



The direct and indirect effect of loneliness on the development of adolescent alcohol use in the United Kingdom



Michael T. McKay^{a,*}, Svenja Konowalczyk^b, James R. Andretta^c, Jon C. Cole^a

^a Department of Psychological Sciences, University of Liverpool, United Kingdom

^b University of Dortmund, Germany

^c Child Guidance Clinic, Superior Court of the District of Columbia, United States

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ABSTRACT

Alcohol use among adolescents in the United Kingdom (UK) remains relatively high compared to those in other European countries. The present study sought to examine both the direct and indirect effect of loneliness on drinking behavior. Participants were school children (mean age 13.5 years at Time 1) participating in a Randomized Controlled Trial in the UK, who completed a battery of questionnaires examining alcohol-use indicators, loneliness, self-efficacy and sensation seeking at Time 1 and at +12 months. Loneliness at Time 1 had a substantive, though largely indirect (i.e., via self-efficacy and sensation seeking covariates), impact on alcohol-related harm at +12 months. Furthermore, Loneliness interacted with gender in the prediction of context of alcohol use, where being female and experiencing loneliness put an individual at a greater risk of unsupervised drinking. Females experiencing loneliness were also 2.9 times as likely to have had a drink in the past 30 days, and around 2.5 times as likely to have ever consumed a full drink, when compared to their male peers. The current results indicate that loneliness is an important but complex factor in adolescent drinking. There are important implications for the development of interventions to prevent underage drinking, not least that it is not appropriate to consider all underage drinkers as socially marginalised. However, for those that are, the self-medication hypothesis is potentially relevant through emotional self-efficacy.

1. Introduction

Alcohol consumption among adolescents in the United Kingdom (UK) remains high compared to other European States (e.g., Fuller & Hawkins, 2014; Hibell et al., 2012), although there are regional variations (e.g., McInnes & Blackwell, 2013). This is an important public health concern as excessive alcohol consumption in this developmental period is associated with a range of both short- and long-term negative outcomes (e.g., Bonomo, Bowes, Coffey, Carlin, & Patton, 2004; Ellickson, Ticker, & Klein, 2003). Within the UK itself, there has been a change in adolescent drinking behaviors in recent years such that, while the overall proportion of lifetime users (adolescents who have ever drunk) continues to decline, those who report lifetime use of alcohol are exposed to high, and increasing amounts of alcohol-related harms (Healey, Rahman, Faizal, & Kinderman, 2014). In the context of changing alcohol use patterns among adolescents in the UK, the present study examines the degree to which one psychosocial variable, loneliness, predicts changes in alcohol use behaviors above and beyond socio-demographic variables over a key 12 month period.

1.1. Loneliness and alcohol behaviors in adolescence

Adolescence is a period of great change, and many psychiatric problems emerge during this period (Moksnes, Bradley-Eilertsen, & Lazarewicz, 2016). Adolescence is also the developmental period in which individuals spend increasingly more time with peers, and less time with parents. In this context, loneliness is broadly understood as the negative emotional response to a discrepancy between the desired and achieved quality of one's social network (Peplau & Perlman, 1982). Whilst feeling lonely can result from a lack of social interaction or social isolation, it can also occur within quite extensive social networks (e.g., Heinrich & Gullone, 2006). In addition, loneliness is not inextricably tied to social isolation, as some individuals may see no need for a social network (e.g., socially avoidant or disinterested) and are therefore not emotionally distressed by their isolation. Loneliness should therefore not be assumed where social isolation exists.

Across a range of populations and study types, conflicting evidence on the relationship between loneliness and alcohol consumption has been presented. Some correlational studies in College students

* Corresponding author at: Department of Psychological Sciences, Bedford Street South, Liverpool L69 7ZA, United Kingdom.
E-mail address: Michael.McKay@liverpool.ac.uk (M.T. McKay).

(McBroom, Fife, & Nelson, 2008), and adolescents (Varga & Piko, 2015), have shown an inverse relationship between loneliness and alcohol use; whereas others have provided a positive correlation between the two in adult (Bonin, McCreary, & Sadava, 2000), student (Cacioppo, Hawkley, Crawford, et al., 2002), and adolescent (Barbosa Filho, Campos, & Lopes Ada, 2012; Carvalho, Barros, Lima, Santos, & Melo, 2011) populations.

Stickley, Koyanagi, Kuposov, Schwab-Stone, and Ruchkin (2014) reported that feelings of loneliness were linked to adolescents' substance use (generally) among other risk taking behaviors, and suggested that this substance misuse may be to avoid feelings of loneliness. Several studies have shown, for example, that lonely adolescents are more likely to use alcohol, cigarettes and illicit drugs (Page, 1990; Page & Cole, 1991; Page, Dennis, Lindsay, & Merrill, 2011) possibly also as a form of self-medication in response to the emotional discomfort of loneliness. And in fact, the findings of Niño, Cai, and Ignatow (2016) suggested that some youth may engage in alcohol use independent of peer influence. Among adults, chronic loneliness has been found to be associated with avoidant coping strategies, including drinking (Cacioppo et al., 2000; Gonzalez & Skewes, 2013; Hawkley & Cacioppo, 2010).

In contrast to the growing body of literature suggesting a positive relationship between loneliness and alcohol consumption, Pedersen and von Soest (2015) reported that alcohol use was positively associated with social integration, but negatively associated with loneliness. These authors concluded that socially integrated adolescents were more at risk of alcohol use behaviors than peers at the social margins. Similarly, in cross-sectional studies in Northern Ireland (NI), McKay et al. (McKay, Cole, Field, Goudie, & Sumnall, 2011; McKay, Sumnall, Percy, & Cole, 2012) reported that social-self-efficacy was positively related to alcohol use behaviors. Alcohol use is typically a social event, even in adolescence (Percy, Wilson, McCartan, & McCrystal, 2011), and this finding is in keeping with the theory that those with greater social competency will be more likely to involve themselves in social events or experiences. However, efficacy beliefs are best understood as domain-specific (e.g., Grau, Salanova, & Peiro, 2001; Muris, 2001) such that self-efficaciousness in one domain (e.g., academics) does not always translate to all domains of life (e.g., emotions); therefore, feelings of competence tied to task demands of a given situation have greater predictive utility than a global self-evaluation (Bandura, 1997). For example, the above-mentioned NI-specific studies also found that social self-efficacy positively predicted alcohol use, academic self-efficacy negatively predicted it.

Summarising this literature, it is apparent that a range of factors influence the complex relationship between loneliness and alcohol use. These include cultural context, gender, age and the precise nature of the alcohol use measures under consideration. The present study utilised two available waves of data from a longitudinal study of adolescents from two different cultural contexts within the UK (NI and Scotland) to examine the relationship between self-reported loneliness and a range of alcohol use indicators. The study had two aims: Firstly, to examine how loneliness at Time 1 predicts lifetime and past 30 day use of alcohol as well as being an abstainer or (un-)supervised drinker at Time 2 (+12 months), and how loneliness interacts with sociodemographic measures and a combined classroom and parental alcohol prevention intervention in this relationship. Secondly, to examine how loneliness at Time 1 predicts alcohol harms, alcohol attitudes, and heavy episodic drinking at Time 2 (+12 months) and how this relationship is mediated by academic self-efficacy, social self-efficacy, emotional self-efficacy, and sensation seeking. Sensation seeking data were gathered as part of the research described below, and we felt justified including it as a potential mediator given the extensive literature linking it with alcohol use behaviors (e.g., Doumas, Miller, & Esp, 2017; Hittner & Swickert, 2006; Stephenson, Hoyle, Palmgreen, & Slater, 2003).

2. Methods

2.1. Participants

Participants were a proportion of those in a cluster Randomized Controlled Trial examining the efficacy of a combined classroom and parental alcohol prevention intervention in both Scotland and NI (Sumnall et al., 2017). Scottish participants were from urban schools in Glasgow City and Inverclyde (an urban center to the west of Glasgow), while NI participants were from a mixture of schools in rural and urban settings. Data were opportunistically collected at two time points in that Trial (participants were in school Grade 9 [aged 13–14 years], hereafter T1), and at +12 months (hereafter T2). By T2 those participants randomized into the intervention group had received all intervention components. Loneliness was not a specific Trial outcome, nor was it a covariate in Trial analyses. Sample 1 consisted of 966 adolescents (42.67% females, 1.7% unreported) attending secondary schools in NI. Sample 2 consisted of 829 adolescents (54.52% females, 1.4% unreported) attending secondary schools in Scotland. Both groups of adolescents completed the same questionnaires.

2.2. Measures

Loneliness was measured using the revised three-item UCLA Loneliness Scale (Hughes, Waite, Hawkley, & Cacioppo, 2004), “How often do you feel that you lack companionship?”, “How often do you feel left out?”, and “How often do you feel isolated from others?” The full UCLA Scale consists of 20 items; however, a previous study has shown that a short form of the scale has adequate validity for inclusion in large-scale studies (Hughes et al., 2004). The items were rated “hardly ever” (0), “some of the time” (1), or “often” (2). We summed the items to produce a total loneliness score (α current study = 0.79).

In terms of alcohol-use measures, we examined five in total. (1) Context of alcohol use was assessed based on the binary responses (yes/no) to six questions. Participants were asked if they had ever consumed alcohol: with their family at a special occasion; with their family on holiday; at a party under adult supervision; with small groups of friends with no adults present; at parties with no adults present; or alone. Accordingly, participants were categorized as an abstainer, a supervised (by adults) only drinker, or an unsupervised drinker (on one or more occasion). (2) Lifetime use, and past 30 day use of a full drink (not just a sip or taste) were assessed by means of two questions, “Have you ever (in the past 30 days) consumed a full drink, not just a sip or a taste (yes/no)?” (3) Heavy episodic drinking (HED) was assessed by asking, “How often in the past 30 days have you consumed five or more full drinks of alcohol on the one drinking occasion?” Responses ranged from “never”, through “12 or more times”. (4) Harms associated with own use of alcohol were measured using a 16-item scale (internal consistency α = 0.9; McBride, Midford, Farrington, & Phillips, 2000). Following concern from many of the schools, two of the questions used in this scale were eliminated: “How often during the past year did you have sexual intercourse that you later regretted?” and “How often during the past year did you have sexual intercourse that you were afraid would lead to pregnancy or sexually transmitted diseases?” Moreover, one question was added: “How often during the past year did you have to attend a doctor or hospital with a condition relating to alcohol misuse?” This was included to assess the relationship between alcohol use and medical attention or support in this population. (5) Attitudes towards alcohol were assessed using a six-item scale (internal consistency α = 0.64; McBride et al., 2000). Responses were on a 5-point Likert type scale, with a higher score indicative of less healthy or safe attitudes towards alcohol.

The Self-Efficacy Questionnaire for Children (SEQ-C; Muris, 2001) contains 21 items assessing three domains of self-efficacy: (a) academic self-efficacy (e.g., “How well do you succeed in passing all subjects?”), α current study = 0.86), (b) emotional self-efficacy (e.g., “How well can

Table 1
Correlations and descriptive statistics.

	1	2	3	4	5	6	7	8	9	10	11
1. Loneliness	1.00										
2. Social SE T2	−0.27*	1.00									
3. Emotional SE T2	−0.29*	0.53*	1.00								
4. Academic SE T2	−0.11*	0.33*	0.33*	1.00							
5. Sensation Seeking T2	−0.03	0.26*	0.15*	−0.18*	1.00						
6. Attitudes	0.08	−0.04	−0.04	−0.26*	0.16*	1.00					
7. Harms	0.08	−0.01	−0.09	−0.24*	0.13*	0.43*	1.00				
8. HED	0.02	0.00	−0.03	−0.20*	0.09*	0.32*	0.56*	1.00			
9. Attitudes T2	0.03	0.00	−0.07	−0.33*	0.27*	0.52*	0.33*	0.27*	1.00		
10. Harms T2	0.03	0.00	−0.10*	−0.26*	0.16*	0.34*	0.47*	0.37*	0.47*	1.00	
11. Heavy Episodic T2	0.05	0.08	−0.02	−0.23*	0.17*	0.26*	0.39*	0.35*	0.42*	0.67*	1.00
M	0.50	3.65	3.12	3.48	3.60	2.35	1.25	−	2.52	2.22	−
SD	0.51	0.60	0.76	0.76	0.81	0.64	4.24	−	0.67	6.44	−
Kurtosis	0.92	−0.38	−0.17	−0.43	−0.39	0.53	−	−	0.36	−	−
Skewness	3.24	3.38	3.02	2.90	2.94	3.51	−	−	3.19	−	−
Alpha (95% CI ≥)	0.79 (0.76)	0.76 (0.75)	0.77 (0.75)	0.86 (0.85)	0.74 (0.72)	0.61 (0.58)	−	−	0.62 (0.60)	−	−

SE = self-efficacy; HED = heavy episodic drinking.

* $p \leq 0.0006$ using Bonferroni's adjustment.

you control your feelings?", α current study = 0.77), and (c) social self-efficacy (e.g., "How well do you succeed in staying friends with other children?", α current study = 0.76). Each subscale consists of seven items, and respondents rate their competence in each self-efficacy domain on a 5-point Likert scale (1 = *not at all*; 5 = *very well*). SEQ-C subscale scores have been found to be structurally valid and internally consistent ($\alpha > 0.80$; Muris, 2001).

Sensation seeking was measured using the four-item Brief Sensation Seeking Scale (BSSS-4; Stephenson et al., 2003, e.g., "I like to do frightening things"). Responses to the four items were given on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5). Scores in the present study were found to be internally consistent (α current study = 0.74).

Descriptive statistics for all continuous variables can be drawn from Table 1. Information was gathered on gender, and free school meals entitlement (FSM), which is an imperfect proxy for low-income families, and thus socio-economic status (Hobbs & Vignoles, 2007).

2.3. Statistical analyses

In order to examine the relationship between loneliness and alcohol use behaviors, a series of regression-based analyses were developed using the maximum likelihood (ML) estimator in Mplus Version 7, which is robust to missing data and nonnormality (Muthén & Muthén, 1998–2015). As the default in Mplus, missing data were treated with Full Information Maximum Likelihood (FIML).

In a first step, four multinomial logistic regression analyses were developed for assessing the impact of loneliness on categorical outcome variables which were recoded as binary dummy variables: (1) Participants classified as abstainers vs. those classified as supervised drinkers, (2) participants classified as abstainers vs. those classified as unsupervised drinkers, (3) participants who ever had a full drink vs. those who never had a full drink in their lifetime, (4) participants who had consumed a full drink vs. those who had not in the last month. The aforementioned intervention and sociodemographic variables, i.e., gender, country, and socioeconomic status, were controlled for in all analyses and the interactions of these potentially meaningful covariates with loneliness were examined.

In a second step, based on Hayes' approach (e.g., Hayes, 2009; Hayes, Preacher, & Myers, 2011; Preacher & Hayes, 2008), four regression-based mediation models were developed for continuous alcohol use variables. In these models, both the direct effect of loneliness on alcohol harms, alcohol attitudes, and HED as well as the indirect effect through the effect of loneliness on the self-efficacy and sensation

seeking mediator variables were questioned. The intervention as well as alcohol harms, alcohol attitudes, and HED at T1 were controlled for in all analyses as were gender, country, and socioeconomic status.

3. Results

Correlations describing the relationship between loneliness, self-efficacy and sensation seeking variables, and continuous alcohol use variables at T2 are shown in Table 1. Loneliness scores at T1 were negatively correlated with social, emotional, and academic self-efficacy at T2, though the association with academic self-efficacy was very small. Sensation seeking at T2 was not associated with loneliness at T1. However, loneliness was not significantly correlated with alcohol attitudes, harms, or HED at T1 or T2. This suggests that there is no direct effect between these variables. However, Hayes (2009), Hayes et al. (2011), and others (e.g., Mathieu & Tylor, 2006; Shrout & Bolger, 2002), have posited that "a failure to test for indirect effects in the absence of a total effect can lead to you miss some potentially interesting, important, or useful mechanisms" (Hayes, 2009, p. 11). Indeed, upon further investigation, regression-based analyses did show indirect effects in the absence of direct effects, and these are described below.

Table 2 shows the results of multinomial logistic regressions to investigate the effect of loneliness on lifetime and past 30 day use of alcohol, as well as the effects on being an abstainer or (un-)supervised drinker at T2 controlling for T1. Here, it can be seen that none of the targeted effects were statistically or practically significant when comparing abstainers with supervised drinkers. By contrast, socio-economic status and country of residence had statistically significant associations with the difference between being an abstainer and drinking without supervision. Specifically, individuals who were not eligible for free lunch, and individuals living in Scotland, were all more likely to drink without supervision than be an abstainer when compared to individuals who are eligible for free lunch, or living in Northern Ireland. None of the interactions between loneliness and targeted covariates were substantive.

Again, Scottish adolescents were more likely to drink unsupervised than adolescents from NI. There were no further findings by comparing supervised with unsupervised drinkers. With regard to having had a full drink in the past month, there were a few notable observations. First, Scottish adolescents, compared to Northern Irish peers, had a higher odds of having had a full drink in the past month than not. Second, participating in the alcohol intervention reduced the likelihood of having had a full drink in the past month. Last, being female and experiencing loneliness increased the loglikelihood of having had a full drink in the last month.

Table 2

The effect of loneliness at baseline on alcohol context (abstainer/(un-)supervised) and alcohol use (lifetime use/past 30 day use) + 12 months: controlling for context and use at baseline.

Predictor	Abstainer vs. supervised		Abstainer vs. unsupervised		Supervised vs. unsupervised		Past 30 day use (“no”) vs. past 30 day use (“yes”)		Lifetime use (“no”) vs. lifetime use (“yes”)	
	β	OR (95% CI) ¹	β	OR (95% CI) ¹	β	OR (95% CI) ¹	β	OR (95% CI) ¹	β	OR (95% CI) ¹
Baseline	0.62***	19.23 (14)	0.77***	215.17 (109)	0.53***	16.61 (12)	0.26***	8.75 (5.8)	0.62***	31.78 (23)
Gender ^a	0.05	1.29 (0.99)	−0.04	0.79 (0.47)	0.00	1.00 (0.75)	−0.05	0.82 (0.60)	−0.07*	0.71 (0.55)
SES ^b	−0.04	0.77 (0.56)	−0.12*	0.43 (0.23)	−0.04	0.82 (0.57)	0.04	1.22 (0.86)	−0.03	0.86 (0.64)
Country ^c	−0.03	0.86 (0.66)	0.11*	1.97 (1.14)	0.10**	1.57 (1.19)	0.13**	1.69 (1.25)	0.13***	1.86 (1.45)
Intervention ^d	−0.06	0.75 (0.58)	−0.10	0.55 (0.32)	−0.01	0.94 (0.71)	−0.13**	0.61 (0.45)	−0.06*	0.74 (0.57)
Loneliness	−0.10	0.57 (0.26)	−0.15	0.34 (0.08)	−0.04	0.82 (0.37)	−0.11	0.60 (0.26)	−0.13	0.48 (0.25)
Interactions with loneliness										
Gender	0.01	1.09 (0.55)	0.08	3.06 (0.80)	0.06	1.87 (0.87)	0.12*	2.89 (1.23)	0.08*	2.61 (1.35)
SES	0.00	0.95 (0.41)	−0.01	0.78 (0.19)	−0.01	0.86 (0.34)	0.03	1.38 (0.53)	0.04	1.67 (0.82)
Country	0.01	1.08 (0.55)	−0.01	0.90 (0.24)	−0.06	0.56 (0.27)	0.01	1.05 (0.49)	−0.08*	0.41 (0.22)
Intervention	0.04	1.58 (0.78)	0.07	2.63 (0.66)	0.00	1.02 (0.49)	0.00	0.99 (0.44)	0.10**	3.00 (1.55)

* $p \leq 0.05$.** $p \leq 0.01$.*** $p \leq 0.001$.¹ Lower 5%.^a Reference = male.^b Reference = no free school meals entitlement.^c Reference = NI.^d Reference = control group.

Turning to lifetime use of a full drink, both gender and country affected outcomes. Specifically, boys were more likely to have consumed a full alcoholic drink than girls. Furthermore, Scottish adolescents were far more likely to have consumed a full drink in their lifetime when compared to Northern Irish peers. It was also observed that the alcohol intervention reduced the likelihood of lifetime use of a full drink. As with results specific to the past month, being female and experiencing loneliness substantially increased the odds of lifetime use of a full drink. Living in Northern Ireland and experiencing loneliness also increased the odds of lifetime use of a full drink. Last, the interaction between the alcohol intervention and experiencing loneliness increased the loglikelihood of lifetime use of a full drink.

Turning to Fig. 1, results overall show that the best predictor of T2 behavior was, in fact, T1 behavior. Accordingly, the effect sizes for T1 harms and HED on T2 harms and HED reached Ferguson's recommended minimum practical effect size (≥ 0.2), while the effect of T1 attitudes on T2 attitudes reached a moderate effect size (≥ 0.5 ; Ferguson, 2009). Beyond this, gender, socio-economic status, and the alcohol intervention were shown not to have significant effects on alcohol harms at T2. Although country did have a significant effect, where participants from Scotland reported significantly more alcohol harms than participants from NI, this did not reach Ferguson's recommended minimum practical effect size (≥ 0.2). There was no significant direct effect of loneliness at T1 on alcohol harms at T2. Despite this, indirect effects of loneliness were significant but small, through academic (0.023, $p \leq 0.01$) and emotional self-efficacy (0.041, $p \leq 0.01$). In both indirect paths through social self-efficacy and sensation seeking, the 0 was in the 95% bootstrapped confidence interval, which indicated non-significance (Preacher & Hayes, 2004).

Further, adolescents living in Scotland reported significantly more problematic alcohol attitudes than adolescents living in NI, although the effect size did not reach Ferguson's recommended minimum threshold. Gender and socio-economic status were not associated with alcohol attitudes. However, the intervention had a significant positive effect on alcohol attitudes at T2 (that is, attitudes became healthier), although again, the effect size was not practically significant (Ferguson, 2009). The direct regression path of loneliness at T1 on alcohol attitudes at T2 showed a negative effect which was not practically significant (Ferguson, 2009). However, indirect effects showed that the mediations through academic (0.034, $p \leq 0.001$) and emotional

(0.051, $p \leq 0.001$) self-efficacy were positive, whereas the indirect effect through social self-efficacy was negative (-0.045 , $p \leq 0.01$). There was no indirect effect through sensation seeking.

Analyses for HED again showed a greater likelihood of HED for participants from Scotland in comparison to participants from NI, with a practically insignificant effect size. Also, the intervention had a negative effect on HED at T2. Loneliness at T1 was a significant (but not practically so) predictor for HED at T2 in the direct path. Indirect effects were shown through academic (0.026, $p \leq 0.01$) and social self-efficacy (-0.054 , $p \leq 0.01$), but not through emotional self-efficacy or sensation seeking.

4. Discussion

The present study used two waves of data from a longitudinal study in the UK to examine the effects of self-reported loneliness on a range of self-reported alcohol-use indicators and results are instructive on a number of levels. Firstly, the model fit for the structural models was such that results can be interpreted with confidence. Had the present study been a simple bivariate analysis of the relationship between loneliness and alcohol use, results would have suggested that such a relationship was of limited importance. Interestingly, the inclusion of covariates and a range of alcohol use indicators allowed for the loneliness-alcohol use relationship to fully emerge.

The influence of loneliness on alcohol-related harms and attitudes towards alcohol via emotional self-efficacy suggests that perceived emotional competence in early adolescence is important in this cultural context. Conversely, the results for social self-efficacy suggest that higher social self-efficacy is significantly related to less safe alcohol-related attitudes and an increased likelihood of HED in the past 30 days. These data are consistent with the results of other NI-based studies (McKay et al., 2011, 2012). In these cross-sectional studies, higher levels of social self-efficacy were significantly related to the probability of being a more problematic drinker, assessed using a composite alcohol use measure. We concur with the observations of McKay et al. (2012) that challenged the notion that adolescent problematic drinkers are somehow socially marginalised or dysfunctional.

Two other results were noteworthy and merit discussion. Firstly, the positive effect of the classroom intervention on both HED and alcohol-related attitudes, as well as lifetime and past month consumption of a

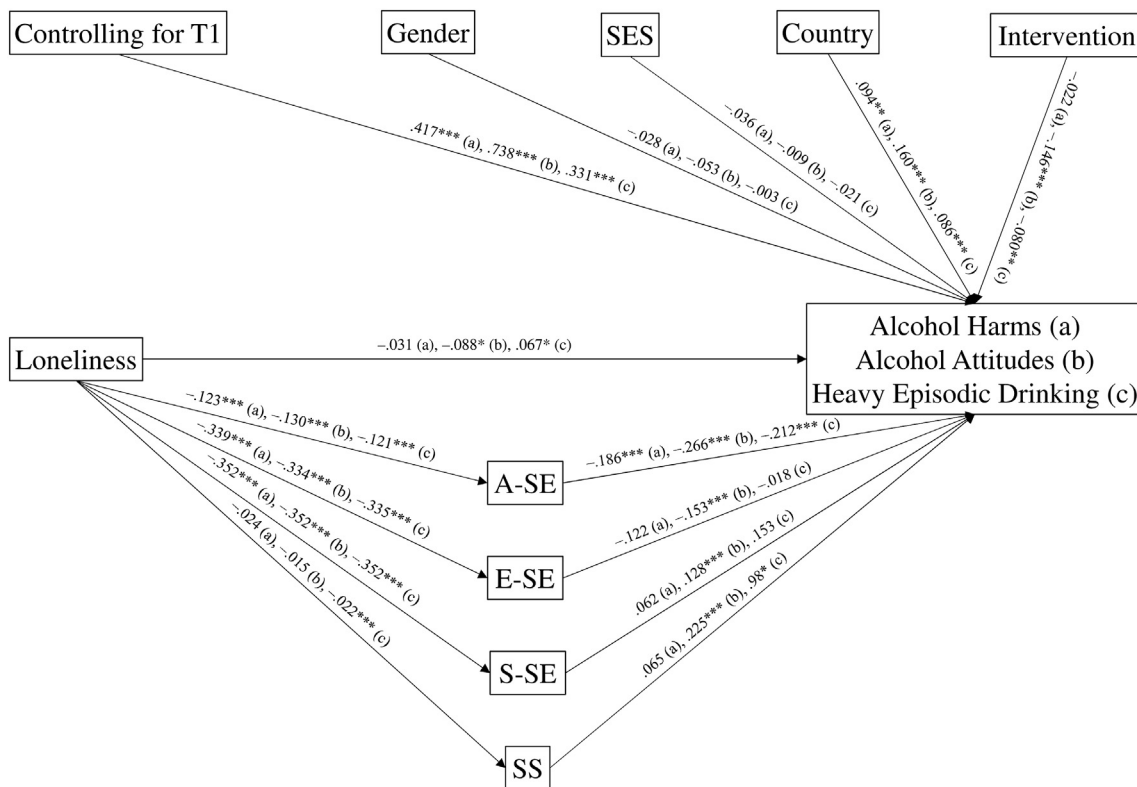


Fig. 1. Standardized parameter estimates for alcohol harms, alcohol attitudes, and HED at +12 months, controlling for alcohol harms, alcohol attitudes, and HED at baseline. A-SE = academic self-efficacy at T2; E-SE = emotional self-efficacy at T2; S-SE = social self-efficacy at T2; SS = sensation seeking at T2. * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

full drink are important findings. The present study consisted of one fifth of an overall longitudinal cohort participating in an evaluation of the efficacy of a combined parental/classroom intervention on HED and alcohol-related harms. The classroom intervention in question was a NI-adapted version of the School Health and Alcohol Harm Reduction Project (SHAHRP; see McKay et al., 2012). It was therefore methodologically important to control for the possible effects of the intervention on alcohol-use behaviors in the present analyses. Although not necessarily statistically powered to speak to the intervention effects per se, the results of the present study support the potential viability of being able to intervene positively with school children with regard to HED, and support findings elsewhere (McKay et al., 2012) with specific regard to the modified version of SHAHRP.

The second noteworthy finding relates to the heightened risk for alcohol harms, HED, and less safe alcohol-related attitudes for Scottish compared to NI adolescents (with a small effect size), the higher risk for drinking unsupervised, and having consumed a full drink in their lifetime in Scottish adolescents, and the interaction between experiencing loneliness and living in NI, that increased the loglikelihood of ever having drunk a full drink. Although regional variation has elsewhere been discussed in terms of UK adolescent alcohol use (e.g., McInnes & Blackwell, 2013; Smith & Foxcroft, 2009), and these results support that variation, there are a number of demographic differences that should be highlighted. For instance, the Scottish cohort were drawn exclusively from schools in the Glasgow Local Authority area, and schools from Inverclyde, while schools in NI were drawn from across the whole geographical area, with the exception of the densely populated Greater Belfast Area. This was for reasons related to the RCT, and the fact that some schools in the greater Belfast Area were already in receipt of the classroom intervention. Essentially, the Scotland/NI comparison is between a relatively rural-living NI population (consisting of those living in the countryside up to large-sized metropolitan towns) compared to an International City population in Scotland. Also,

although in the same academic year in school, the Scottish sample are slightly older than the NI sample. This relates to the fact that Scottish school intake for a given year runs from January to December, while the NI equivalent runs from July to June. Both of these issues (urban living and a slightly older cohort) have likely contributed somewhat to the Scottish/NI comparative findings.

The gender results for the categorical alcohol outcomes show that girls who are experiencing loneliness were at greater risk of lifetime and past 30 days use of a full drink, when compared to boys although this dynamic did not influence context of use (i.e., supervised, unsupervised, etc.). Not in keeping with the results of the present study, Bellis et al. (2010) reported that among those identifying any measure of unsupervised consumption or heavy/frequent drinking, there was a significantly greater likelihood of alcohol-related violence, regretted sex, or forgetting things after drinking. Meanwhile, other studies suggest that supervised drinking is not without prospective negative implications either. For example, Livingston, Testa, Hoffman, and Windle (2010) reported that women who were allowed to drink while living at home, either at home with meals or at school with friends, reported more frequent heavy and episodic drinking at college. Individuals allowed to drink with friends reported the heaviest drinking episodes at both time points.

The relationship between SES and alcohol use indicators is complex, however, a general pattern of those from a lower SES experiencing a disproportionate amount of alcohol-related harm has been widely reported (e.g., Moore & Littlecott, 2015). The results of the present study suggested that experiencing loneliness did not compound this relationship such that loneliness among those entitled to a free school lunch had no effect on the likelihood of unsupervised drinking, and past 30 day and lifetime use of a full drink.

In keeping with the research literature, the current results indicated that both social efficacy and loneliness are important but somewhat complicated factors in adolescent drinking, with differential

relationship depending on the outcome of interest. This continues to challenge the notion that all adolescent drinkers are marginalised and dysfunctional. Instead, the quality of the relationship of the individual to their social network may be a key factor. By contrast, the experience of loneliness appears to depreciate the degree to which adolescents feel as though they can manage academic demands, which in turn sets the stage for unfavourable alcohol outcomes. It is also noted that females appear to be the most vulnerable to suffering unfavourable alcohol outcomes as a result of loneliness.

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