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Trends in technological advance: Implications for sedentary behaviour and obesity in screenagers

It has been claimed that the research into the health effects relating to sedentary behaviours like video game playing appear to be somewhat trivialized (Griffiths, 2005). To date, the research literature has generally shown that sedentary lifestyles are greatly influenced by increasing technological interaction and involvement. More specifically, research on television and videogame use by children and adolescents tends to show associations with obesity and that increased sedentary lifestyle often has positive correlations with obesity (e.g., Shimai, Yamada, Masuda & Tada, 1993; Johnson & Hackett, 1997; Vandewater, Shim & Caplovitz, 2004; Marshall, Biddle, Gorely, et al, 2004), although some research on frequency of video game play has reported no significant relationship with body mass index (Wack & Tantleff-Dunn, 2009).

Work and leisure have become increasingly technologised and remote for both adults and children (Griffiths, 2002; 2009; Widyanto & Griffiths, 2006). Activities that were once done in an external environment (e.g., an amusement arcade, cinema) can now be done in the home and/or workplace. This has led to 'cocooning' where a majority of activities can be done without ever having to leave the

home and/or the work desk (Griffiths & Wood, 2000; Griffiths, 2003a). Furthermore, technology is becoming increasingly convergent (e.g., cell phones with Internet access, *Blackberrys*, etc.) and there is increasing multi-media integration (De Freitas & Griffiths, 2008; Griffiths, 2008a; King, Delfabbro & Griffiths, 2010a). As a consequence, people of all ages are spending more time interacting with technology in the form of Internet, videogames, interactive television, mobile phones, MP3 players, etc. For adults, the increasing time is mostly work-related (and is also related to the fact people are generally working longer hours) whereas for teenagers is more likely to be leisure-related (Griffiths, 2002; Griffiths, 2003a; 2003b; 2009; King et al, 2010a).

Young people's use of technology, the so-called 'screenagers', has increased greatly over the last two decades and a significant proportion of daily time is spent in front of various screen interfaces most notably videogames, mobile phones (e.g., SMS) and the Internet (e.g., social networking sites like *Bebo*, *Facebook*, etc.; Griffiths, 2000; 2001). It has been claimed that children's increasing time spent engaging with these newer technologies may contribute to childhood obesity in 'screenagers' (Griffiths, 2004).

Technology has changed the way that society views social and asocial activities (Griffiths, 2003). Although many people's interactions with technology are asocial (e.g., a single person engaging in some kind of screen-based activity), many of the activities carried out are social activities (playing and chatting to others in an online videogame or during online gambling on bingo or poker, chatting via *Twitter* or other social networking sites) (Cole & Griffiths, 2007; Meredith, Hussain & Griffiths, 2009). The new types of technological (social) interaction appear to be more sedentary in nature and may have implications for obesity.

Sedentary lifestyles and mobile technologies

Technology users of all ages are becoming increasingly more sedentary in lifestyle although (somewhat paradoxically) technology is becoming increasingly mobile because of wireless-based technologies (Griffiths, 2007; De Freitas & Griffiths, 2008). New interactive technologies (e.g., *Nintendo's Wii* console with *Wii Sports*, *Wii Fit*; games such as *Rock Band*, *Guitar Hero*) are more activity-based and have the potential to reverse the sedentary nature of interactive technology (Brown, 2006). However, a recent review by Daley (2009) stressed caution on this topic and asserted that active gaming was no substitute for real sports and activities. She also stressed the need for high-quality randomized, controlled trials to evaluate the effectiveness and sustainability of active gaming.

It should also be stressed that technological advance appears to have different effects at different stages of human development at least in terms of activities like video game playing (e.g., Griffiths, Davies & Chappell, 2004). The younger the person, the more likely that technology may affect some aspect of their moral, cognitive and/or social development (Griffiths, 1998). There is some evidence that both adults and

children appear to be 'dependent' on various forms of interactive technology (e.g., videogames, Internet) although there are debates around technological excess, abuse and addiction (Widayanto & Griffiths, 2006; Griffiths, 2008b) although the context of excessive play is critical (Griffiths, 2010). However, when it comes to obesity, the operational definition of behavioural excess makes little difference as the person is likely to be engaged in a sedentary lifestyle.

Given the increasing role that technology plays in people's lives, it is somewhat surprising that there is so little empirical research in the area of changing technology and sedentary. Technology appears to have pervaded most areas of both working and social lives across all age groups. Technologies bring new ways of working and playing. One of the major limitations of research in this area is that technology is viewed homogeneously. Asking whether increased playing of video games leads to increased sedentary behaviour depends upon which games across which platforms. The most important aspect is to realise that research does not happen in a vacuum and that the technological landscape is ever changing and ever evolving. By the time findings from a longitudinal study are complete, the findings may already be irrelevant and/or obsolete.

Regardless of whether excessive technology use may be termed an 'addiction' it is generally agreed that some individuals' technology usage may be considered problematic. Griffiths (2008c) has argued that researchers still face the task of identifying the mechanisms - biological, psychological and/or social - that underlie problematic involvement in technology and the implications that arise from this (e.g., increased sedentary lifestyles). There needs to be development of technological taxonomies that categorises and groups technologies in terms of structural characteristics as it is these dimensions that

may help determine and/or pinpoint features that promote excessive use (and in turn increased sedentary behaviour). Such taxonomies are starting to be developed in specific areas such as video games (e.g., King, Delfabbro & Griffiths, 2010b) but need to be developed more generally. Their intention was to demonstrate the ways in which the psychological effects of these features may contribute to the development of problematic styles of video game playing (a consequence of which may be increased sedentary behaviour).

The extent to which these features contribute to excessive playing requires further empirical investigation. It is hoped that the development of such taxonomies will act as a catalyst for future research into the health effects of excessive video game play. King et al (2010a) argue that much of this research should perhaps be directed at child and teenage groups because these individuals (a) represent the potentially most vulnerable demographic group in the population, (b) are highly likely to be exposed to new technologies as a natural consequence of their involvement with the Internet and new media, (c) are increasingly more likely to be 'early adopters' of these new technologies (the so-called 'screenagers') and be more 'techno-savvy', and (d) are perhaps less 'techno-phobic' than the adult population.

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