

Detailing the digital experience: Parent reports of children's media use in the home learning environment

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Abstract

Screen media occupy an increasing role in young children's play and learning environments. This paper advances the current discussion of the changing digital lives of children, with new insights of media use in the homes of Australian families ($N = 406$). Parents reported their child's technology ownership, engagement with traditional and new media, joint media engagement, as well as children's preferences and quantity of media use. From 2014 to 2017, cross-sectional data were collected via media use questionnaire from families with a child 8 years of age or younger. Of all the media activities, children most frequently participated in reading (paper-based or eBooks) and watching television. Children's touchscreen use indicated a variety of choices from the "digital toy box," referring to the numerous apps available and their potential to serve as a medium for play. This data can inform policy and practice of researchers, educators and family engagement specialists and optimize early learning potential prior to formal schooling.

Introduction

A child's home is where they begin to play, and play has been well documented to have importance in domains of physical, social, emotional and cognitive development (Frost, Wortham, & Reifel, 2011; Gleave & Cole-Hamilton, 2012; Hirsh-Pasek & Golinkoff, 2003; Trawick-Smith, Swaminathan, & Liu, 2015; Weisberg, Hirsh-Pasek, & Golinkoff, 2013). When children are playing, they are learning. Play describes an activity that is fun and initiated voluntarily by the child with no extrinsic goals, it should also involve active engagement and some degree of make-believe (Hirsh-Pasek & Golinkoff, 2003, p. 210–211). Given the importance of play in development and learning, it is understandable that changes to how children play can instigate concern by parents and others (Ofcom, 2017; Paik, 2001; Wartella & Robb, 2008).

The appearance of contemporary children's play differs from the childhood that their parents and grandparents experienced. One possible explanation for this is the integration of technology with play, and the prolific rate at which new technologies emerge (Arnott, 2016; Marsh, 2010; Marsh *et al.*, 2015, 2016). Technology refers to "anything that can create, store or process data," and includes electronic toys, touchscreen devices, and can take less concrete forms such as the internet (Johnston & Highfield, 2017, p. 58). Touchscreens are portable electronic media devices

Practitioner Notes

What is already known about this topic

- Play in early childhood has important implications for physical, cognitive, social, and emotional development.
- The appearance of childhood play is changing due to the adaptation of new technologies (eg, touchscreens) in the early years.
- Children engage with screen media more than policies advise.

What this paper adds

- New data detailing young Australian (0–8 years) children's media use activities, focusing on *how* screen time is spent, rather than simply *how long*.
- Parent reports of the touchscreen applications that Australian children use most often.
- Parents' views on the apps their children use most often and the educational value of screen media.

Implications for practice and/or policy

- Policy for children's media use should move away from the blanket phrase "screen time" and provide educators (including parents) with specific guidelines to select quality content to optimize media experiences for young children.
- Detailing the screen media experience and external environment will provide a better understanding of whether digital media are being used to promote play-based learning in the early years.

such as smartphones and tablets that receive touch input, can connect to the internet to download apps (applications) or watch videos (Rideout, 2013).

There is widespread concern that time spent with screen media replaces more traditional forms of play, which some believe to be more valuable (Ahearne, Dilworth, Rollings, Livingstone, & Murray, 2016; Cristia & Seidl, 2015; Hamilton, Hatzis, Kavanagh, & White, 2014; Kirkorian, Wartella, & Anderson, 2008). Fueling these fears, an industry report found that children play with touchscreens more than traditional toys (Michael Cohen Group, 2014). Parents surveyed in the UK indicated that touchscreen use could negatively impact their infants' and toddlers' social development, and replace traditional activities such as outdoor play (O'Connor, 2017). Conversely, parents surveyed in England, Greece, Malta and Luxembourg, and parents in the US, did not view technology as a threat to childhood, but rather as a tool for learning under certain conditions (Palaiologou, 2016; Rideout, 2017). While some parents view play and technology as opposing activities, others are more eager for the possibilities technology brings to play and learning.

Contrary to television, touchscreens are physically interactive, have the possibility to scaffold children's learning, and can provide immediate, contingent feedback in the absence of a social partner, making them possess many similar features to play in the real world (Ingalls, Kaehler, Maloney, Wallace, & Kay, 1997; Lovato & Waxman, 2016; Marsh *et al.*, 2015; Revelle, 2013; Strommen, 1993). For instance, touchscreens make it possible for young children to solve puzzles earlier than they would with physical toys because they may not yet have the dexterity to manipulate the physical pieces (O'Connor, 2017). Play with touchscreens is not limited to the digital world, nor are children restricted to solo use. O'Mara and Laidlaw (2011) describe a children's tea party that combined the use of a touchscreen app with physical toys, blending digital and traditional play. These examples demonstrate the play potential of touchscreens in a variety of domains (eg, creative, dramatic) and settings (eg, digital or multimodal).

In Australia, it is recommended that children ages 2–4 years old limit their screen time to less than one hour per day and spend at least three hours in a variety of physical activities (Australian Government, 2017). Infants under 2 years old should have no screen time at all, while children 5 and older are limited to 2 hours per day. Australia's most recent guidelines fail to advise caregivers on the optimal choices for their child's screen time (Australian Government, 2017). Conversely, the American Academy of Pediatrics' (AAP) screen media policy encourages parents to share the media experience with their children, select high quality, age-appropriate content and permit the use of video communication with children under 2 years of age (Radesky & Christakis, 2016). The lack of instructive guidelines put forth by the Australian Department of Health is unhelpful to those trying to make the most informed choices for children's screen media activities, particularly when Australian children are spending more time with screen media than policies advise (Cliff *et al.*, 2017; Houghton *et al.*, 2015; Rhodes, 2017).

Recent work by Cliff *et al.* (2017) reported that only 17.3% of preschoolers met Australian screen time guidelines, with the majority exceeding one hour per day. Additionally, the Australian Child Health Poll (Rhodes, 2017) found that 63% of infants under two years of age had used screen media—recall that this age group should not have any exposure to screen time according to Australia's Department of Health (Australian Government, 2017). A further 72% of 2–5-year-olds' daily screen time exceeded the guidelines' recommendation of limiting screens to one hour per day in this age group (Rhodes, 2017). Measuring *screen time* fails to detail the media experience, including the content children are consuming, the quality of programming and how developmentally valuable the experience is. Each of these factors influence the impact of screen media on children (eg, Brown, Shifrin, & Hill, 2015; Daugherty, Dossani, Johnson, & Wright, 2014; Li, Subrahmanyam, Bai, Xie, & Liu, 2018; Neumann, 2014).

Research has begun to describe how young Australian children spend their screen time. Coenen, Howie, Campbell, and Straker (2015) reported the reasons and settings parents provided touchscreens to children birth–5 years old, but specific screen media content was not measured. A glimpse into 2–4-year-olds' home media use found screen time was dominated by television viewing, followed by touchscreen use (Neumann, 2015). However, Neumann (2015) acknowledges that a more detailed account of screen time is necessary to develop best practices and quality media experiences, stating, “more empirical research is needed that examines how young children in the [early years] are using tablets at home and for what purpose” (p. 9), as well as which apps and whether a parent is present to scaffold the experience (Neumann, 2017).

A detailed account of what children's media use looks like in Australia is needed, particularly one that goes beyond time-based reports alone. This study aims to detail children's (birth–8 years) media use in Australian families by reporting, not only screen time, but *how* screen time is spent (ie, the preferences, content and context of the screen media experience).

The following research questions were posited: Has young children's media use changed over a four-year period (2014–2017)? How is children's screen time spent in terms of the content and type of media experience (eg, app choices, media platform)? What are Australian parents' attitudes about the educational potential of digital media? Touchscreens can foster play and creativity, but are they actually being used in this way? More information on how parents and children use and choose their touchscreen experiences will be useful to parents and educators seeking to optimize the early learning potential of digital devices. The findings will also provide evidence to inform best practices for screen media use policy guidelines and recommendations.

Method

Participants

Participants included 406 Australian families with a child aged between birth and 8 years old (girls, $n = 178$; boys, $n = 225$; not reported, $n = 3$). Data collection took place over four years (2014–2017). Families were recruited via social media advertisements (eg, Facebook) and word of mouth from the university's surrounding suburbs.

The survey asked parents to describe demographics for themselves (eg, education) and their child (eg, age, gender). Most parents in our sample had obtained a bachelor's degree ($n = 137$) or a postgraduate degree ($n = 140$). The majority of mothers identified themselves as AngloAustralian (73%), 8% identified as Asian and another 8% described themselves as European. The sample was divided into developmental stages based on the child's age, consistent with Australian and AAP guidelines: infants (birth up to 2 years, $n = 40$), preschoolers (2–4 years, $n = 300$) and school-age (5–8 years, $n = 60$). Age data was missing from 6 participants.

The procedures, consent and questionnaire materials were approved by the university's human research ethics committee.

Procedure

This study implemented a cross-sectional design. Survey responses were collected online using Opinio, an online survey tool ($n = 152$) or via tablet- or paper-based methods during a visit to the research lab ($n = 254$).

Materials

The media use questionnaire items were based on Common Sense Media's survey (Rideout, 2013). Parents were asked about their child's media consumption, including specific media activities, favorite apps and time spent with media. We asked parents to report the amount of time (in minutes) their child spent in various media activities (eg, reading, watching television, playing video games) during the previous day. Additionally, parents were asked to indicate the frequency their child participated in various media activities from most frequent, "several times a day," to "has never done this."

In order to detail the specific touchscreen media experience, we asked parents to report how often their child used a touchscreen by themselves or with a parent on a scale of 1 (often) to 4 (never). Parents also indicated how frequently their child performed various activities on a touchscreen device from 1 (often) to 4 (never). These activities included playing educational games, games just for fun and watching television. Parents were also asked to list the apps that their child used most often.

A later subset of data ($n = 135$) collected information about parents' views of educational media via additional survey questions, including whether they thought their child had learned from television or videos. Parents were also asked whether they thought their child had learned from an educational app, and to provide a description of the apps their child has learned from.

Analysis plan

Data were analyzed using IBM SPSS 25 and nVivo software (version 11.2.4). Summary data were examined to address the research questions. Descriptive data for total screen time was calculated, as well as the percentage each type of screen media activity contributed to total screen time. This was calculated for each individual by dividing the number of minutes of a particular screen activity by their total screen time.

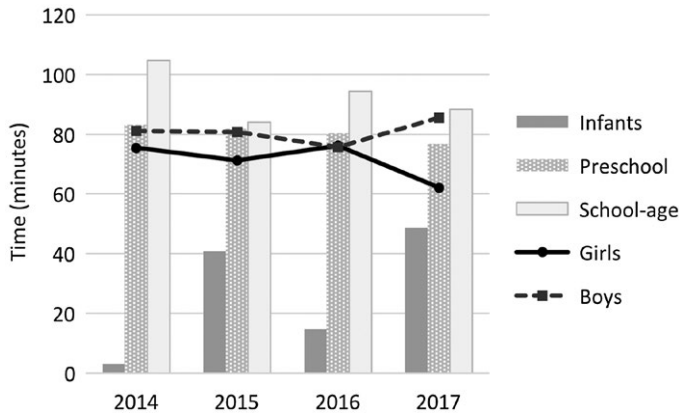


Figure 1: Mean daily screen time by age and gender over 4 years

Results

General screen time

Parent reports of their child's media use revealed some interesting trends. The average daily screen time for 2–4-year-olds has not increased from 2013 to 2017 (see Figure 1). In general, boys spent slightly more time with screens than girls. The most marked difference between boys' ($M = 86$ minutes) and girls' ($M = 62$ minutes) screen time was observed in 2017.

In addition to gender differences, differences between the age groups were also observed. The average daily screen time increased with age, a trend consistent for each year of data collection (Figure 1). See Table 1 for the *ns* for each year of data collection by gender and age group.

The average daily screen time remained largely unchanged over the past four years for the older age groups. However, the adherence to the Australian Department of Health (2017) guidelines has declined over time for infants (Table 2).

Meanwhile, for two- to four-year-olds, the percentage of children adhering to the limit of one hour per day has improved over time. For school-age children, adherence to the 2 hours per day limit has remained relatively constant from 2014 to 2017 (see Table 2).

Detailing screen time: Content and context

In order to understand what comprises "screen time," descriptive data for various media activities were compiled, combining all four years of data collection. Table 3 details the average daily screen time for each media activity, as well as total average screen time. Additionally, the average percentage that each media activity occupies out of the total screen time was calculated (Table 3). Most notable of these results was that across age groups, the greatest percentage of screen time was dedicated to watching television or videos on a TV set. Further, time with a touchscreen was dominated by watching videos rather than playing games, thus indicating children's preference for watching streamed media.

Consistent with parent reports on their child's daily time spent in various media activities during the day prior to survey completion, the frequency with which children participated in various media activities at any given time revealed similar findings. Reading paper-based books, viewing television and using a touchscreen were the most popular daily activities (Table 4). This was the case across individual age groups. Only 4.6% of preschool-age children

Table 1: Subsamples for each year by gender and age group

Year	Girls	Boys	Infants	Preschool	School-age
2014	53	63	10	96	10
2015	40	42	13	44	25
2016	47	74	12	101	8
2017	38	46	5	59	17

Table 2: Percentage of children adhering to Australian screen time guidelines by age group and year

	2014	2015	2016	2017
Infants	75.0	41.7	22.4	0.0
Preschool	50.5	50.0	56.4	64.3
School-age	75.0	73.9	85.7	76.5

Table 3: Average daily time (minutes) of various media activities and their percentage of total screen time

	Infants				Preschoolers				School-age			
	M	Min	Max	%	M	Min	Max	%	M	Min	Max	%
Reading or being read to*	31	0	120	–	33	0	160	–	29	0	120	–
Watching videos or television on a TV set	14	0	105	40	62	0	300	73	56	0	200	64
Watching videos on a touchscreen	5	0	60	25	14	0	150	18	10	0	60	13
Watching videos on a computer	3	0	60	9	1	0	40	3	3	0	45	4
Total TV/Video viewing	22	0	120	74	69	0	300	88	69	0	220	81
Playing video games	0	0	0	0	1	0	180	<1	6	0	120	4
Portable video game player	0	0	0	0	0	0	15	<1	0	0	20	1
Games: touchscreen	3	0	60	11	7	0	240	6	7	0	90	6
Games: computer	0	0	0	0	2	0	240	<1	1	0	30	1
Educational software: computer	1	0	30	5	2	0	120	1	2	0	60	2
Computer: other	0	0	10	11	0	0	15	1	1	0	30	<1
Total screen time	26	0	125	–	81	0	365	–	90	0	280	–

*Reading unspecified includes eBooks and paper-based books.

(2–4-year-olds) had never used a touchscreen device and less than half of infants had never used a touchscreen.

Table 4: Percentage of children's use of various media platforms by age

	< 2 years		2–4 years		5–8 years	
	Daily	Never	Daily	Never	Daily	Never
Read or be read to (paper-based books)	86.1	2.8	93.8	0	87.7	0
Watch DVDs	11.4	65.7	22.2	4.7	7.1	3.6
Watch TV	22.9	34.3	66.9	2.4	62.5	5.4
Use the computer	2.9	80	2.9	51.1	14	12.3
Read eBooks	0	91.4	2.1	80.4	1.8	61.4
Use a touchscreen	17.1	48.6	26.1	4.6	29.8	3.5

Touchscreen use

Parents reported how often their child used a touchscreen by themselves or with a parent. Children used a touchscreen more frequently with a parent (38.1%) than they did by themselves (20.4%). We also asked parents to indicate the frequency their child engaged with different types of apps. Educational apps were the most commonly used apps with 56% of parents indicating their child engaged “often” or “sometimes” with apps designed to teach children something, while this combined rate for apps just for fun was 45%, and creative apps was 47%.

There were 302 responses to the question “Which apps does your child use most often?” ABC iView or ABC kids was mentioned by 36 parents, the next most popular was YouTube (23), and 17 parents specified no apps were used. Here, a preference for watching streamed media, akin to traditional television, was found. Within these data, apps where interactivity is notionally limited to the ability to choose episodes and then control media were surprisingly popular given the plethora of more interactive apps available.

Learning and screen media

A subsample of parents ($n = 135$) were asked about their views regarding the educational potential of technology. The majority of parents (92%) agreed or strongly agreed with the statement, “technology can be used as a useful learning tool,” and only 8% reported that they were neutral. A further 68.5% of parents indicated that their child had learned from an educational app. Respondents were then asked which app, and what the app was aiming to teach their child, with qualitative data revealing the majority of parents identified specific learning (87% of the 128 responses).

However, these data indicate a narrow concept of what “educational” activities for this age group are, with a significant focus on apps that teach curriculum-based skills and concepts, and apps that focus on drill and practice activities. Parents who responded to this question focused on a narrow range of specific skills children are developing with the app, including ideas such as “counting, memory, patterns, puzzles” or broad academic notions such as “literacy, numeracy.” It is noteworthy that only a very small number of responses moved beyond traditional curriculum to include learning as “building” (for the Lego App), “brushing teeth” (for the “my teeth” App) or “emotional regulation/intelligence” and “social skills, spatial awareness, problem solving” (for the Daniel Tiger App). Qualitative analysis of apps identified indicated a significant proportion of apps that focus on the child consuming premade content, or engaging with restrictive, rules-based games. “Quality” media is a concept that is somewhat challenging to define, with data here indicating limited parental understanding of quality and a focus on drill and practice activities

and traditional curriculum areas. Given the affordances of creative and open-ended apps and opportunities for rich problem solving with interactive games, the lack of these preferences in these data is somewhat challenging.

Discussion

The purpose of this study was to paint a more detailed picture of the intricacies of screen time. Below, findings are discussed within the context of specific research questions.

Has young children's media use changed from 2014 to 2017?

Despite small samples sizes for infants and school-age children, the average screen time increased with age. This trend was found for each of the four years of data collection. This finding is consistent with data found in the UK (Ofcom, 2017) and the US (Rideout, 2017), where older children tend to spend more time with a screen compared to younger children. Similarly consistent with global trends, boys' average daily screen time for each year was greater than that of the girls.

Current Australian recommendations state that children under 2 should not be exposed to screen media at all (Australian Government, 2017). Our results indicated that since 2014, the proportion of infants adhering to Australia's screen time guidelines has decreased. However, these guidelines are at odds with those of the AAP, which makes an exception with video communication for children under 2 years of age (Radesky & Christakis, 2016). Research has found that certain types of screen time, such as video chat, are not harmful to this age group (McClure, Chentsova Dutton, Barr, Holochwost, & Parrott, 2015; Myers, Lewitt, Gallo, & Maselli, 2016; Radesky & Christakis, 2016). Thus, screen time is not a detailed enough measure to determine the impact of digital media on developmental outcomes; details of the screen media experience should be considered.

How is children's screen time spent?

The most popular screen media activity for children was watching television, reflected in both the percentage of overall screen time and the frequency of screen media use. This result is consistent with findings in Australia, the US and the UK which have reported that television remains the most heavily used screen media activity, despite the availability of touchscreen devices (Neumann, 2015; Ofcom, 2017; Rhodes, 2017; Rideout, 2017). Further, specific touchscreen use findings revealed that touchscreens were used as a portable television more often than to engage with physically interactive apps. Given that screen media use guidelines are largely based on television research, these results provide evidence that the recommendation for children's media use are still relevant because their screen time remains dominated by television viewing, despite the availability of touchscreen devices and potential for them to change the traditional screen media experience.

Parents indicated that they shared the touchscreen media experience more often than their child used the device alone. This was a positive finding because joint media engagement, or sharing the screen media experience with a caregiver, improves meaning making and learning outcomes. Adults can scaffold the material and help children understand the content, and build on it to create future learning opportunities (Barr, Muentener, Garcia, Fujimoto, & Chávez, 2007; Neumann, 2017; Skouteris & Kelly, 2006; Takeuchi & Stevens, 2011; Zack & Barr, 2016; Zimmermann, Moser, Lee, Gerhardstein, & Barr, 2016).

What are Australian parents' attitudes about the educational potential of digital media?

The majority of parents had positive views about the educational value of technology; none of the parents surveyed disagreed with the statement that "technology can be used as a useful

learning tool.” Additionally, two-thirds of parents indicated that their child had learned from an educational app. These findings are consistent to positive views that parents in the US have of their children’s screen media use (Rideout, 2017; Vittrup, Snider, Rose, & Rippy, 2016). In the US, more than two-thirds of parents are satisfied with the educational media available to their child, and the majority felt that their child had benefitted from screen media use, citing benefits to learning, creativity, and even social skills (Rideout, 2017).

A significant proportion of the apps that parents indicated their children had learned from revealed a focus on consuming premade content, or engaging with rules-based games. These activities are contrary to Hirsh-Pasek and Golinkoff’s definition of play (2003) and align more closely with newer conceptions of play such as Edwards, Nuttall, Mantilla, Wood and Grieshaber’s notion of “digital play” (2015) or Bird and Edwards (2015) concept of “hybrid play,” where traditional play merges with digital activities in an integrated or “bidirectional” manner (p. 1115). In this way, play is not limited to the constraints of the app. Instead, it can promote children’s exploration and imagination, inspiring play that transcends the two-dimensional space (Marsh *et al.*, 2015).

Are touchscreens being used to foster play and creativity?

Our findings indicated that children chose a variety of apps from the digital toy box, including apps for both learning and creating. Touchscreen apps can share many features with traditional play (Marsh *et al.*, 2015,), and may encourage multimodal play that blurs the line between digital and traditional play (O’Mara & Laidlaw, 2011; Yelland & Gilbert, 2017). However, touchscreens were most often used as a portable television with apps such as YouTube or ABC iView (an Australian broadcasting company), or engaging in limited educational content, rather than for taking advantage of the interactive affordances of the device.

Touchscreens are able to provide a digital play environment with seemingly infinite possibilities. Apps themselves can share many features with traditional play (Marsh *et al.*, 2015, 2016), and may encourage multimodal play that blurs the line between digital and traditional play (O’Mara & Laidlaw, 2011; Yelland & Gilbert, 2017). With touchscreen use especially, it is difficult to disentangle screen time from playtime because of the multiple ways in which screen media can promote play. It is important for future work to detail children’s screen media activities with context to determine the potential impacts of these different experiences on young children, and to ascertain whether their screen time is also doubling as play time.

Limitations

It is notable that our sample was a largely affluent, highly educated group of families. Future surveys of Australian families’ use of media should include a more diverse range of participants from different geographical locations (eg, rural) and educational levels in order to strengthen the ecological validity of the results. However, reports in the US and the UK have found that families of lower income and minority status actually spend more time with screens, and access to touchscreens is similar regardless of socioeconomic status (Kabali *et al.*, 2015; Marsh *et al.*, 2015). Therefore, we would anticipate that our results are a conservative estimate of media use trends in the general Australian population.

The survey was subject to social desirability bias by relying on parent reports of children’s media use. Social desirability bias is the tendency of respondents to answer questions in a way that makes themselves appear favorable with respect to cultural norms and expectations (Krumpal, 2013). Parents may have underreported children’s media use, given the stigma associated with children’s exposure to screen media and the restrictions on screen time (Australian Government, 2017; Radesky & Christakis, 2016; Vandewater & Lee, 2009). Additionally, the incidence of

reading was quite high in our sample, and reading estimates have also been susceptible to the confounds of social desirability bias (Hofferth, 1999).

Experience sampling provides a way to improve on the limits of self-report by collecting data at random intervals throughout the day (Larson & Csikszentmihalyi, 2014). With the use of an experience sampling app, parents can report detailed screen time statistics of their own, as well as their child's screen media. A program that tracks children's time spent with various apps could also supplement the experience sampling data. These details would help researchers and practitioners gain more accurate accounts into specific screen media experiences in the home learning environment (eg, play).

Implications and conclusions

Children are using screens more than policies advise, and parents need to make informed choices when choosing screen activities for their children. If children are going to be using these devices regardless of public policy, what are the best ways we can make screen time, playtime? A simple displacement hypothesis that claims time spent with screens is less valuable than traditional activities falls short because it fails to account for the potentially valuable play experiences that screen time can offer (Bird & Edwards, 2015). Arnott (2017) succinctly describes how to optimize technology for play and learning:

High quality experiences with technologies do not happen by chance. Technologies do not do the pedagogic planning for us, despite their interactive properties. Yet ... through open ended play and fun, carefully framed, scaffolded and supported experiences, children can have enriched technological journeys. (p. 14)

Parents, educators and practitioners can make the most of new technology such as touchscreens, by selecting high-quality, well-designed apps that encourage a variety of domains of play and by sharing in the media experience (Neumann & Neumann, 2015). Even though the appearance of play is changing, the role of parents as early educators remains constant.

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Conflict of interest statement

The authors have no conflicts of interest to declare.

Ethics

All procedures and materials were approved by the Swinburne University Human Research Ethics committee. All participants were informed of the voluntary nature of their participation and could omit any questions and discontinue at any time. All participants' data have been anonymized.

Data access

The authors do not have permission to share the data.

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