

Associations between social media usage and alcohol use among youths and young adults: findings from Understanding Society

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ABSTRACT

Background and Aims Given the decline in alcohol consumption and rise in technological use among young people, there is a need to investigate whether technology use might influence how young people drink. This study explores how social media use and changes in social media use over time could affect alcohol use among youths. **Design** The UK Household Longitudinal Study (Understanding Society). **Setting** United Kingdom. **Participants** Participants aged 10–15 ($n = 4093$) and 16–19 ($n = 2689$) from the youth and main survey interviewed in 2011–13, and followed-up in 2014–16 (aged 10–15 $n = 2588$, aged 16–19 $n = 1057$). **Measurements** Self-reported social media usage on an average day (no profile/non-daily/less than an hour/1–3/4+ hours use), drinking frequency (never/one to three times/weekly) and binge drinking frequency (never/one to two/three/more than three times) in the past month. Covariates included sex, age, educational status, household income, urban/rural, number of friends and life satisfaction. **Findings** Among 10–15-year-olds, compared with those who used social media for less than an hour, those with no profile [odds ratio (OR) = 0.41, 95% confidence interval (CI) = 0.25–0.67] and non-daily users (OR = 0.49, 95% CI = 0.33–0.72) had a lower risk of drinking at least monthly, whereas those with 1–3 hours' use (OR = 1.44, 95% CI = 1.14–1.81) and 4+ hours' use (OR = 2.08, 1.47–2.95) had a greater risk. Among participants aged 16–19, a lower risk of binge drinking three or more times per month was found for those with no profile [relative risk ratios (RRR) = 0.29, 95% CI = 0.17–0.48] and a higher risk for those with 4+ hours' use (RRR = 1.47, 95% CI = 1.03–2.09). Longitudinally, among 10–15-year-olds, those who had increased their social media usage versus no change were more likely to have increased their drinking frequency (OR = 1.89, 95% CI = 1.45–2.46). Some social media use at baseline (rather than none) was predictive of increased drink and binge drinking frequency over time among youths and young adults. **Conclusions** Heavier social media use was associated with more frequent alcohol consumption among young people in the United Kingdom.

Keywords Adolescence, alcohol, binge drinking, internet use, social media, young adults.

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INTRODUCTION

The decline in alcohol consumption among young people is a phenomenon observed globally [1–3], yet the factors underpinning this change are not understood. One possible explanation, among others, is the impact of new technology such as the internet on young people's leisure time, providing new ways of socializing [2,4,5]. Of particular interest is the rapid increase in social media use. In 2006, approximately a third of people in the United Kingdom were using social media sites,

increasing to approximately four-fifths in 2016, with usage being highest among the youngest 16–24-year-old age group [6]. Social media platforms may provide a virtual space where young people can socialize, potentially replacing physical spaces such as bars and nightclubs. Admissions to nightclubs in the United Kingdom have fallen by 23% from 2010 to 2015. [7]

To our knowledge, only one study to date has specifically explored whether the use of digital technologies could influence non-drinking, and found a small positive effect of gaming among boys [8]. However, in this study and

many others, more frequent users of digital technologies were more likely to be heavier alcohol drinkers [9–13]. For example, one cross-country study found daily use of Facebook and Instagram to be associated with hazardous alcohol consumption among youths [9]. However, of the studies that examined digital technologies, few have focused upon virtual socializing or social media platforms directly [9,12,13]. In longitudinal studies, baseline internet use was found to be predictive of future alcohol use [11,14]. However, the study by Chiao *et al.* [11] did not explore the effect of changes of internet use over time. The study by Sun *et al.* [14] was on a selective sample of students with behavioural or economic challenges. Neither looked at social media use directly.

Studies which have explored the relationship between social media use and alcohol consumption have focused upon the effects of alcohol-related content on social media, and have generally found an influential effect on alcohol consumption [15,16], rather than use of social media platforms more generally, or assessing whether social media use could influence non-drinking. The aim of this study is to explore how social media use may be related to drinking patterns among youths and young adults in the United Kingdom, including whether it could be related to non-drinking, and how changes in social media use may impact upon changing drinking patterns over time.

METHODS

Study sample

This study utilizes data from Understanding Society: the UK Household Longitudinal Study (UKHLS), which has been collecting annual information from the original sample of UK households since 1991 (when it was previously known as The British Household Panel Study (BHPS) [17,18]. The sample is based on participants aged 10–15 years and 16–19 years in wave 3 (2011–13) and followed-up in wave 6 (2014–16), as these waves have consistent questions regarding social media use and alcohol consumption. Data were drawn from the youth self-completion questionnaire (aged 10–15) and the young adult self-completion questionnaire (aged 16–19) which participants completed in private, administered by trained interviewers in participants' households. Baseline (cross-sectional) models are conducted on the full data available at wave 3 to maximize the available sample (aged 10–15, $n = 4093$; aged 16–19, $n = 2689$). Longitudinal models are based on those with data from waves 3 and 6 (aged 10–15, $n = 2588$; aged 16–19, $n = 1057$). Ethical approval was granted ahead of data collection by the University of Essex Ethics Committee [19]; further ethical approval was not needed.

Variables

Social media use

In waves 3 and 6, participants were asked whether they belonged to social media sites, including Facebook, Myspace and Bebo (yes/no). Those who responded 'yes' were then asked: 'How many hours do you spend chatting or interacting with friends through social web-sites on a normal weekday?'. Responses included none, less than an hour, 1–3 hours, 4–6 hours and 7 or more hours. A new variable to indicate overall social media use was created comprising the following categories: 'no-profile' (those not on social media sites), 'non-daily user', 'less than an hour' (reference), '1–3 hours' and '4+ hours'. Among those aged 16–19 years, 'no-profile' and 'non-daily users' were combined to form 'non-users' due to the small sample size of those with no profile ($n < 90$).

Alcohol use

In waves 3 and 6, participants were asked if they had ever had an alcoholic drink (yes/no), which we refer to as 'drinker' and 'never drinker', respectively. Of those who responded 'yes', drinking frequency was measured via the question asking how many times they had drunk alcohol during the past month. Responses included; never, once only, two to three times, one to two times a week and most days. Those who responded 'never' were grouped together with 'never drinkers'. Binge drinking frequency was based on whether participants had drunk five or more drinks on a single occasion in the past month (16–19-year-olds only), categorized as none (including never drinkers), once, twice, three to five, six to nine or 10 or more times. When modelled as an outcome variable, alcohol use was dichotomized into never versus at least monthly among 10–15-year-olds, and into the groups never (reference)/one to three times a month/at least weekly among 16–19-year-olds. The reason for the dichotomy among 10–15-year-olds was due to there being few of those who drank at least weekly ($n < 90$).

Change in social media and drinking frequency

Change over time was modelled via subtracting the full response variables at wave 6 from wave 3 for social media usage, drinking frequency and binge drinking frequency. From this information, changes in social media usage were categorized into no change, decreased usage and increased usage. Similarly, changes in drinking were dichotomized into no increases versus increased drinking. Those who had decreased their drinking during the period accounted for fewer than 9% of the sample, hence the reason for the dichotomy.

Covariates

Covariates included sex, age in year and the equalized household income scale as a measure of social and economic position, which drinking is known to vary across [20]. In addition, urban/rural locality and participants' educational/employment status (at school/further education/university/employed/not employed/other) were adjusted for similar reasons. Traditionally, non-drinking has been found to be associated with low sociability and worse mental health [21,22], so we also adjusted for the number of friends and life satisfaction. Participants were asked to report the number of close friends that they have. A question on life satisfaction was used as a proxy for mental wellbeing, as this was the only suitable scale that was available consistently across waves and in both the youth and young adult self-completion booklets. The one-item question on life satisfaction comprised a seven-point scale ranging from completely dissatisfied to completely satisfied. The completely dissatisfied and dissatisfied categories were collapsed due to small numbers in each category (< 4%), forming the groups 'dissatisfied', 'neither satisfied/dissatisfied', 'somewhat satisfied', 'mostly satisfied' and 'completely satisfied'. Although not a direct measure of mental health, strong associations have been found between the one-item 'life satisfaction' question and subjective mental health [23]. Details on all variables can be found in the Appendix S1.

Missing data

Missingness due to item non-response accounted for 0–4% among participants with drinking records, resulting in a sample of 6782 respondents in baseline data at wave 3. Missing due to item non-response accounted for less than 1% in models using binge drinking, based on 16–19-year-olds only ($n = 2687$). In longitudinal analyses ($n = 3615$), missing due to item non-response accounted for 0–6% among participants with drinking records across both waves. As this was above 5%, the suggested threshold where multiple imputation is thought to add value [24] and due to the smaller sample size using two waves, we carried out multiple imputation of missing data. Multiple imputation chained equations using 20 imputation models was conducted, with five to 20 imputations suggested as being adequate when there is moderate missingness [25]. Imputations of the outcome variable were deleted following recommendations [26].

Statistical analyses

Analyses were stratified by the 10–15 and 16–19 years age-groups representing youth and young adulthood, given the distinct periods that these age-groups may represent in terms of drinking behaviour. Among

10–15-year-olds, cross-sectional models at wave 3 consisted of a logistic regression model, with drinking frequency as the outcome and social media as the main exposure. Among 16–19-year-olds, multinomial logistic was carried out with drinking frequency and social media as the exposure. The same model was repeated for binge drinking as the outcome (never (reference)/one to two times a month/three or more times a month). We compared two models, one with and without adjusting for life satisfaction, after accounting for all other covariates among 10–15-year-olds only (as bivariate associations between life satisfaction and drink frequency among 16–19-year-olds were not significant), presented in Table 1. This was conducted to observe the potential mediating role of mental wellbeing in relation to social media use and alcohol consumption using the Baron & Kenny method [27].

Logistic regression models were carried out with change in drinking frequency as the outcome and change in social media usage as the main exposure. This was repeated for changes in binge frequency. Models were adjusted for the same covariates as the cross-sectional models, including the number of years between waves, baseline drinking frequency and age, educational/work status, number of friends and life satisfaction measured at wave 6 (rather than wave 3 in the baseline models) being closer in time to the outcome variable and potentially having a greater effect. Social media usage at baseline was also adjusted for in these models, given that baseline internet use has been found to influence later alcohol consumption in other studies [11,14]. An interaction effect between age and changes in social media was carried out to observe whether the relationship between changes in social media and drink frequency may be attributable to greater age effects between the waves, but was not significant ($P = 0.2302$), so was discarded from the model. We conducted a sensitivity analyses limiting the youth longitudinal model to only those who were aged under 18 at follow-up, before the legal limit of purchasing alcohol is reached, which could potentially complicate results. Corresponding cross-sectional weights and longitudinal weights were applied which account for non-response, and the complex survey design was accounted for in statistical analyses [18].

Analyses were conducted using Stata version 15.0 [28]. The analysis was not pre-registered, so the results should be considered exploratory.

DATA ACCESS

The data sets supporting the conclusions of this article are available via the UK Data Service Archive, subject to their end-user license agreement, from the University of Essex [17].

Table 1 Characteristics among drinking frequency categories in percentages, Understanding Society (wave 3).^a

| | 10–15-year-olds | | | | 16–19-year-olds | | | | P-value |
|----------------------|-----------------|------------------|-------------|-----------|-----------------|-------------------|-----------------|-------------|-----------|
| | Never | At least monthly | Total | P-value | Never | 1–3 times a month | At least weekly | Total | |
| <i>n</i> | 3353 | 740 | 4093 | | 841 | 1029 | 819 | 2689 | |
| Sex | % | % | % | | % | % | % | % | |
| Male | 50 | 51 | 50 | 0.6797 | 52 | 49 | 56 | 52 | 0.0337 |
| Social media usage | | | | | | | | | |
| No-profile | 18 | 4 | 15 | | b | b | b | b | |
| Non-daily user | 20 | 6 | 17 | | 17 | 9 | 8 | 11 | |
| Less than an hour | 34 | 33 | 34 | | 32 | 35 | 36 | 35 | |
| 1–3 hours | 23 | 43 | 27 | | 34 | 40 | 39 | 38 | |
| 4+ hours | 5 | 14 | 7 | P < 0.001 | 16 | 17 | 17 | 17 | P < 0.001 |
| Life satisfaction | | | | | | | | | |
| Dissatisfied | 3 | 6 | 4 | | 15 | 14 | 15 | 14 | |
| Neither | 7 | 9 | 8 | | 9 | 9 | 8 | 9 | |
| Somewhat satisfied | 15 | 21 | 16 | | 15 | 15 | 15 | 15 | |
| Mostly satisfied | 35 | 40 | 36 | | 37 | 43 | 45 | 42 | |
| Completely satisfied | 39 | 24 | 36 | P < 0.001 | 24 | 19 | 18 | 20 | 0.1104 |
| Urban/rural | | | | | | | | | |
| Urban | 79 | 73 | 78 | 0.0022 | 85 | 76 | 75 | 78 | 0.001 |
| Educational status | | | | | | | | | |
| At school | 100 | 100 | 100 | | 21 | 19 | 10 | 17 | |
| Higher education | – | – | – | | 47 | 41 | 34 | 40 | |
| At university | – | – | – | | 7 | 8 | 16 | 10 | |
| Employed | – | – | – | | 12 | 19 | 28 | 20 | |
| Not employed | – | – | – | | 13 | 13 | 13 | 13 | P < 0.001 |
| Mean (SD) | | | | | | | | | |
| Age (years) | 12.2 (1.64) | 13.9 (1.24) | 12.5 (1.71) | P < 0.001 | 17.2 (1.17) | 17.4 (1.05) | 17.8 (0.95) | 17.5 (1.08) | P < 0.001 |
| Income | 2.3 (0.60) | 2.4 (0.49) | 2.3 (0.01) | 0.7899 | 2.6 (0.68) | 2.4 (0.50) | 2.4 (0.54) | 2.4 (0.57) | P < 0.001 |
| Number of friends | 6.9 (6.94) | 7.9 (6.05) | 7.1 (6.78) | 0.001 | 5.0 (4.96) | 5.5 (4.31) | 6.1 (5.92) | 5.6 (5.12) | 0.0082 |

^aSample weights were applied to estimates. Sample sizes refer to the unweighted sample. ^bNo-profile combined with non-daily users. SD = standard deviation.

RESULTS

Characteristics of drinkers and social media users

Among 10–15-year-olds, 18% drank at least monthly (Table 1). Compared with never drinkers, those who drank at least monthly were older (mean age 12.2 versus 13.9, $P < 0.001$), had a higher average number of friends (6.9 versus 7.1, $P = 0.001$), a higher proportion who used social media for 1+ hours (28 versus 57%, $P < 0.001$) and a lower proportion who were completely satisfied with their life (39 versus 24%, $P < 0.001$). Bivariate associations were in a similar direction among 16–19 year-olds; however, the relationship between life satisfaction and drinking was not significant ($P = 0.1104$). Never drinkers, those who drank one to three times a month and those who drank weekly accounted for 31, 38 and 31% among 16–19-year-olds, respectively.

Among 10–15-year-olds, 4+ hours social media users had a higher proportion who were dissatisfied with their lives (13%) than those with less than an hour's use (3%) ($P < 0.001$), were more likely to be female (64 versus 36%) and to drink once a month or more (42 versus 19%) (Table 2). Similar associations were found among 16–19-year-olds, but age and sex were not significant.

The effect of social media usage on drinking among 10–15-year-olds

Figure 1 presents logistic regression results on the risk of drinking by social media usage among 10–15-year-olds. The likelihood of drinking at least monthly versus never increased with greater social media use, adjusting for all covariates. Compared with those with social media use of less than 1 hour, those with no-profile [odds ratio (OR) = 0.41, 95% confidence interval (CI) = 0.25–0.67] and non-daily users (OR = 0.49, 0.33–0.72) had a lower risk of drinking one to three times a month, whereas those with 1–3 hours (OR = 1.44, 95% CI = 1.14–1.81) and 4+ hours (OR = 2.08, 95% CI = 1.47–2.95) of use had a greater risk. All groups who were less than completely satisfied with their life were more likely to drink at least monthly [e.g. mostly satisfied (OR = 1.44, 95% CI = 1.13–1.83); results not shown]. When comparing models with and without life satisfaction, effect sizes for non-users, 1–3 hours and 4+ hours were smaller by 2, 6 and 15%, respectively, suggesting life satisfaction as a potential mediator between social media use and drinking, according to Baron & Kenny's criteria [27] (Supporting information, Table S1).

The effect of social media usage on drinking and binge drinking frequency among 16–19-year-olds

Results for multinomial logistic regression and relative risk ratios (RRR) of drinking frequency and binge drinking

among 16–19-year-olds are presented in Figs 2 and 3, respectively. Compared with those who use social media for less than 1 hour, non-users were less likely to be drinking one to three times a month (RRR = 0.48, 95% CI = 0.33–0.72) or at least weekly (RRR = 0.44, 95% CI = 0.29–0.68), after adjusting for all covariates. Results for those with longer social media usage were not significant (Fig. 2). Similarly, in Fig. 3, compared with less than an hour's use, non-users were less likely to binge drink one to three times a month (RRR = 0.33, 95% CI = 0.22–0.48) or three or more times a month (RRR = 0.29, 95% CI = 0.17–0.48); 4+ hours users were more likely to binge drink three or more times a month than those who had less than an hour's use (RRR = 1.47, 95% CI = 1.03–2.09); other effects were not significant.

The effect of changes in social media use on changes in drinking frequency among 10–15-year-olds

Among those aged 10–15 years, 43% increased their drinking frequency from waves 3 to 6. Of those who were never drinkers, those who drank once only, two to three times a month, one to two times a week and most days in wave 3, 40, 68, 46, 15 and 0% (the ceiling), increased their drinking in wave 6, respectively. Those who had decreased, stayed the same or increased their social media usage from waves 3 to 6 accounted for 4, 36 and 50%, respectively. Of those who were non-users, less than 1 hour, 1–3 hours, 4–6 hours, 7+ hours social media users in wave 3, 68, 56, 27, 13 and 0% increased their social media usage in wave 6, respectively (Supporting information, Table S2).

Table 3 presents the effect of changes in social media usage on changes in drinking frequency from waves 3 to 6 following logistic regression after adjustment for all covariates. Compared with those who had not changed their social media usage between waves, those who had increased their use had higher odds of increasing their drinking frequency (OR = 1.89, 95% CI = 1.45–2.46). Results for decreasing social media usage and drink frequency was not significant. Some baseline social media usage was also predictive of increased drinking frequency; those with no profile (OR = 0.46, 95% CI = 0.33–0.64) and non-daily users (OR = 0.43, 95% CI = 0.31–0.59) had lower odds of increasing their drinking frequency over time than those with less than an hour's use. Results were similar when limiting to those aged under 18 years at follow-up; those who had increased their social media use had greater odds of increased drink frequency (OR = 2.18, 95% CI = 1.66–2.87), whereas those with no profile (OR = 0.43, 95% CI = 0.30–0.61) and non-daily social media users (OR = 0.39, 95% CI = 0.28–0.55) at baseline had lower odds.

Table 2 Characteristics among social media usage categories in percentages, Understanding Society (wave 3).^a

| | 10–15-year-olds | | | | | 16–19 year-olds | | | | | P-value |
|--|-----------------|----------------|-------------------|-------------|-------------|-----------------|-----------------------|-------------------|-------------|-------------|-------------|
| | No-profile | Non-daily user | Less than an hour | 1–3 hours | 4+ hours | P-value | Non-user ^b | Less than an hour | 1–3 hours | 4+ hours | |
| n | 591 | 718 | 1421 | 1084 | 279 | | 326 | 885 | 1042 | 436 | |
| Sex | % | % | % | % | % | | % | % | % | % | |
| Male | 53 | 56 | 53 | 44 | 36 | $P < 0.001$ | 58 | 54 | 52 | 47 | 0.0604 |
| Drinking frequency | | | | | | | | | | | |
| Never | 95 | 93 | 81 | 68 | 58 | | 44 | 25 | 24 | 26 | |
| 1+ (10–15 years)/1–3 times a month (16–19 years) | 5 | 7 | 19 | 32 | 42 | $P < 0.001$ | 32 | 40 | 42 | 40 | |
| At least weekly | – | – | – | – | – | | 24 | 35 | 34 | 34 | $P < 0.001$ |
| Life satisfaction | | | | | | | | | | | |
| Dissatisfied | 3 | 4 | 3 | 3 | 13 | | 15 | 13 | 15 | 16 | |
| Neither | 6 | 9 | 7 | 8 | 13 | | 11 | 9 | 8 | 9 | |
| Somewhat satisfied | 17 | 12 | 14 | 20 | 17 | | 21 | 16 | 14 | 11 | |
| Mostly satisfied | 34 | 32 | 40 | 37 | 31 | | 38 | 43 | 44 | 38 | |
| Completely satisfied | 40 | 43 | 36 | 32 | 26 | $P < 0.001$ | 15 | 20 | 19 | 26 | 0.0306 |
| Urban/rural | | | | | | | | | | | |
| Urban | 77 | 79 | 75 | 78 | 86 | 0.0107 | 85 | 74 | 77 | 83 | 0.001 |
| Educational status | | | | | | | | | | | |
| At school | 100 | 100 | 100 | 100 | 100 | | 19 | 15 | 19 | 13 | |
| higher education | – | – | – | – | – | | 36 | 39 | 39 | 47 | |
| At university | – | – | – | – | – | | 6 | 13 | 12 | 4 | |
| Employed | – | – | – | – | – | | 18 | 23 | 18 | 19 | |
| Not employed | – | – | – | – | – | | 21 | 10 | 11 | 16 | $P < 0.001$ |
| Mean (SD) | | | | | | | | | | | |
| Age | 11.4 (2.44) | 11.6 (1.62) | 12.6 (1.65) | 13.3 (1.41) | 13.5 (1.47) | $P < 0.001$ | 17.5 (1.19) | 17.6 (1.04) | 17.4 (1.10) | 17.4 (1.02) | 0.0523 |
| Income | 2.3 (0.55) | 2.3 (0.54) | 2.4 (0.58) | 2.4 (0.55) | 2.4 (0.54) | 0.4936 | 2.5 (0.72) | 2.5 (0.55) | 2.4 (0.55) | 2.5 (0.51) | 0.0573 |
| Number of friends | 5.3 (4.75) | 6.5 (7.38) | 7.3 (6.86) | 7.8 (6.80) | 8.4 (7.63) | $P < 0.001$ | 4.4 (4.78) | 5.4 (5.59) | 6.2 (5.02) | 5.3 (4.25) | 0.0051 |

^aSample weights were applied to estimates. Sample sizes refer to the unweighted sample; ^bnon-user includes no-profile and non-daily users. SD = standard deviation.

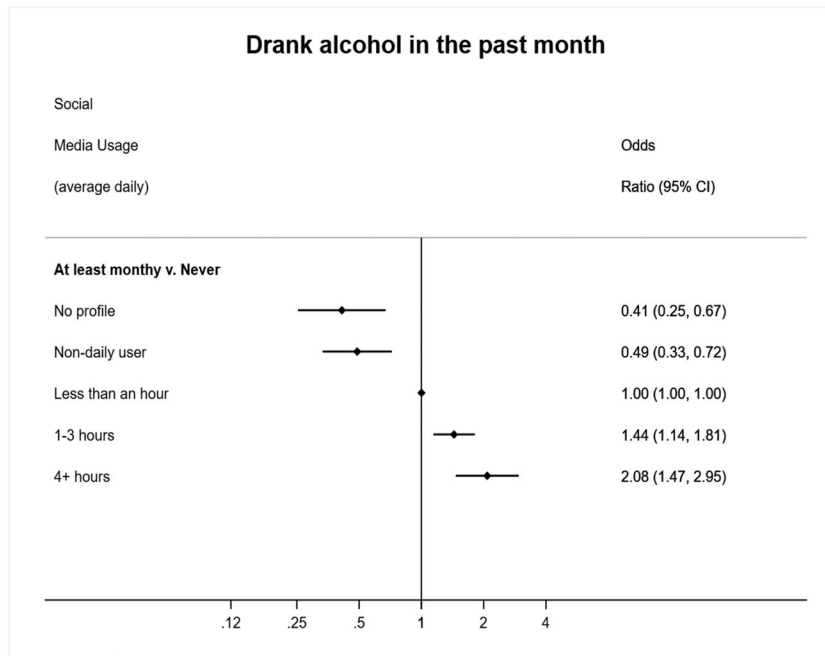


Figure 1 Logistic regression results on the risk of drinking among 10–15-year-olds ($n = 4093$), Understanding Society (wave 3), adjusted for sex, age, income, urban/rural, number of friends and life satisfaction, sample weights applied

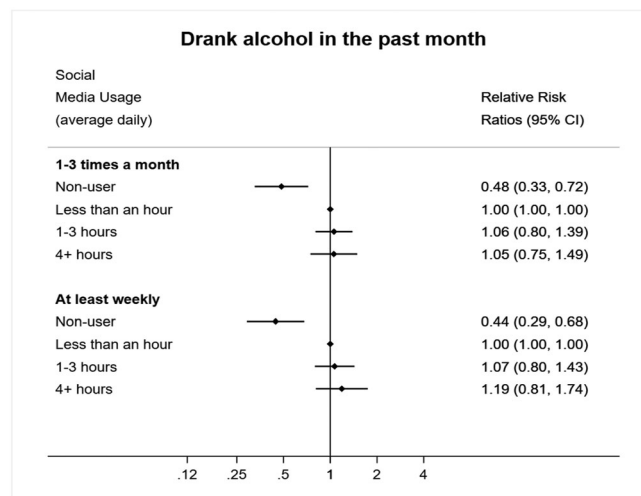


Figure 2 Multinomial logistic regression results on the risk of drinking frequency among 16–19-year-olds ($n = 2689$), Understanding Society (wave 3), adjusted for sex, age, educational status, income, urban/rural, number of friends and life satisfaction, sample weights applied

The effect of changes in social media use on changes in drinking and binge drinking frequency among 16–19-year-olds

Among 16–19-year-olds, 44% had increased their drink frequency from wave 3 to 6. Those who had decreased, remained the same or had increased their social media usage accounted for 27, 41 and 32%, respectively. Further analysis can be found in Supporting information, Table S2.

In logistic regression models, non-users of social media at baseline were less likely than less than 1-hour users to have increased their drink frequency during the time-period (OR = 0.45, 95% CI = 0.22–0.93) (Table 3). The effect of changes in social media use was not significant.

During the time-period, 39% had increased their binge drinking frequency. Those with the highest social media usage at baseline were more likely to have increased their binge frequency over time [4+ hours (OR = 1.89, 95% CI = 1.01–3.53)]. Results for other baseline users and changes in social media use were not significant.

Discussion

Among youths and young adults, heavier social media use was associated with greater likelihood of more frequent drinking including over time, among 10–15-year-olds, and to some extent greater binge drinking among those aged 16–19 years. Some baseline social media use was

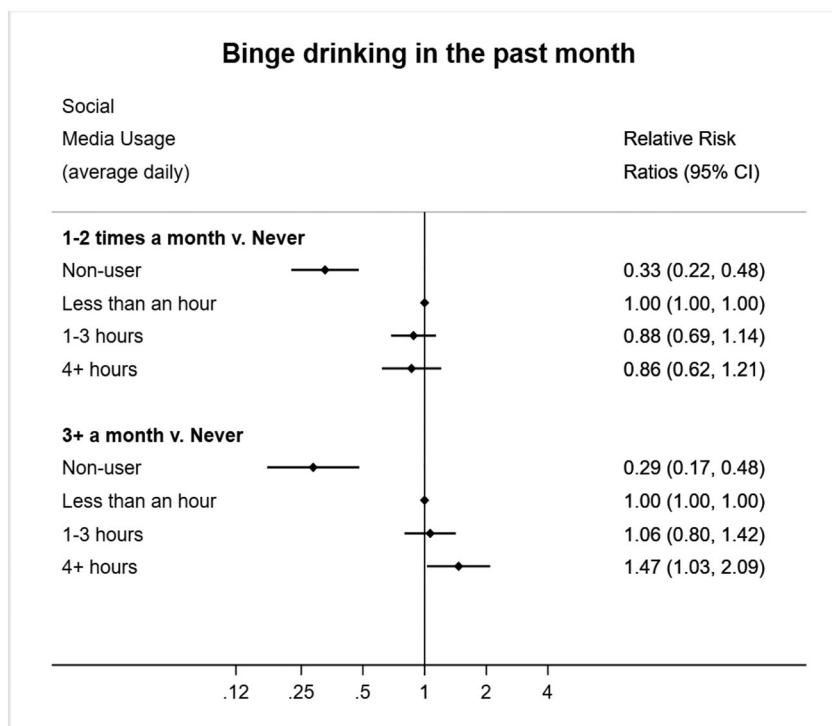


Figure 3 Multinomial logistic regression results on the risk of binge drinking frequency among 16–19-year-olds ($n = 2687$), Understanding Society (wave 3), adjusted for sex, age, educational status, income, urban/rural, number of friends and life satisfaction, sample weights applied

Table 3 Logistic regression odds of increases in drinking frequency versus no increase, Understanding Society [wave 3 (2011–13) and wave 6 (2014–16)].^{a,b,c}

| | Age 10–15 ($n = 2558$) | | Age 10–15 (under age 18 at follow-up) ($n = 2164$) | | Age 16–19 ($n = 1057$) | | | |
|---|--------------------------------|---------------------|---|---------------------|--------------------------------|---------------------|--------------------------------------|---------------------|
| | Increase in drink frequency | | Increase in drink frequency | | Increase in drink frequency | | Increase in binge drink frequency | |
| | OR | (95% CI) | OR | (95% CI) | OR | (95% CI) | OR | (95% CI) |
| Change in social media usage | | | | | | | | |
| Stayed the same | 1.00 | Ref | 1.00 | Ref | 1.00 | Ref | 1.00 | Ref |
| Decrease in social media usage | 1.18 | (0.80, 1.72) | 0.95 | (0.62, 1.45) | 0.64 | (0.37, 1.08) | 0.66 | (0.40, 1.09) |
| Increase in social media usage | 1.89 | (1.45, 2.46) | 2.18 | (1.66, 2.87) | 1.22 | (0.74, 2.01) | 1.54 | (0.96, 2.48) |
| Baseline social media usage | | | | | | | | |
| Non-profile Non-daily users ^d | 0.46 | (0.33, 0.64) | 0.43 | (0.30, 0.61) | 0.45 | (0.22, 0.93) | 0.69 | (0.35, 1.37) |
| Less than an hour | 1.00 | Ref | 1.00 | Ref | 1.00 | Ref | 1.00 | Ref |
| 1–3 hours | 1.06 | (0.79, 1.41) | 1.21 | (0.89, 1.65) | 0.80 | (0.50, 1.30) | 1.14 | (0.73, 1.79) |
| 4+ hours | 1.24 | (0.72, 2.14) | 1.61 | (0.86, 3.02) | 1.37 | (0.69, 2.71) | 1.89 | (1.01, 3.53) |

^aSample weights have been applied; sample sizes refer to the unweighted sample; ^badjusted for sex, age, years between waves, educational status, equalized household income, urban/rural, number of friends, baseline drinking frequency and life satisfaction; ^cfigures in bold type signify $P < 0.05$; ^dno-profile and non-daily users combined among ages 16–19. OR = odds ratio; CI = confidence interval.

associated with greater likelihood of increased drink frequency over time for both youths and young adults.

Potentially, the use of social media may be a part of the cultural norm of drinking among youths, which includes the posting of photographs of people drinking, which could encourage use and normalize being drunk [15,16,29,30].

In addition, interacting on social media may also reflect greater sociability both on- and off-line, which could influence greater alcohol use, especially if the drinking occurs in social settings. We adjusted for number of friends to account for this; however, this variable may only measure one aspect of sociability.

Our findings are consistent with other studies that show a relationship between digital technology use, such as heavier internet or problematic internet use, and greater alcohol consumption [9–13]. The behavioural mechanisms underlying problematic substance use may closely resemble that of heavy internet use and potentially more frequent social media use, and these behaviours may complement or even reinforce each other [31]. We cannot rule out that the relationship may be in the opposite direction, with heavier alcohol use encouraging more frequent social media use, or that the relationship is bidirectional. This is an area for future investigation.

Nevertheless, this research is important to consider with regard to recent discussion on regulating social media use more tightly [6]. As this is an emerging area of research, we believe we are the first in the United Kingdom to show that there is a strong correlation between heavier social media use and more frequent alcohol consumption, and that this relationship exists across time. This was especially the case for 10–15-year-olds, where the purchase of alcohol is illegal and where the introduction to alcohol from an earlier age may be problematic [32]. A clearer pattern between social media and drinking frequency was found among 10–15-year-olds than 16–19-year-olds, which may reflect that the behaviours of drinking alcohol and social media use may be less normative among this young age group and are more strongly correlated. The relationship may be partly mediated by having poorer mental wellbeing, which is known to have a relationship with social media use [33,34]. Further research is needed in investigating the exact mechanisms to prevent alcohol-related harm developing in youth.

Considering that we consistently found that those with some social media use were more likely to drink than those with no social media use, we did not find direct evidence that the rise of social media platforms could be contributing to the increase in non-drinking. However, the quantitative analysis here is arguably too simplistic to explore subcultures and norms that may exist among internet users, which may make it easier for young people to resist social pressures to drink, and that there might still exist displacement. This warrants further investigation. The study was based on data in 2011–13, when platforms such as Instagram, snapchat and TikTok may not have existed. It is important that research continues in this area to observe whether the relationship may alter with changing media and technology.

STRENGTHS AND LIMITATIONS

The strengths of the study include a relatively large sample and the ability to explore changes over time, while accounting for several key characteristics.

There are many limitations. Questions from the pre-existing survey on social media use were limited, involving only one question on chatting/interacting on a weekday, with no indication of the type of technology used for this to take place. It also signifies a more active use, whereas passive use was not explored. Active and passive use has been found to have a differential association with wellbeing [34], and could potentially have a different effect on drinking. Questions on drinking behaviour were also limited to frequency and binge drinking, with no further information on volume drunk, which is an area of further research. Answers were self-reported, so they could be biased, especially with under-reporting usage; a self-completion questionnaire was administered in private as one way to mitigate this.

Attrition between waves 3 and 6 may have resulted in bias. Non-response weights and multiple imputation was carried out to mitigate this. We were limited to two waves of data, and the way we modelled changes in social media and alcohol consumption may have involved an element of regression to the mean. More sophisticated methods could be employed to model changes over time, involving more frequent follow-up data.

Conclusion

Heavier social media use, including over time, was associated with more frequent drinking, especially among youths, and to some extent with binge drinking among young adults. Further research is needed to investigate the mechanisms behind this relationship.

Declaration of interests

None.

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Author contributions

Linda Ng Fat: Conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration. **Noriko Cable:** Data curation; formal analysis; funding acquisition; investigation; methodology; project administration. **Yvonne Kelly:** Data curation; formal analysis; investigation; methodology; project administration.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Table S1 Logistic regression on the risk of drinking at least monthly *versus* never, comparing models with and without life satisfaction, among 10–15-year olds ($N = 4093$).

Table S2 Change in drink and social media use variables between wave 3 and 6, and baseline drink and social media usage, row percentages (%).

Appendix S1