participants reported internet-based screen time (opportunities) in more places other than the home where Wi-Fi was mostly utilised, outdoors and on school transport. Other device-based facilitators among participants related to their functional preferences of their personal devices: the size of the device, touchscreen capabilities, and storage capacity.

4 DISCUSSION

In this qualitative study, adolescents provided rich descriptions about their daily screen-based routines, providing insights into the nature, patterns, perceptions and facilitators of their contemporary screen engagement. Consistent with previous research,[30] the data presented here indicated that adolescents are engaged in high amounts of screen time. This consisted of greater time spent on contemporary screens such as smartphones and tablets, engaging in a range of newer digital media such as communicating online, social networking, and streaming online, and lesser time spent on conventional TV sets. The greater time spent on smartphones could be due, in part, to the multiple functions that these devices offer. In line with previous literature,[23] we showed that adolescents' use these devices to carry out several social (e.g., communicating with friends), functional (e.g., setting an alarm) and recreational tasks (e.g., streaming videos). Moreover, smartphones offer persistent access to the internet, offering limitless opportunities to remain connected via digital communication.[31] Therefore, it seems necessary for future research studies to determine effective strategies for the responsible use of contemporary screens by adolescents, paying special attention to the use of smartphones.[16] In addition, there appeared to be a strong sedentary nature of adolescents' contemporary screen time, particularly within the family home environment. With the extensive availability of screens at home, adolescents reported more opportunities to sit, which might have encouraged an excessive amount of time spent in sedentary small-screen recreation.[32]

On the whole, adolescents displayed a wide range of screen-viewing practices. Multi-screening – the simultaneous usage of multiple screens – emerged as a common pattern of contemporary screen engagement among adolescents. This finding is

consistent with the wider literature, demonstrating the high prevalence and centrality of multi-screening in the lives of adolescents.[33] To mitigate the risks involved with excessive screen engagement, we need to better understand why adolescents engage in multi-screening. Here, it emerged that adolescent multi-screening was largely driven by social motives such as being able to communicate or network socially with friends whilst watching peer-mutual favourite TV shows. Consistent with previous qualitative findings,[23] we also found that adolescents proactively engaged in multi-screening because it served as a function to relieve boredom from other media, such as TV commercials. The data reported here, therefore, suggest that the underlying social factors might be important to understand multi-screening among adolescents. This is consistent with the ecological framework whereby individual factors are embedded in a multi-layered approach to behaviours, including social and environmental influences.[34,35] But given the emphasis on social factors in our findings, further work using social theoretical perspectives is warranted. For example, elements from social cognitive theory, social identity theory, and related social networks and social support perspectives may prove insightful.[36,37] This could assist in a greater understanding of the functions such social behaviours serve when using electronic media and screens, and also help researchers deliver effective interventions should it be deemed necessary to change some screen behaviours.

Adolescents sometimes indulged in prolonged sedentary screen engagement, mostly through watching multiple episodes of the same TV series in a single sitting, also referred to as 'binge-watching'.[38] Interestingly, even though some adolescents perceived binge-watching as problematic to their physical and emotional well-being, they admitted it was potentially addictive, especially now that video-streaming services enable non-linear viewing. That is, viewers are no longer required to watch one episode of a TV show at a time each week on TV at home. Instead, in line with our findings, viewers are now able to watch multiple episodes, almost anywhere and at any time on smartphones and tablets. Such efficacy and control over media choice and consumption has been shown to heavily motivate viewers to binge-watch.[39] Our findings also revealed that binge-watching might be an important aspect of adolescents' social lives, with TV series providing entertaining topics for discussion amongst peer groups. This finding was also highlighted by Frayelle, showing that binge-watching might be sustained by social pressure and peer recommendations.[40] These data, therefore, suggest

that the psychological and social processes underpinning binge-watching behaviours might be important to reduce contemporary screen engagement among adolescents.

Time spent in screen-based activities appeared to differ according to the adolescents' sex. This is consistent with other literature, showing that boys spend increasing time using electronic games, while girls engage in more time communicating online, social networking and using computers.[16,18,30] Although sex differences in some screen behaviours have been reviewed in adults,[41] less is known about adolescent screen viewing from this perspective. Therefore, this seems to be an important future research direction.

As shown in the present study, many adolescents felt that contemporary screen engagement offered many social benefits, many of which are supported by scientific literature. Social media was strongly perceived to be an important aspect of their social lives – particularly among girls – in that it enabled them to freely communicate and connect with friends. Indeed, the available evidence supports these beliefs, showing that social media may support adolescents' basic social needs such as those for connectedness, support and communication.[42] There were additional social benefits conveyed by boys, in that video-gaming served as a major venue for the maintenance of friendships. This finding is consistent with the wider literature, demonstrating that video-gaming reinforces social benefits through social interactions and connectedness.[43] Accordingly, it appears that the source of screen-related social benefits differs by sex and screen time domain. These findings should be considered when designing interventions to reduce screen time among adolescents; as to be cautious not to mitigate any overall benefits associated with contemporary screen engagement. It is also important not to neglect the perceived concerns of screen time found in this study, which often overshadowed the abovementioned benefits. The complexity of creating an environment that maximises the potential (social) benefits and mitigates the known harms of contemporary screen engagement will be a challenge for policy makers, and will undoubtedly garner future research.

Data from this study also highlighted several facilitators of contemporary screen engagement, which were mostly categorised as social-environmental facilitators, such as family, friends, and social notifications. Many adolescents felt the need to check their

smartphones throughout the day. This seemed to be heavily prompted by frequent and irregular social notifications such as social media updates and receiving messages from group chats. Similar qualitative findings were found recently, showing that incoming notifications were often a source of irresistibility to use mobile touchscreen devices.[23] Together, these findings are suggestive that smartphone engagement, and precisely checking notifications, may be regarded as an integrated (automatic) habit. That is, a learned behaviour triggered by environmental cues with limited cognitive influence.[44] Indeed, smartphones offer instant gratification that is conducive to unconscious habit-formation.[45] In fact, as also shown in this study, when removing these gratifications, for example, by silencing notifications or setting time limits to attend them, evidence suggests that users experience higher levels of anxiety.[46] This can also be explained by habit-formation and supports the claim that already established habits of use best predict continued use.[47] Therefore, strategies that implement habit-formation techniques, specifically targeting incoming notifications, may be profitable in influencing overall smartphone usage and frequency.

The findings also suggest that family and friends may facilitate adolescents' contemporary screen engagement, which may have implications to screen-reduction interventions. Parents play an important role in establishing a home environment that promotes or hinders the process of adolescents developing healthy habits including screen time. In this study, TV-viewing emerged as an important family activity, often advocated by parents as a way to spend quality time with adolescents. This is supported in another study which found that TV-viewing may be encouraged by parents as a way of fostering communication and increasing quality family time.[48] These data, therefore, suggest that a balanced and collaborative approach to moderation of screen time may be warranted to mitigate family conflict.[32]

4.1 Strengths and limitations

A strength of this study is that it adds evidence to the limited qualitative literature exploring contemporary screen engagement in adolescents, such as their time spent using smartphones and tablets. So far, research on screen time among adolescents has largely focussed on traditional screen use, such as TV-viewing and computer-use. Given that screen-based technology is rapidly changing, it is important that researchers

continue to recognise and keep pace with the shifts in trends and use of contemporary screen-based devices. This includes exploring the nature and context in which various screen-based behaviours occur. Moreover, the semi-structured interview format allowed for the discussion of new topics raised by adolescents and for the nuances to be pursued. Some limitations of this study are also considered. First, a small sample of adolescents from Australia (QLD) was recruited; findings may not be true for children or young adults, nor might they be generalizable to all adolescents in other countries. Future studies need to consider other sociodemographic groups to confirm the key findings observed in the present study. Second, due to time impositions held upon participants, transcripts were not returned for comment; while transcripts were carefully reviewed and transcribed, there is a risk that transcription errors and omissions occurred. Future studies need to consider these factors (e.g., sociodemographic groups).

5 CONCLUSION

This study provides important information about the context, functions, patterns, facilitators, benefits and concerns of contemporary screen engagement of adolescents. Most notably, spending time on newer digital media appeared to be an important aspect of adolescents' social lives. The findings from this study also have implications for the development and implementation of interventions aimed at influencing recreational screen time among adolescents. Specifically, it might be desirable to target the use of contemporary screens (smartphones and tablets), acknowledge the underlying social and psychological factors that influence emerging patterns of screen time (multi-screening and binge-watching), account for the potential (social) benefits associated with different types and contexts of contemporary screen time, recognise the importance of social environmental facilitators (family and friends), and implement habit-formation techniques to influence the excessive use of smartphones (notifications).

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