Journal Pre-proof

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PII: S0091-7435(21)00482-5

DOI: https://doi.org/10.1016/j.ypmed.2021.106909

Reference: YPMED 106909

To appear in: *Preventive Medicine*

Received date: 19 April 2021

Revised date: 29 November 2021

Accepted date: 30 November 2021

Please cite this article as: D.L. Harvey, K. Milton, A.P. Jones, et al., International trends in screen-based behaviours from 2012 to 2019, *Preventive Medicine* (2021), https://doi.org/10.1016/j.ypmed.2021.106909

International trends in screen-based behaviours from 2012-2019.

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Abstract

Many adults accumulate considerable time in screen-based behaviours, some of which have been associated with negative physical and psychological health outcomes. The aims of this study were to characterise contemporary patterns of screen-based behaviours and describe their temporal trends by global region, age, sex and education. Data covering the period 2012-2019 were obtained in aggregated form from GWI (previously known as Global Web Index), a global market research company. Temporal trends in the duration of adults' (16-64 years) self-reported personal computer, laptop and tablet use, mobile phone use, broadcast television viewing, online television viewing and games console use were described using data from over 2 million participants from 46 countries. For each activity, participants selected from response options ranging from less than 30 minutes to more than 10 hours. Internationally, daily screen time increased from approximately 9 hours in 2012 to 11 hours in 2019, with notable increases in mobile phone use (approx. 2 hours), online television viewing (approx. 37 minutes) and games console use (approx. 26 minutes). Differences were seen in the duration of time spent engaging in screen-based behaviours across regions and between socio-demographic groups, with Latin America, the Middle East and Africa and younger age groups seeing greater increases in overall screen time. The findings have important implications for

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health behaviour surveillance and for research exploring the links between screen-based behaviours and health.

Keywords: Screen Time, Temporal Trends, Industry Data, Adults

Introduction

Across numerous contexts, many adults accumulate considerable time in screen-based behaviours, such as watching broadcast or streamed content on television, playing computer and videogames or using a smartphone or tablet (Birken et al., 2011, Sivanesan et al., 2020). A growing body of predominantly observational research has linked higher amounts of screen time with negative physical and psychological health outcomes, including cardiovascular disease, all-cause mortality and depression (LeBlanc et al., 2017; Stamatakis et al., 2011; Wang et al., 2019). However, not all forms of screen time may have the same associations with health. There is evidence of differential associations between screen use and some health markers depending on whether screen use was mentally active or passive (Kikuchi et al., 2014).

Early research on sedentary behaviour and its association with obesity and chronic diseases used screen-based behaviours as a proxy for sedentary time and tended to focus primarily on television viewing (Biddle et al., 2017). In recent years, the way in which people watch television has changed, with traditional forms of viewing (broadcast via cable or satellite) being replaced or supplemented with internet streaming services, such as Netflix and YouTube (Prince et al., 2017). In addition, there have been considerable developments in the volume and accessibility of screen-based devices, some of which may promote sedentary behaviour (Biddle et al., 2017). In particular, mobile phones have transformed into multifunctional devices that can be used for browsing the internet, engaging in social networking, playing videogames and streaming content (Lepp et al., 2013). Despite these developments, there is little empirical evidence on temporal changes in the type and duration of screen device use.

The rapid evolution of technology has led some researchers to question whether current academic research on sedentary behaviour accurately reflects contemporary

behaviour patterns (LeBlanc et al., 2017). In particular, self-report questionnaires still tend to measure time spent watching broadcast television or using a computer rather than time spent on contemporary behaviours, such as using a mobile phone or tablets and accessing associated streaming services (LeBlanc et al., 2017). Self-report questionnaires, such as the Sedentary Behaviour Questionnaire (Rosenberg et al., 2010), the Past Day Adults' Sedentary Time Questionnaire (Clark et al., 2013) and the Longitudinal Ageing Study Amsterdam Sedentary Behaviour Questionnaire (Visser and Koster, 2013) all include items about television viewing and computer/video game use but do not capture the full breadth of screen-based activities undertaken today. One recently developed questionnaire, the International Sedentary Assessment Tool (Prince et al., 2017) does attempt to address this issue by capturing a wider range of sedentary behaviours, but this remains a limited example.

Data collected in non-academic sectors, often for commercial or regulatory purposes, may better reflect contemporary behaviour patterns than that from academic studies as these data can be collected more rapidly. Companies such as Ofcom and Nielsen routinely collect data that provide useful insights into the technology market (Nielsen, 2020; Ofcom, 2020). Academic use of industry data may further understanding of the use of screen-based technology, providing an up-to-date picture of which screen-based behaviours are prevalent and how usage may have changed over time. The aims of this study were to utilise industry data to characterise contemporary patterns of screen-based behaviours, describe temporal trends in screen-based behaviours by region, age, sex and education, and consider implications of the findings for future research.

Method

Data Source

Data for this study were extracted from a dataset created and maintained by GWI (previously known as Global Web Index), a market research company that provides global insights into the use of electronic media by adults (GWI, 2021a,b,c). GWI conduct biannual or quarterly surveys as part of their ongoing market research activity into global electronic media usage, recruiting from 46 countries across five continents. Surveys include items pertaining to use of a range of screen-based

activities including the use of personal computers, laptops and tablets, mobile phones and traditional television (GWI, 2021b; further details below). Data collection was via online self-report questionnaires administered through panel providers including Dynata and Toluna (GWI, 2020). The full methodology of the surveys is available elsewhere (GWI, 2020). GWI are a corporate member of the European Society for Opinion and Market Research (ESOMAR) and adhere to the International Chamber of Commerce/ESOMAR International Code on Market, Opinion and Social Research and Data Analytics (ESOMAR, 2021). They are also a corporate member of the Market Research Society (MRS), the Interactive Advertising Bureau (IAB) Europe and IAB United Kingdom, which demonstrates their commitment to follow ethical procedures when conducting research (IAB Europe, 2021; IAB United Kingdom, 2021; Market Research Society, 2021). This study involved secondary analysis of existing data; thus, ethical approval was not required.

Sample

Recruitment into GWI surveys was conducted by the panel survey providers, with the target population being internet users aged 16-64 years in each country. Quotas were set on age, sex and education status of participants, whose responses were weighted to ensure that the sample was representative of a country's online population aged 16-64 years (GWI, 2020). To ensure the target sample size was reached, participants were over-recruited in each sub-group as between 5 and 15% of respondents were removed during data cleaning. The final global sample size for each year was: 2012, n=60,200; 2013, n=153,650; 2014, n=166,600; 2015, n=193,750; 2016, n=204,500; 2017, n=364,500; 2018, n=438,750; 2019, n=550,500; 2020, n=689,000. Details on the most recent sample size for each country can be found at https://www.globalwebindex.com/data-coverage.

Survey

The data used in the current study were collected from 2012-2019. The annual data comprised bi-annual surveys combined for 2012 and quarterly surveys combined for each year from 2013 to 2019. Time spent in selected screen-based activities was assessed using the following question, which remained unchanged throughout the period of study: "On an average day how long do you spend on the following types of media?". Five screen-based behaviours are examined in this study: online via a

personal computer/laptop/tablet; online via a mobile phone; traditional television; online television; and games consoles. For each activity, participants selected from the following response options: less than 30 minutes; 30 minutes to 1 hour; 1 to 2 hours; 2 to 3 hours; 3 to 4 hours; 4 to 6 hours; 6 to 10 hours; more than 10 hours; and 'do not use'. Mean duration of each screen-behaviour was derived using response category mid-points (for example, less than 30 minutes = 15 minutes). An estimate of total screen-time was derived as the sum of the five individual screen behaviours. Prior to data being made available for the current analysis, survey responses were cleaned to ensure good data quality following the GWI methodology. This included checking survey completion time, detection of patterned answers and using logic traps to identify illogical or contradictory responses. The survey was completed in each respondents' local language. However, in some countries, for example Austria, Canada and Egypt more than one language was available.

Data analysis

During the preliminary analysis, normality was checked for each of the behaviours studied and a sufficient number of outcomes were normally distributed. Therefore, data are reported as mean and standard deviation throughout this paper. Data were made available by GWI in aggregated form, comprising the number of participants selecting each response option to each question, stratified by country and selected social/demographic indicators (described below). As such, data were not amendable to statistical testing for temporal changes or between group differences. Accordingly, our analysis seeks to highlight substantive trends in the data which have significance for public health surveillance and intervention design. Results are presented at the international level and stratified by age (16-24, 25-34, 35-44, 45-54, 55-64 years), sex, education (school to age 16, school to age 18, trade/technical school or college, university degree, postgraduate degree) and global region (Asia-Pacific, Europe, Latin America, Middle East and Africa, North America as defined by GWI; see the supplementary file for country composition of each region). To establish a total estimate of screen time the aggregated data for each behaviour in a given year was converted to a mean estimate using the mid-point (for example, 1-2 hours = 1.5 hours). The mean estimates for each of the five behaviours in a given year were then summed to establish the overall screen time estimate for each year.

Results

Table 1. Temporal trends in daily per-capita duration (hr:min) of screen-based behaviours from 2012-2019 (sum of: personal computer/laptop/tablet, mobile, traditional television, online television and games console). Data are mean with standard deviation.

	2012		2013		2014		2015		2016		2017		2018		2019	
Region*																
World	9:20	(10:06)	9:49	(10:15)	10:04	(10:46)	10:04	(10:54)	10:27	(11:14)	10:46	(11:35)	10:51	(11:41)	11:15	(11:58)
AP	9:05	(9:41)	9:18	(9:26)	9:40	(10:02)	9:33	(10:05)	10:01	(10:34)	10:33	(11:13)	10:34	(11:14)	10:53	(11:30)
Europe	8:31	(9:41)	9:03	(9:26)	9:09	(10:02)	9:17	(10:05)	9:25	(10:34)	9:30	(10:28)	9:34	(10:38)	10:06	(11:05)
LA	10:38	(10:55)	11:38	(11:33)	12:19	(12:11)	13:10	(12:35)	13:13	(12:30)	13:16	(12:30)	13:12	(12:23)	13:43	(12:59)
MEA	10:14	(10:52)	10:54	(11:27)	11:15	(11:52)	11:44	(12:15)	11:43	(12:30)	12:12	(12:43)	12:23	(12:48)	12:40	(12:46)
NA	10:38	(10:56)	11:36	(12:09)	11:39	(12:06)	11:1[illegible]	(12:13)	11:48	(12:33)	11:21	(12:19)	11:44	(12:50)	11:56	(13:53)
Age (years)																
16-24	10:12	(10:57)	10:33	(10:53)	11:02	(11:26)	10:46	(11:19)	11:10	(11:38)	12:02	(12:16)	11:48	(12:08)	11:51	(12:09)
25-34	10:02	(10:19)	10:28	(10:22)	10:46	(10:56)	10:54	(11:12)	11:19	(11:30)	11:34	(11:50)	11:40	(12:01)	12:07	(12:21)
35-44	8:42	(9:20)	9:12	(9:31)	9:28	(10:04)	9:33	(10:18)	10:10	(10:55)	10:07	(10:58)	10:24	(11:09)	11:00	(11:36)
45-54	8:06	(8:30)	8:39	(9:02)	8:37	(9:07)	8:46	(9:32)	9:01	(9:49)	9:05	(10:09)	9:20	(10:30)	10:07	(11:12)
55-64	7:49	(7:48)	8:15	(8:21)	8:14	(8:35)	8:02	(8:26)	8:17	(8:53)	8:07	(9:00)	8:34	(9:42)	8:52	(9:56)
Education[ǂ]																
School to 16	9:41	(11:28)	10:01	(11:28)	10:20	(11:49)	9:47[¥]	(10:40)[¥]	9:45	(11:13)	10:15	(12:06)	10:40	(12:17)	10:18	(11:39)
School to 18	9:00	(10:08	9:33	(10:31	9:46	(11:00	9:47	(11:01	10:0	(11:19	10:3	(11:50	10:3	(11:42	11:0	(12:06

		)		)		)		)	2	)	6	)	5	)	5	)
Trade school /college	9:20	(10:15)	9:54	(10:20)	10:08	(10:53)	10:08	(11:03)	10:22	(11:06)	10:53	(11:24)	11:04	(11:46)	11:28	(12:05)
UG Degree	9:21	(9:42)	9:46	(9:50)	10:05	(10:19)	10:10	(10:39)	10:36	(11:06)	10:46	(11:09)	10:51	(11:13)	11:06	(11:23)
PG Degree	9:46	(10:17)	10:17	(10:27)	10:34	(10:56)	10:52	(11:33)	11:36	(11:36)	11:24	(11:34)	11:34	(11:52)	11:41	(12:07)
Sex																
Male	9:21	(10:09)	9:41	(10:01)	10:00	(10:41)	9:59	(10:48)	10:24	(10:49)	10:36	(11:26)	10:49	(11:36)	11:01	(11:48)
Female	9:19	(9:59)	9:57	(10:18)	8:33	(10:48)	10:27	(10:58)	10:29	(11:22)	10:57	(11:42)	10:52	(11:41)	11:18	(12:05)

*AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America.
[Ŧ]UG Degree = Undergraduate Degree, PG Degree = Postgraduate Degree
[¥]Midpoint used due to anomalous data.

Total screen time, which comprised of personal computer, laptop and tablet, mobile phone, traditional television, online television and games console use, from 2012-2019 is summarised in Table 1. Internationally, daily mean per capita screen time increased from approximately 8 hours in 2012 to 11 hours in 2019. The greatest increase was observed in Latin America, which exhibited a rise of approximately 3 hours during the period studied. In each survey year, the highest volume of screen time was observed among the 16-24 and 25-34 age groups, with total screen time typically declining with age. Within education groups, there has been a greater increase in usage among the more educated. Throughout the period of study, total screen time was similar in males and females.

Temporal trends in daily duration of time spent in the five behaviours of interest are presented in Figure 1. Personal computer, laptop and tablet use declined by approximately 1 hour a day between 2012 and 2019, while daily mobile phone use increased by approximately 2 hours a day over the same period. Use of traditional television reduced across the seven-year period, whilst there was a slight increase in online television and games console use.

Figures 2-6 illustrate temporal trends in use of personal computer, laptop and tablet (Figure 2), mobile phone (Figure 3), traditional television (Figure 4), online television (Figure 5) and games console (Figure 6), stratified by region, age, education and sex. There is variation in the vertical axis (daily duration hr:min/day) across each of the six figures to highlight trends over time rather than facilitate comparison of absolute durations between behaviours.

Figure 2 shows a decline in the time spent on a personal computer, laptop and tablet for all regions between 2012 and 2019, with the greatest decrease in the Asia Pacific region. There was also a decrease in the time spent using a personal computer, laptop and tablet in both sexes and across all age and education groups. Findings show that the 25-34 age group and individuals who have higher levels of education had the highest levels of time spent on these devices.

Figure 1. International temporal trends in daily per-capita duration (hr:min) of screen-based behaviours from 2012-2019.

Figure 3 shows that time spent online via a mobile phone increased each year across all regions, with the greatest increases being observed in Latin America (3 hours approximately) and the Middle East and Africa (2 hours approximately). In each survey year, the younger age groups consistently had the highest volume of time spent on a mobile, with findings demonstrating that mobile phone use decreased with age. There was, however, an increase over time in duration of mobile phone use across all age groups and education groups, and among both males and females.

Figure 4 shows that time spent watching traditional television declined over time across all regions, with the greatest reduction occurring in North America. Nevertheless, North America still had the highest levels of television viewing time across each survey year. Traditional television viewing time decreased across all age groups between 2012 and 2019. The oldest age groups consistently had the highest amounts of television viewing time, with viewing time increasing with age. Television viewing time also decreased for both sexes, with females having higher

amounts of television viewing time than males across each survey year. There were no clear differences between education groups.

Figure 5 depicts an increase in the volume of time spent watching online television, which was observed in all regions, age groups, education groups and for both sexes. The most notable differences were observed across age groups with younger people having the highest amounts of time spent watching online television.

Figure 6. provides a breakdown in games console use over time by region, age, education, and sex. Increases in time spent on a games console were observed for all regions, age groups, education groups and both sexes. Notable differences were observed across age groups with younger people spending a greater volume of time on a games console compared to older age groups. It was also observed that males consistently reported more time on a games console than females across each survey year.

Figure 2. Temporal trends in daily per-capita duration (hr:min) of time spent online (via personal computer/laptop/tablet), stratified by (A) global region, (B) age-group, (C) education, (D) sex.

AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America

Figure 3. Temporal trends in daily per-capita duration (hr:min) of time spent online (via mobile), stratified by (A) global region, (B) age-group, (C) education, (D) sex.

AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America

Figure 4. Temporal trends in daily per-capita duration (hr:min) of time spent watching traditional television, stratified by (A) global region, (B) age-group, (C) education, (D) sex.

AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America.

*Midpoint used for school to 16 group in 2015 due to anomalous data.

Figure 5. Temporal trends in daily per-capita duration (hr:min) of time spent watching online television, stratified by (A) global region, (B) age-group, (C) education, (D) sex.

AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America

Figure 6. Temporal trends in daily per-capita duration (hr:min) of time spent playing on a games console, stratified by (A) global region, (B) age-group, (C) education, (D) sex.

AP = Asia Pacific, LA = Latin America, MEA = Middle East and Africa, NA = North America

Discussion

Using data collected over the period 2012-2019 from over 2 million participants, we describe international temporal trends in the duration of screen-based behaviours. We observed notable increases in the duration of overall screen time across all sub-groups during the period of study, with the greatest increases occurring in Latin America, the Middle East and Africa and among younger age groups. Findings also indicate temporal changes in the types of screen-based activities being undertaken across the globe, with mobile phone use, online television viewing and games console use increasing across the eight-year period. This has been accompanied by a decrease in personal computer, laptop and tablet use and traditional television viewing. These findings have important implications for public health surveillance of screen time and future research exploring the links between screen time and health.

Our study has demonstrated a decrease in levels of traditional television viewing across the eight-year period of study. Television viewing is one of the most researched screen-based behaviours and has consistently been associated with negative health outcomes (LeBlanc et al., 2017; Saunders et al., 2020). Our findings suggest that online television viewing, or other screen behaviours, may have replaced some of the time previously spent watching traditional television. At present, it is not clear whether there are postural differences when engaging in traditional versus online television viewing. There is, however, evidence that traditional television viewing promotes unhealthy eating through advertisements, which may, in part, be the mechanism linking television with adiposity (Biddle et al., 2017). Recent evidence indicates that internet streaming services tend to have a lower frequency of adverts than traditional television (Vizcaino et al., 2020) suggesting that it may not be appropriate to infer that the health detriments associated with traditional television will be applicable to newer forms of television. Future research should differentiate these types of television viewing, in order to establish their specific links with health and well-being.

Time spent online on a mobile increased considerably between 2012 and 2019. This is concurrent with an increase in smartphone ownership during this period and improvements in device capability (Statista, 2021). The extent to which smartphones promote sedentary behaviour or physical activity remains unclear (Alley et al., 2017; Biddle et al., 2017; Lepp et al. 2013). Smartphones and tablets can be used whilst standing still or moving around (Alley et al., 2017) and new devices such as smart watches and tablets have design features that may discourage or disrupt prolonged periods of sedentary behaviour (Barkley et al., 2015). There are also potential positive outcomes associated with certain types of screens with a recent narrative review outlining the usefulness of commercial video games in reducing symptoms of depression and anxiety (Kowal et al., 2021). Collectively, this research highlights the potential benefits that some forms of screens possess and highlights the importance of assessing the associations between contemporary screen-based behaviours and health outcomes.

Given the increasing use of smartphones it is striking that many of the self-report tools currently used to measure screen time focus primarily on television viewing and leisure time computer use (Vizcaino et al., 2019). A recent review found that amongst questionnaires designed to assess screen-based behaviours, television viewing was assessed in 72% of questionnaires and computer and/or videogame time in 39% of questionnaires (Prince et al., 2017). However, no information was included on the percentage of questionnaires that assessed mobile phone use (Prince et al., 2017). Therefore, it seems timely to review existing physical activity and sedentary behaviour tools to ensure research is capturing the expanding breadth of screen-based behaviours (Gunnell et al., 2018). We concur with the recommendation of Ross et al. (2020) that screen time measurement should be expanded in research and surveillance to include a variety of screen-based behaviours and to assess the domain in which use occurs. There is also a need to better assess the postures and co-occurring activities that accompany screen-use. This will help establish potential mechanisms linking screen behaviours with health markers and aid the development of behaviour change interventions.

We observed a notable increase in screen time over the period of study, consistent with previous research in Australia, Canada, the Netherlands and the United States

of America (Chau et al., 2012, Prince et al., 2020, van der Ploeg et al., 2013, Yang et al., 2019), but the greatest increases in screen time were observed in Latin America and the Middle East and Africa. Many countries within Latin America and the Middle East and Africa are classified as low- or lower-middle income according to The World Bank (The World Bank, 2021). These findings are consistent with previous research indicating that access to technology, and in particular screen ownership, is expanding rapidly within developing countries (LeBlanc et al., 2017). For example, smartphone ownership in emerging economies increased from 18% in 2013 to 47% in 2018 (Silver, 2019). This rise in screen-based behaviours in low- and middle-income countries may be reflective of the epidemiological transition (Katzmarzyk and Mason, 2009) and indicates that without intervention, populations in these settings may spend increasing amounts of time engaged in screen-based behaviours, as already demonstrated in high-income countries. Overall, these changes are likely to be detrimental to health, indicating the need for strategies and interventions to focus on low- and middle-income countries.

Perhaps unsurprisingly, we found that younger age groups, those aged 16-24 and 25-34, had the highest amounts of time spent on each of the behaviours studied, apart from traditional television viewing. This is consistent with previous research indicating age-related differences in screen-behaviour patterns (Herman and Saunders, 2016). In the United States, in 2018, for example, individuals aged 18-34 spent a greater proportion of their day accessing apps and the internet via a smartphone and engaging with television connected devices, such as watching DVDs and using games consoles, compared to older age groups (Nielsen, 2018). In the United Kingdom, a 2018 survey by Ofcom found that adults aged 55-64 were more likely to report using any type of television compared to those aged 16-24 (Ofcom, 2018). Comparatively, adults aged 16-24 were more likely to report using a games console compared to those aged 55-64 (Ofcom, 2018). Consistent with Herman and Saunders (2016), our findings suggest that interventions aimed at changing the time spent using screens should be tailored to age-specific preferences and patterns of use.

A strength of this study is the use of large-scale international data to describe temporal trends in screen behaviours and explore differences for a range of socio-

demographic sub-groups. Use of industry data enabled the exploration of trends in contemporary screen-based behaviours, which are often omitted from academic research. A limitation is that country-specific samples were recruited to be representative of the online population rather than be nationally representative of the resident population as a whole. In addition, no data were collected in adults over 65 years of age, due to difficulty in recruiting a sufficient number of participants in this age group where internet penetration is low (GWI, 2020). In such countries, internet users are more likely to be young, urban and educated (GWI, 2020). The questionnaire used by GWI to assess screen use has not been formally tested for reliability and validity. Our estimate of overall screen-time may be inflated due to possible overlap in questionnaire item coverage (for example, streaming television on a tablet), failure to account for screen multi-tasking and due to the use of categorical, non-mutually exclusive response options. Finally, as noted in the methods, the data were provided to us in aggregated form, such that formal statistical testing of temporal changes or between group differences were not possible. It is worthwhile to note that given the very large sample size, formal hypothesis testing would likely have produced small, notionally statistically significant, p-values in most instances.

Conclusion

This study used data from over 2 million participants, collected over an eight-year period, to explore international temporal trends in the duration of screen-based behaviours. The results demonstrate that screen time is increasing globally, with Latin America, the Middle East and Africa and younger age groups seeing the greatest increases. Additionally, the ways in which people are engaging with screens is changing, with large increases being seen particularly in mobile phone use. Findings indicate a need to review existing screen time measures to establish how effectively they capture contemporary behaviour patterns and update them accordingly. It also highlights the need for policies to acknowledge that all parts of the world, and particularly lower income regions are seeing increasing rates of screen use, which may have implications for public health and well-being.

Acknowledgments

The authors would like to thank GWI for providing the data for this research, Simon Kemp (Kepios) for his expertise on industry data and Prof Lee Shepstone (University of East Anglia) for his help with the analyses.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. Danielle L Harvey is supported by a Faculty of Medicine and Health Sciences PhD studentship from the University of East Anglia.

Author Contributions

Danielle L Harvey: Conceptualisation, Methodology, Formal Analysis, Data Curation, Writing – Original draft, Visualization. **Karen Milton:** Conceptualisation, Methodology, Writing – Review & Editing, Visualization. **Andy P Jones:** Conceptualisation, Methodology, Writing – Review & Editing, Visualization. **Andrew J Atkin**: Conceptualisation, Methodology, Writing – Review & Editing, Visualization.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests

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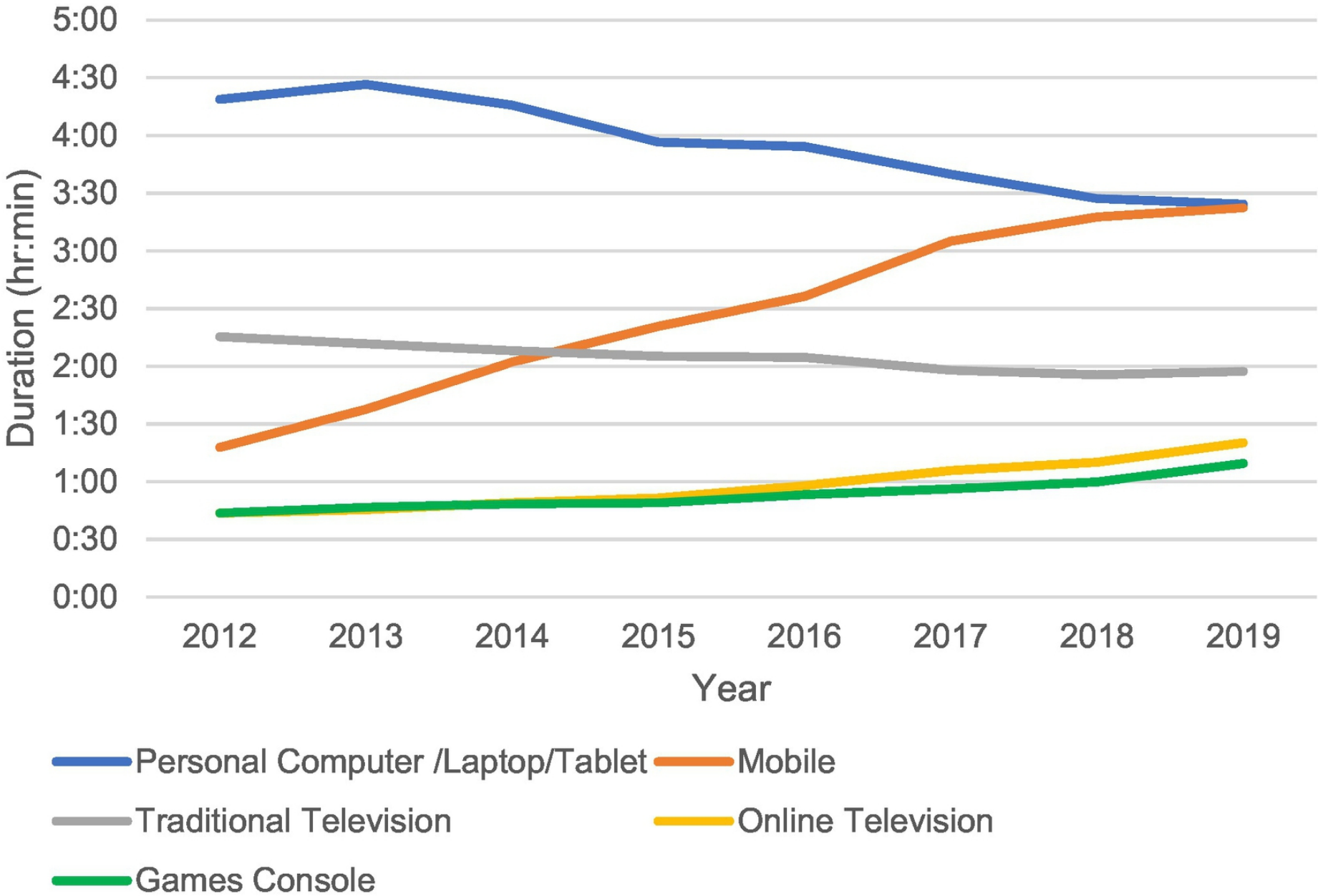
Highlights

- Daily screen time increased between 2012-2019 particularly in Latin America
- Screen use was highest in 16-24 and 25-34 age groups across all survey years
- Traditional TV viewing has decreased while mobile phone use has increased
- Industry data on technology use can provide insights for public health research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4:30
4:00
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Duration (hr:min)
2012
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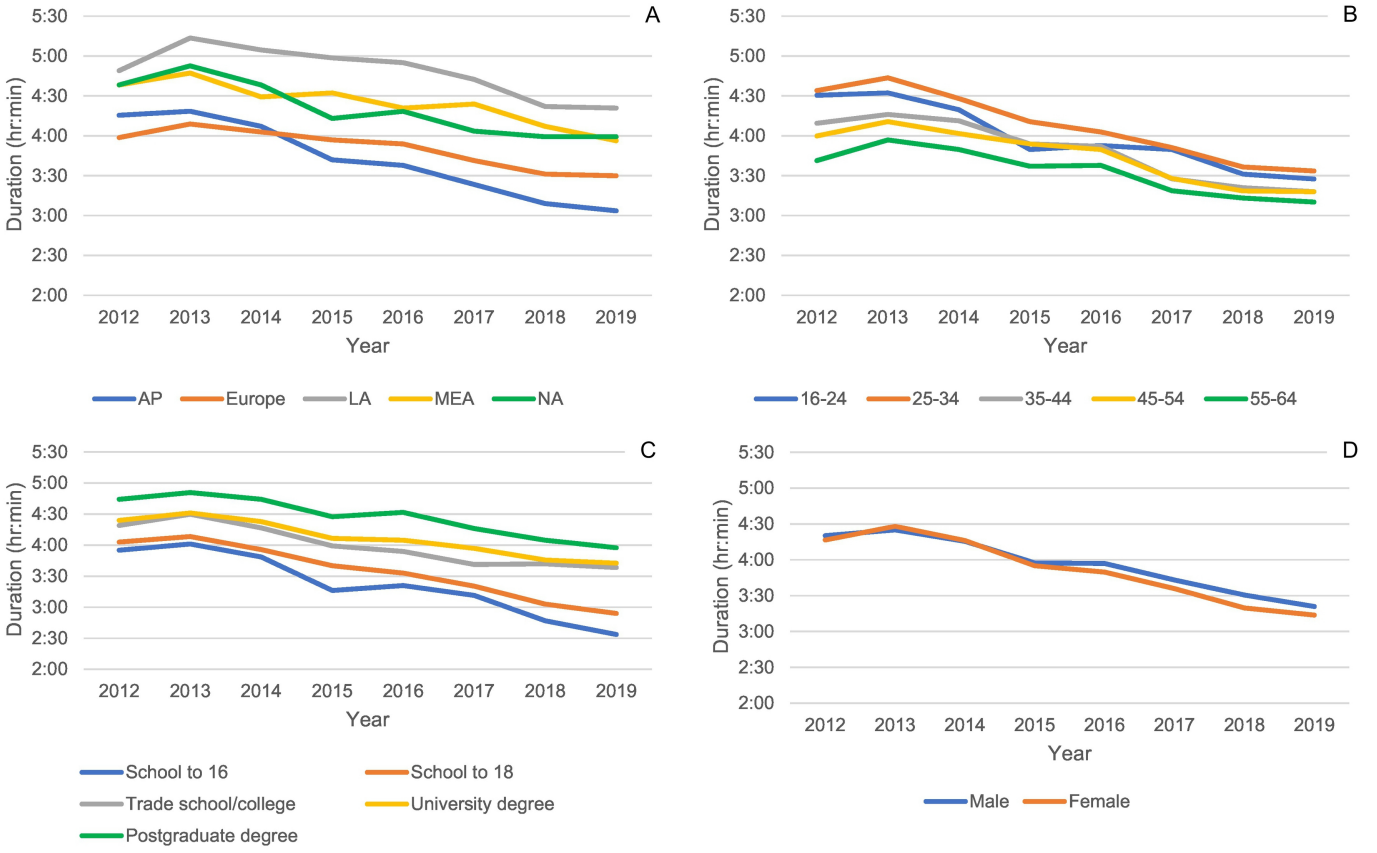
2015
2016
2017
2018
2019
Year
Personal Computer /Laptop/Tablet
Mobile
Traditional Television
Online Television
Games Console

Figure 1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2012
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2016
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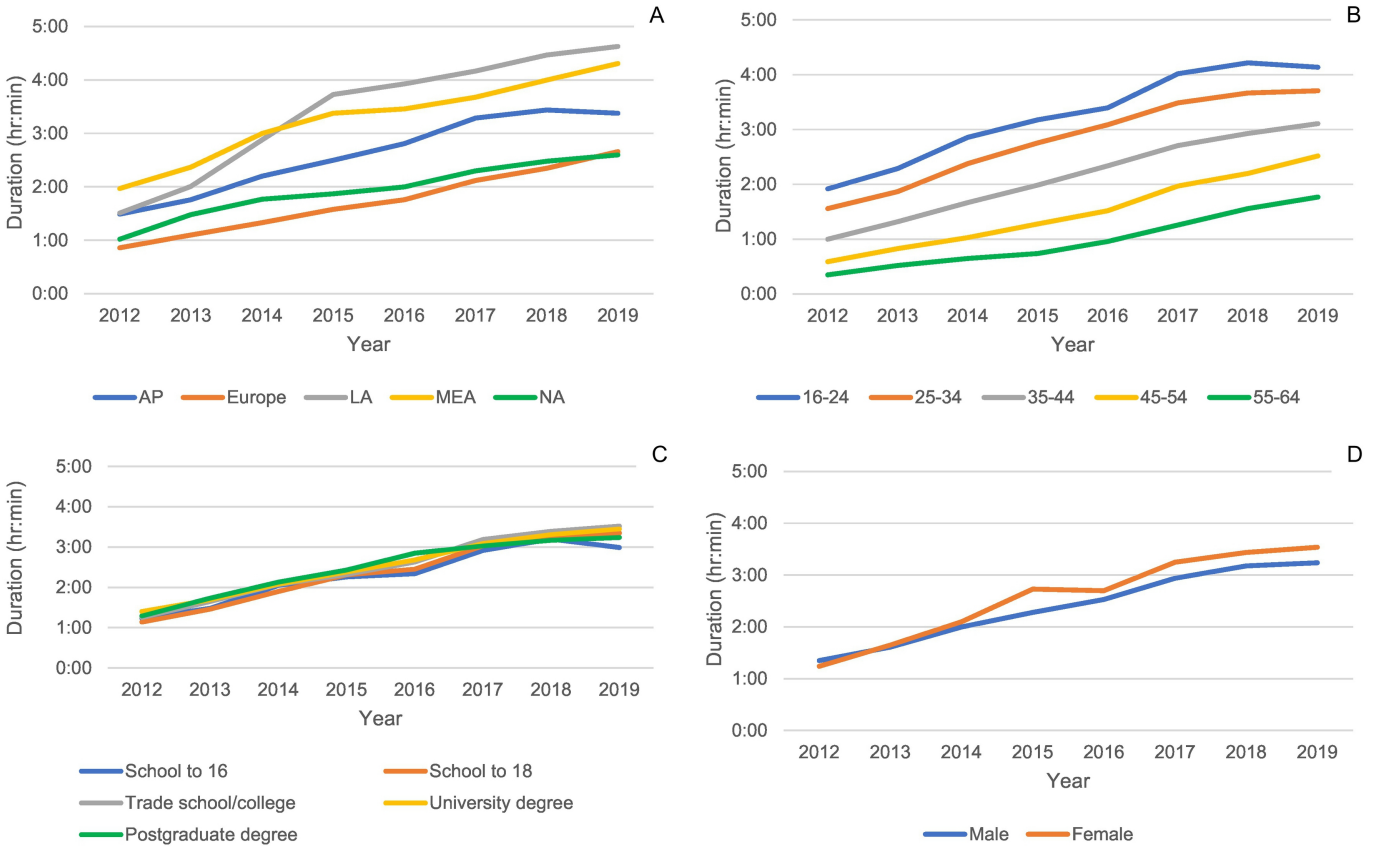
2018
2019
Year
AP
Europe
LA
MEA
NA
B
16-24
25-34
35-44
45-54
55-64
C
School to 16
School to 18
Trade school/college
University degree
Postgraduate degree
D
Male
Female

Figure 2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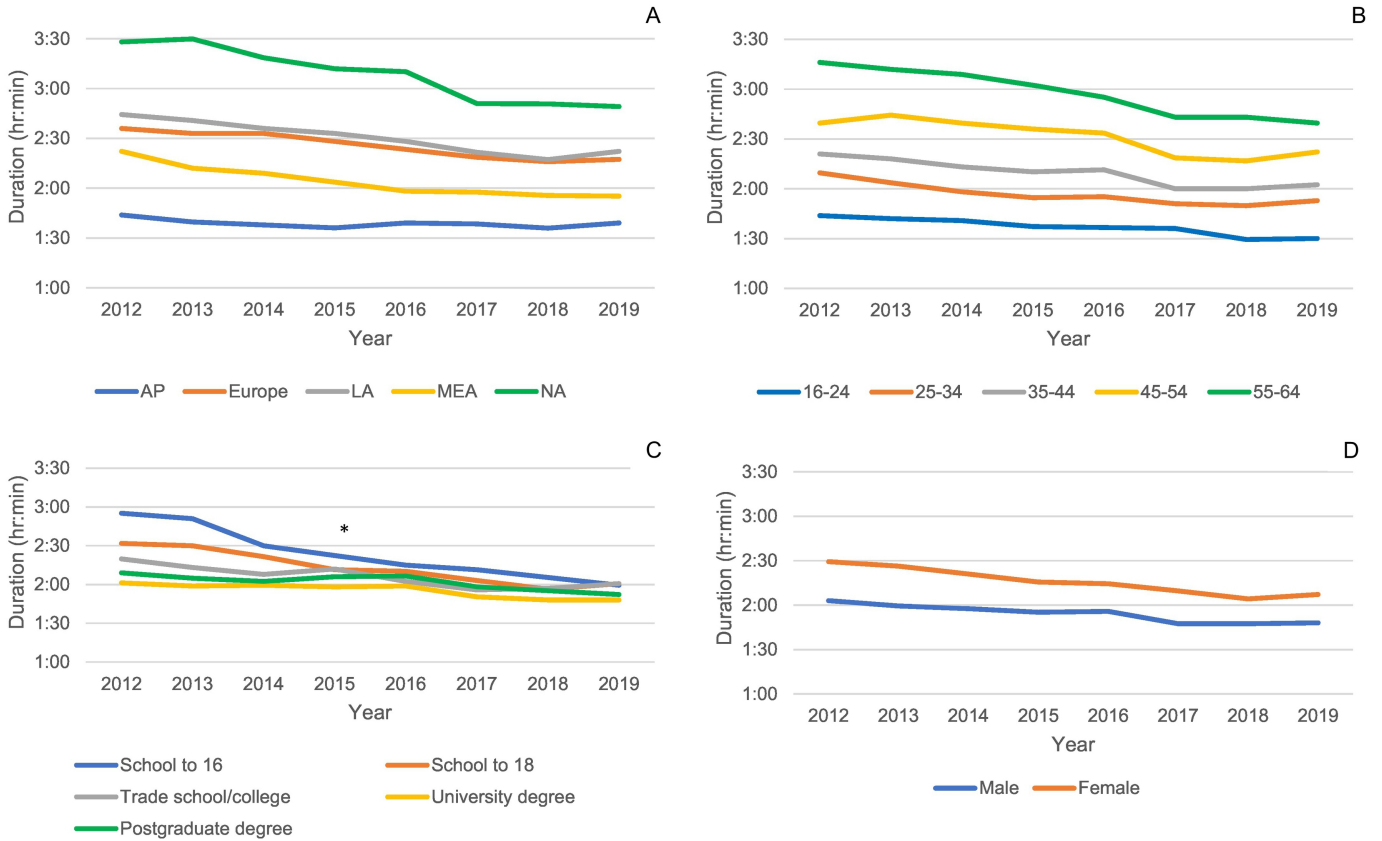
C
School to 16
School to 18
Trade school/college
University degree
Postgraduate degree
D
Male
Female

Figure 3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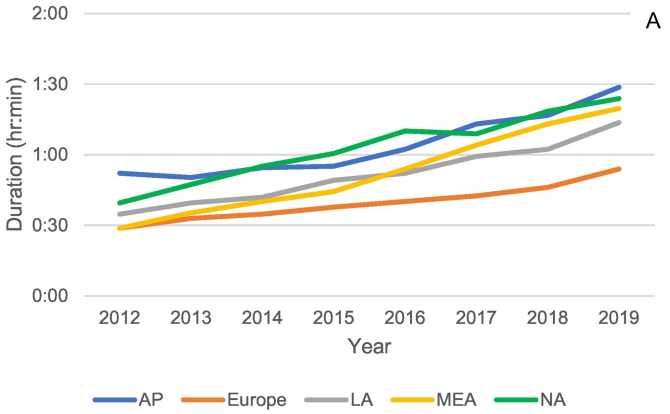
School to 16
School to 18
Trade school/college
University degree
Postgraduate degree
D
Male
Female

Figure 4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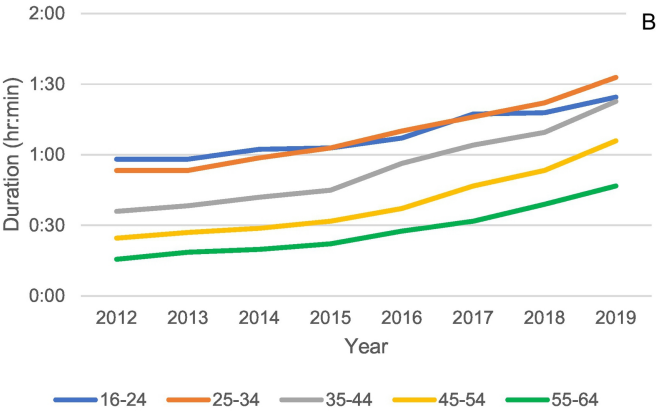
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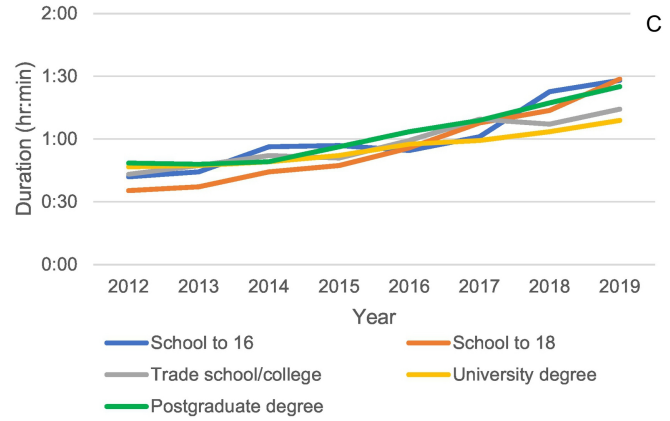
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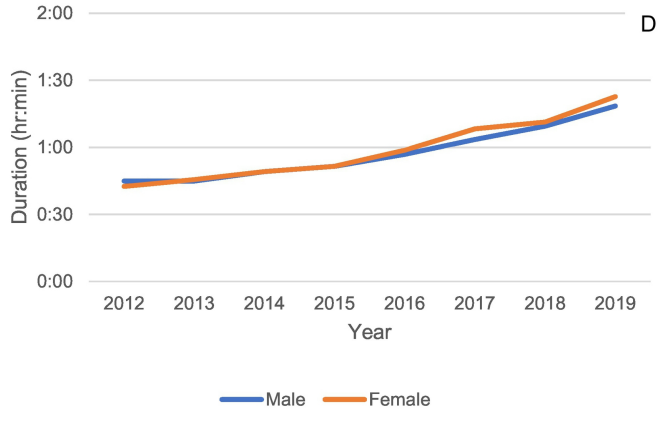
School to 16
School to 18
Trade school/college
University degree
Postgraduate degree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2:00
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Duration (hr:min)
2012
2013
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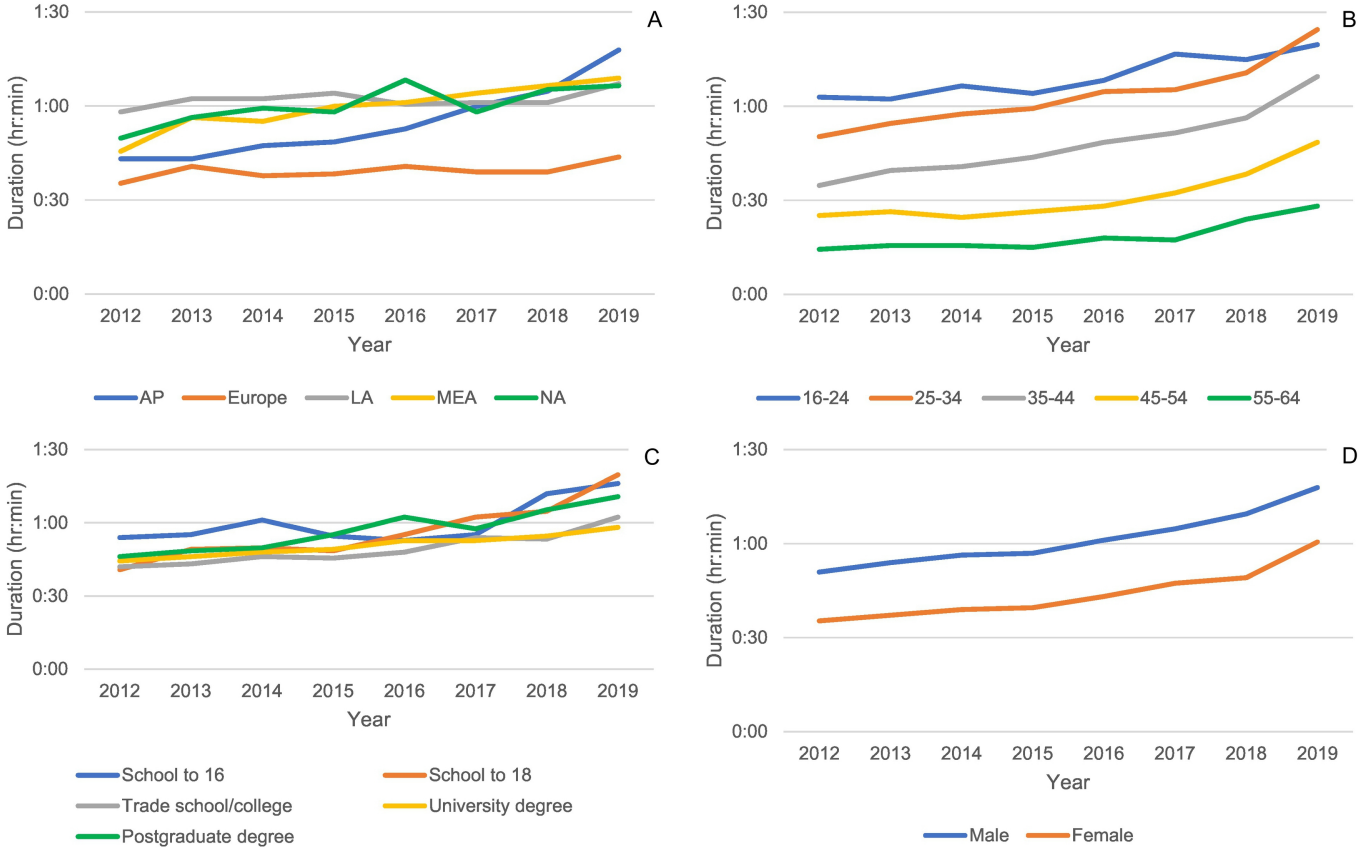
2019
Year
Male
Female

Figure 5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Duration (hr:min)
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Year
AP
Europe
LA
MEA
NA
B
16-24
25-34
35-44
45-54
55-64
C
School to 16
School to 18
Trade school/college
University degree
Postgraduate degree
D
Male
Female

Figure 6