Lay causes of binge drinking in the United Kingdom and Australia: A causal network diagram approach

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Abstract

Risky single-session alcohol consumption or 'binge' drinking is associated with increased health risks and deleterious health, social, and economic outcomes. The aim of this study was to explore the lay causes of excessive alcohol consumption among members of the general public in the UK and Australia. Participants in the UK (N = 133) and Australia (N = 102) completed a network diagram exercise requiring them to indicate the causal relations and the relative strength of the causes among a set of 12 candidate factors (income, age, alcohol availability, drinking culture, low alcohol cost, alcohol advertising, stress, peer pressure, supermarket discount, parental influence, 24-hour opening, boredom) and binge drinking. Findings indicated that the low alcohol cost was the most consistently and strongly factor directly linked to binge drinking by the UK participants. In contrast, Australian participants identified drinking culture and peer pressure as major causes alongside low alcohol cost. While there was consistency in the major perceived cause of binge drinking in the two national groups, some key differences emerged, particularly concerning the role of drinking culture. Current findings may inform the development of preventive measures, health policy, and behavioural interventions with respect to binge drinking.

Keywords: Risky alcohol consumption; network diagram method; causal models; drinking culture

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Introduction

Excessive alcohol consumption and, in particular, risky single-session alcohol consumption, also known as 'binge' drinking, is known to have considerable negative economic, social, and health consequences [e.g., 1, 2, 3]. There has also been a consistent increase in rates of excessive alcohol consumption and binge drinking in the UK, Australia, and worldwide [4, 5]. In the light of growing public health and social issues associated with excessive alcohol consumption and binge drinking, governments are seeking to develop policies and initiatives to reduce these risky patterns of alcohol consumption. Options available to governments and policymakers may be legislative to restrict access to alcohol (e.g., changing licensing laws, raising duty on alcohol) or behavioural interventions to change people's drinking patterns (e.g., educational campaigns, warning labels on alcoholic beverage packaging). Although the successful introduction of any preventive public health initiative depends largely on empirical evidence of its effectiveness, it is also dependent, on the engagement and consent of the general public to provide the policymaking process with the necessary legitimacy for action. With this in mind, an understanding of the beliefs of members of the general public regarding the factors that influence health problems such as binge drinking is likely to prove useful for policymakers when developing public health interventions.

In the present study, we investigated the lay beliefs of the causes of binge drinking by members of the general public in samples from the UK and Australia. The study used a network diagram approach with enabled us to investigate people's perceived causes of binge drinking and their interrelations. The result was a set of network diagrams representing non-expert views of people from the general public on the causes of binge drinking and the relative frequency and strength of each cause. The diagrams provide

insight into the factors identified and prioritised by the general public. This may provide important evidence of the key factors that should be targeted in public health interventions aimed at changing behaviour and may inform the development of information and educational campaigns aimed at increasing the acceptability of policies that may reduce binge drinking.

Non-expert beliefs and health interventions and policy

Binge drinking is a complex social issue with multiple likely causes (Carey, 2001). Research has indicated that binge drinking is caused by multiple social, economic, and psychological factors [6, 7]. However, expert models of the causes of public health issues like binge drinking are likely to contrast with the lay, non-expert beliefs about causes held by the general public. Identifying non-expert views on the causes of binge drinking may have utility in identifying the factors that may inform public health interventions and legislation aimed at reducing binge drinking. For instance, research into lay beliefs regarding causes of binge drinking could inform policymakers' decisions on policy, government initiatives, health education campaigns, and behavioural interventions to reduce risky drinking [8]. An understanding of lay beliefs of the causes of binge drinking by policy makers and stakeholders (e.g., healthcare professionals, emergency services) may assist them in designing health educational materials that will pave the way for the introduction of legislation that may reduce binge drinking. Such materials may assist in the advocacy of policies that may be unpopular with the general public. By emphasising perceived causal factors likely to confer benefits or mitigate threats, and downplaying factors that are likely to be disadvantageous or heighten threat, policy makers may reduce resistance and increase support for public health interventions. Such support is important in order to smooth the path of public health legislation which may potentially be unpopular with the general public. Popular support for public health initiatives is frequently important

if it is to be endorsed by governments and public health officials who are often mindful of negative public opinion [4, 9].

Network diagrams

One way to elicit general consensus on the lay beliefs of a complex issue, like binge drinking, is to use a network diagram method [10]. The method is well-suited to investigate lay beliefs regarding binge drinking as it is effective in quantifying patterns of relations among factors and the target issue or behaviour, but also uses a person-centred inductive approach such that a pattern of relations among perceived causes emerges.

Network diagrams require a sample of individuals to each draw a causal structure that represents their own beliefs with respect to the pattern and strength of different causal factors on a key outcome or issue [10, 11]. By aggregating the diagrams from each individual, it is possible for researchers to formulate a common or composite network diagram that represents broad consensus of the sample concerning the links between a social phenomenon (e.g., binge drinking) and its perceived underlying causes. The composite diagram often represents the consensus (i.e., frequency) among individuals' perceived causal patterns among the factors identified as important to the outcome or issue. A further benefit is allowing perceived strength of each causal factor to be analysed represented as an aggregate of the strength or weight attributed to the relations between each factor and the outcome or issue across individuals.

Network diagrams have previously been used to investigate a wide variety of complex issues including the perceived causes of crime [12], health [13], poverty [14], heart attacks [15], lower back pain [16], risk factors for coronary heart disease [17], work-related stress [18], obesity [11], undergraduate exam failure [19], causes of war [20] and terrorism [21], and employment prospects [22]. In light of growing concerns of the adverse health, social, and economic effects of binge drinking, the use of a network diagram

method offers a structured, systematic approach to study individuals' lay beliefs about their underlying causes.

The present study

The aim of the present study was to investigate the perceived causes of binge drinking in representative samples of the general public from the UK and Australia using a network diagram method [17, 23]. The topic is of particular interest to policymakers and public health advocates due to the high prevalence of binge drinking endemic in the UK and Australia and the recognition of the need for interventions and legislation to address the issue [24, 25]. This approach has not previously been used to study lay-beliefs concerning binge drinking. As the network diagram method is primarily an exploratory technique, no specific predictions were made about the exact nature of the perceived relations among binge drinking causes. However, based on previous research we expect that prominent lay factors in identified in the network diagrams of our samples will include low cost and availability of alcohol, drinking culture and social norms for drinking, and lack of governmental controls [8]. In keeping with previous research using the network diagram method, the precise pattern and effect strengths of the key factors relative to other candidate factors is expected to emerge from the aggregate analysis of participants' diagrams.

Method

Participants

Two hundred and sixty three participants (UK sample: $n = 161$; Australian sample: $n = 102$) completed a network diagram exercise on the perceived causes of binge drinking as part of a larger focus group study on alcohol availability, pricing, and policy. Participants were asked to draw their network diagrams during a break in the focus group discussions and were provided with instructions on how to complete their diagrams by the focus group facilitator. Participants in the UK sample (74 males, 87 females; mean age = 41.38, $SD = 22.09$, range = 16 to 89) described their ethnicity as White-British ($n = 117$),

Asian-Indian ($n = 23$), Black-Caribbean ($n = 6$), White-Other ($n = 5$), Other Ethnic

Background ($n = 5$), Asian-Pakistani ($n = 2$), Black-African ($n = 2$) and Asian-Other ($n =$

1). Participants in the Australian sample (50 males, 52 females; mean age = 39.34, $SD =$

21.34, range = 18-89) described their ethnicity as White Australian ($n = 51$); Australian

Aboriginal or Torres Strait Islander ($n = 1$); Pacific Islander ($n = 1$); North-west European

($n = 10$); Southern or Eastern European ($n = 6$); North African or Middle Eastern ($n = 4$);

South-east Asian (n = 12); North-east Asian (n=2); Southern or Central Asian (n = 13);

North American ($n = 2$); Caribbean Islander ($n = 1$); Sub-Saharan African ($n = 1$); Southern

or East African ($n = 3$). Scores on the fast alcohol screening test [26] indicated that 32% of

UK participants and 66% of Australian participants were classified as hazardous drinkers.

Network diagram method

In order to provide demonstration of a network diagram, participants were shown an

example diagram drawn by a fictitious student for the effects of 12 pre-determined factors

(e.g., social deprivation, community cohesion, drug abuse) on crime levels in the UK or

Australia, accordingly. Following this example, participants were asked to produce a

similar diagram to illustrate their thoughts regarding the causes of binge drinking in the UK

or Australia. Participants were given a pre-determined list of twelve candidate causes or

factors: income, age, availability of alcohol, drinking culture in the UK/Australia, alcohol

cost, alcohol advertising, stress, peer pressure, supermarket discounts, parental influence,

24-hour opening hours, and boredom. These causes were selected as they were the most

frequently cited in previous research on the causes of binge drinking [7, 27]. The restriction

of factors to a pre-determined set of candidate causes is common practice in network

diagram method in order to guide participants toward relevant factors and away from minor

or irrelevant factors. This is in keeping with the focus on the method on the perceived

causal relations rather than the identification of the factors per se. Participants were

instructed to restrict their diagrams to these twelve factors. Participants were told that they

were free to omit any of the factors that they did not consider to have an influence on binge drinking. Eight participants in the UK sample included factors that were not provided on the list of candidate factors and their data were omitted from the final analysis. None of the participants in the Australian sample included factors not on the list. Participants were also asked to indicate which of the 12 factors they believed had a direct and indirect influence on binge drinking. The researcher provided a demonstration to illustrate how to develop direct and indirect effects in their diagrams.

Participants were given approximately five minutes to complete their diagrams, after which they were asked (a) to ensure their diagrams included every factor they believed influenced binge drinking from the candidate list of factors; (b) to check that arrowheads were used appropriately to indicate the direction(s) of the relationships drawn in their diagrams; and (c) to rate each path drawn on a 0 to 100 scale to indicate the relative strength of the different relationships in their diagrams. Scales were rated from '*not a causal factor at all*´ (rating = 0), to '*factor completely causes binge drinking* (rating = 100).

Results

Participants

Five participants from the UK sample declined to participate in the network diagram exercise and a further fifteen did not assign a strength rating to all the causal paths drawn in their diagrams, so their data were excluded from the analyses leading s final sample of 133 participants. None of the 102 Australian participants declined to participate and all completed the exercise as instructed.

Network diagrams

UK participants' included an average of 12.45 causal paths ($SD = 5.11$) in their diagrams. The mean number of direct causal paths linking the 12 factors and the target binge drinking was 5.33 ($SD = 1.84$), participants also included, on average, 7.12 indirect

causal paths ($SD = 5.16$) between the causes. Table 1 shows the frequency of path inclusion

and mean path strength rating for causal paths included by at least 10 per cent of the UK

participants and a composite diagram illustrating the perceived causal paths is provided in

Figure 1. Australian participants' included an average of 12.78 causal paths ($SD = 5.05$) in

their diagrams. The mean number of direct causal paths linking the 12 factors and the target

binge drinking was 8.18 ($SD = 3.13$), participants also included, on average, 4.65 indirect

causal paths ($SD = 5.03$) between the causes. Table 2 shows the frequency of path inclusion

and mean path strength rating for causal paths included by at least 10 per cent of the

Australian participants with the accompanying composite diagram depicting the pattern of

perceived causal paths provided in Figure 2. Reliability of paths in both samples was

calculated by randomly dividing each sample into two groups and comparing the groups

within each sample for path inclusion and path strength consistent with previous research

network diagram methods [11, 16, 17]. The two randomly-selected groups did not

significantly differ ($p < .05$) in terms of the frequency of path inclusion or strength in both

samples.

A number of analytic approaches to interpreting network diagrams exist [11, 17,

23]. In the current study, we adopted Green and McManus' [17] percentage criteria to

provide a detailed overview of all causal factors suggested, and interactions between them

in the final composite diagrams. Diagrams and nodes were developed to allow for easy

comparison and contrast between samples.

Direct causes. All 12 of the pre-determined factors were included in the final

composite diagrams for the UK and Australian samples as each was identified as a direct

cause of binge drinking by at least 10% of the participants. Low cost of alcohol and stress

were the most commonly stated causes of binge drinking (low cost of alcohol, $n = 71.43\%$;

stress, $n = 68.42\%$) with the highest-rated causal strength (low cost of alcohol, $M = 80.29$,

$SD = 20.92$; stress, $M = 68.02$, $SD = 22.71$) by UK participants. These factors were also

frequently cited (low cost of alcohol, $n = 65.69\%$; stress, $n = 77.45\%$) and rated important (low cost of alcohol, $M = 59.58$, $SD = 25.672$; stress, $M = 60.09$, $SD = 23.28$) in the Australian sample, but less so by comparison. Drinking culture was the most commonly stated ($n = 89.21\%$) and rated as the strongest causal factor ($M = 81.48$, $SD = 17.18$) in the Australian sample. Drinking culture in the UK was also rated as a strong cause of binge drinking ($M = 77.50$, $SD = 17.64$), however, just under half of the sample cited this as a cause ($n = 48.12\%$). Peer pressure was also rated as a strong cause ($n = 83.34\%$) with a high causal strength ($M = 74.84$, $SD = 22.72$) in the Australian sample, and the frequency ($n = 65.41\%$) and strength ($M = 70.38$, $SD = 19.04$) of this factor as a cause in the UK sample was less by comparison.

Among other causes, availability of alcohol was rated as a strong factor in the UK sample ($M = 79.08$, $SD = 21.12$); however, only approximately half of the sample stated this ($n = 53.38\%$). In contrast, the strength ($M = 61.16$, $SD = 27.05$) of this factor in the Australian sample was lower, but a larger proportion of participants cited this cause ($n = 73.57\%$). Age was suggested as a cause of binge drinking by the majority of Australian participants ($n = 80.39\%$), but had a low causal strength ($M = 64.39$, $SD = 26.02$). Boredom ($n = 57.83\%$) and 24-hour opening of points of sale ($n = 45.10\%$) were also frequently-cited perceived causes that in the Australian sample but with relatively weak causal strengths (boredom, $M = 40.92$, $SD = 26.99$; 24-hour opening, $M = 42.83$, $SD = 28.00$). These factors had substantially lower citation frequencies in the UK sample by comparison.

Indirect causes. In addition to the factors identified as having direct causal effects on binge drinking, the analysis also permitted the analysis of lay indirect causes. In the UK sample, the most commonly stated indirect influence on binge drinking was the effect of supermarket discounts ($n = 42.11\%$), which was perceived to affect binge drinking via low cost of alcohol; participants also suggested this was a strong causal path ($M = 71.34$, $SD = 25.68$). The strongest indirect causal path was also between supermarket discounts and

binge drinking via increased availability of alcohol ($M = 79.09$, $SD = 22.02$). In both cases, these findings highlight the perceived importance of pricing and the role of supermarket discounts and promotions indirectly influencing binge drinking. The indirect paths between income and cheap of alcohol ($n = 28.57\%$) and age and peer pressure ($n = 28.57\%$) were also commonly stated; however, the perceived causal relationship between age and peer pressure ($M = 75.42$, $SD = 21.12$) was rated stronger than that between income and low cost of alcohol ($M = 65.50$; $SD = 25.05$).

For the Australian sample, age and low cost of alcohol were most frequently identified as having indirect causal effect on binge drinking. The most commonly identified indirect influence on binge drinking was the effect of age ($n = 19.60\%$), which was perceived to affect binge drinking via drinking culture; participants also suggested this indirect link was a relatively strong causal path ($M = 66.84$, $SD = 24.96$). The next most commonly identified path was that of age on binge drinking ($n = 18.63\%$), via peer pressure, which was a stronger causal path ($M = 71.84$, $SD = 19.80$).

Discussion

The aim of the present study was to investigate the perceived causes of binge drinking in representative samples of the general public from the UK and Australia. A network diagram approach was used to produce aggregate, consensual models of participants' lay causes of binge drinking in the UK and Australia. For the UK sample, participants' network diagrams showed evidence of strong consensus regarding which of the 12 factors were perceived to directly influence binge drinking. In particular, three factors were consistently cited by a substantial majority of participants as direct causes on binge drinking in the UK: low cost of alcohol, stress, and peer pressure. Australian participants' diagrams also indicated strong consensus over which of the pre-determined factors was most important, and how strongly they influenced binge drinking. Though all

factors were included in the overall diagram, several had particular prominence and were

repeatedly highlighted by participants: drinking culture, peer pressure, and age.

In the UK sample, low cost of alcohol was the most commonly identified direct

causal factor; it was also identified as the strongest cause of binge drinking in the UK. In

contrast, the Australian sample stated drinking culture as the most common direct causal

factor, and rated as one of the strongest causes of binge drinking. These findings are

important given the recent focus of alcohol pricing as being a key cause of binge drinking

[28, 29], and recent proposed of government policies that aim to tackle alcohol misuse and

binge drinking by regulating the price of alcohol [25]. Perhaps consistent persuasive public

health messages coupled with changes in legislation may be effective in changing social

norms and cultural expectations surrounding excessive alcohol consumption, analogous to

how drink-driving campaigns have transformed attitudes and behaviour toward driving

while intoxicated in the past 20 years. The current findings support previous research

demonstrating the effect of culture on binge drinking habits [30, 31], and might provide an

important means to intervene.

Peer pressure was a frequently identified direct cause of binge drinking by

participants in both samples. This is consistent with findings from a recent meta-analysis of

social psychological predictors of drinking intentions which found social norms have a

substantive effect on intentions to drink [32]. Binge drinking and drinking-related problems

(e.g., alcohol related accidents) are over-represented in younger drinkers who may be more

susceptible to peer pressure [33-35]. It is, therefore, understandable that peer pressure is a

commonly considered causal factor of binge drinking. These lay causal factors are

consistent with research which has demonstrated peer influence as an important

contributing factor to excessive alcohol consumption [36, 37]. In many cases, the

consistency of lay causes of binge drinking and actual causes is likely to reflect 'meta-

cognitive' beliefs regarding binge drinking, that is, binge drinkers demonstrate an awareness of the role that their peers play in influencing their own binge drinking.

Drinking culture was also identified as a strong causal factor of binge drinking by participants in both samples, although it was cited much more frequently by Australian participants. Previous research shows drinking culture as a pervasive actual and perceived cause of binge drinking [30, 38-40]. The pervasive effects of cultural norms and attitudes on excessive patterns of alcohol consumption, presents a considerable challenge to policymakers and those developing behavioural interventions reduce binge drinking. Changing cultural norms around alcohol consumption is extremely difficult given that norms tend to be strongly endorsed and reinforced from a young age in the UK and Australia [40, 41]. Consistent with current findings indicating that the general public is aware of the influence of norms on binge drinking, data suggest that efforts to change 'drinking cultures' need to focus on changing accepted patterns of drinking in young people. Such initiatives need to focus on educational campaigns that highlight the advantages to drinking less (e.g., costs, success in the workplace), the provision alternative social activities that are attractive to young people that do not involve alcohol consumption, and legislation that reduces opportunity for alcohol consumption. Such efforts should take a sustained, long-term approach aimed at changing norms around alcohol over time rather than focusing on legislative changes alone that focus on changing current alcohol consumption patterns that will likely have little effect on norms.

An advantage of the current network diagram method is that it offers an opportunity to study the indirect effects between factors, which might otherwise be overlooked when using traditional survey methods. Participants' network diagrams showed that low cost of alcohol was believed to be the main direct determinant of binge drinking in the UK. However, other factors including supermarket discounts, alcohol advertising, income and the availability of alcohol were also identified as having indirect effects on binge drinking

via low cost of alcohol. For example, income was perceived to have an indirect effect via low cost of alcohol, which supports previous research suggesting the disparity between the rate at which personal income and the price of alcohol have increased [24, 42].

The availability of alcohol was also regarded as a strong and indirect determinant of binge drinking by participants in both samples. A particular strength of the current network diagram method is that it allows relationships between factors to be investigated. Therefore, while just over half of the participants in the UK and Australian samples considered availability to be one of the strongest causal factors of binge drinking, it appears that availability is perceived to be a corollary of supermarket discounts and low cost of alcohol. Both factors were considered to have strong indirect relationships with the availability of alcohol, while a minority of participants indicated that 24 hour opening hours had a moderate, indirect effect on availability. These factors are consistent with research that has identified cost and availability of alcohol as key determinants of excessive alcohol consumption, particularly in young people [43-47]. This is particularly important for policy makers as it seems that participants considered the increasing affordability of alcohol to be the most significant contributor to its growing availability, not extended opening hours. This is an issue in need of further investigation: whether actual and perceived causes of binge drinking align, as this will better inform policy making decisions regarding which issues are targeted in campaigns and other initiatives to manage binge drinking.

Future research could investigate whether binge drinkers hold different network representations compared to those who do not drink to excess, or if individuals of different ages or social backgrounds view the causal strength and frequency of factors differently. It would also be important to compare network diagrams of binge drinkers with those of emergency service providers (e.g., police, paramedics) and policymakers who are directly involved in efforts to manage and treat the outcomes of binge drinking and reduce its prevalence. Investigations of this kind would demonstrate whether people tend to hold

largely similar beliefs about the causes of binge drinking, or if these beliefs are determined by an individual's demographic background (e.g., age, social class), alcohol intake, and profession. For instance, are individuals who regularly misuse alcohol (i.e., regularly exceeding recommended guidelines levels) more likely to perceive binge drinking to be caused by external factors (e.g., peer pressure, drinking culture) than those who do not?

Conclusions

The present studies used a network diagram approach to investigate people's beliefs concerned with the causes of binge drinking in the UK and Australia. This approach allows for the complex, interacting nature of people's causal beliefs to be clearly defined, and a quantifiable consensus of public opinion to emerge. Present findings suggest that the price of alcohol was the most consistently cited and rated as the strongest contributing factor to binge drinking in the UK; whereas drinking culture was the main causal factor in Australia. However, drinking culture was also identified as important in the UK sample, a key area of convergence in the diagrams drawn by participants in both samples. In both cases, the causes of binge drinking mirror causes identified in the literature, suggesting that participants have a good understanding of the factors that underpin binge drinking. Current findings suggest that public health professionals and policymakers may consider addressing people's lay beliefs of the causes of binge drinking identified in the current research, such as drinking culture and norms, when developing public health policies and interventions to reduce excess alcohol consumption [48]. Such approaches may involve developing educational campaigns that acknowledge the importance of 'fitting in' and felt pressure from others when it comes to alcohol consumption, and focus on highlighting the personal advantages of reducing alcohol consumption and identifying non-alcohol alternatives which would provide clear and strong rationales for reducing excessive alcohol consumption in social situations.

Conflict of interest

The authors declare no conflict of interest.

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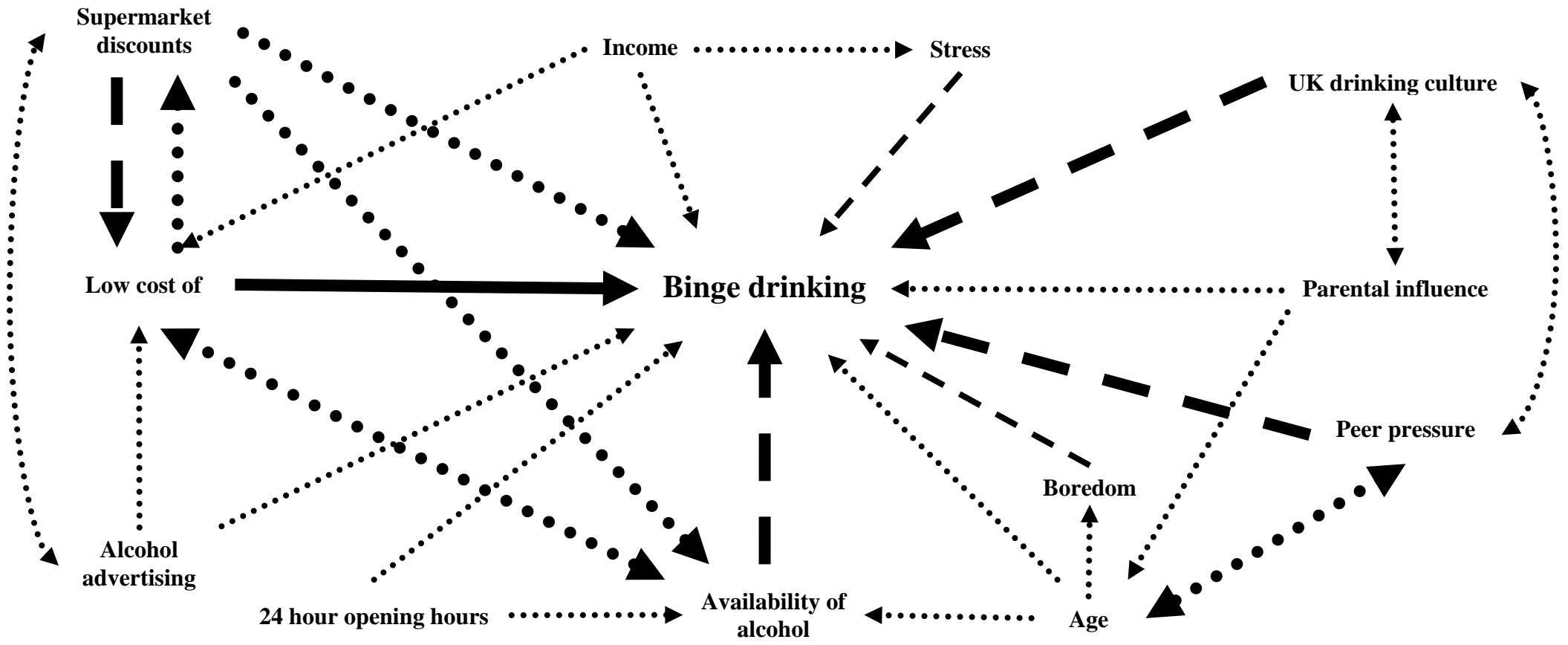
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Table 2

Percentage of UK Participants Including Paths in Network Diagrams and Mean Strength of Paths in Network Diagrams for Binge Drinking

Source factor	Target factors	Percentage including the path (n)[a]	Mean path strength (SD)[b]
Income	Binge drinking	28.57% (38)	66.58 (29.23)
	Low cost of alcohol	28.57% (38)	65.50 (25.05)
	Stress	10.53% (14)	59.64 (30.35)
Age	Binge drinking	34.59% (46)	66.09 (22.30)
	Availability of alcohol	10.53% (14)	62.50 (24.71)
	Peer pressure	28.57% (38)	75.42 (21.12)
	Boredom	14.29% (19)	61.58 (24.33)
Availability of alcohol	Binge drinking	53.38% (71)	79.08 (21.12)
	Low cost of alcohol	18.80% (25)	70.00 (20.21)
UK drinking culture	Binge drinking	48.12% (64)	77.50 (17.64)
	Peer pressure	17.29% (23)	56.52 (29.52)
	Parental influence	10.53% (14)	48.57(26.63)
Low cost of alcohol	Binge drinking	71.43% (95)	80.29 (20.92)
	Availability of alcohol	15.79% (21)	73.81 (20.73)
	Supermarket discounts	10.53% (14)	77.86 (26.44)
Alcohol advertising	Binge drinking	18.80% (25)	61.64 (23.97)
	Low cost of alcohol	15.79% (21)	64.29 (27.26)
	Supermarket discounts	15.04% (20)	55.75 (27.01)
Stress	Binge drinking	68.42% (91)	68.02 (22.71)
Peer pressure	Binge drinking	65.41% (87)	70.38 (19.04)
	UK drinking culture	12.03% (16)	69.06 (19.17)
	Age	17.29% (23)	77.78 (20.56)
Supermarket discounts	Binge drinking	34.59% (46)	75.54 (21.57)
	Low cost of alcohol	42.11% (56)	71.34 (25.68)
	Availability of alcohol	16.54% (22)	79.09 (22.02)
	Alcohol advertising	10.53% (14)	63.21 (33.49)
Parental influence	Binge drinking	27.82% (37)	62.97 (27.97)
	UK drinking culture	12.78% (17)	64.18 (23.04)
	Age	15.04% (20)	54.00 (25.83)
24 hour opening hours at points of sale	Binge drinking	33.08% (44)	68.52 (26.44)
	Availability of alcohol	16.54% (22)	64.32 (26.96)
Boredom	Binge drinking	48.87% (65)	59.94 (22.84)

Note. [a]For inclusion, paths had to be identified by at least 10% of participants; [b]Mean path strength between a factor and binge drinking was calculated by summing all relevant paths for that factor [see 17].

Supermarket discounts

Income · · · · · · · · · · · · · · · ▶ **Stress**

UK drinking culture

Low cost of ━━━━━━━▶ **Binge drinking** ◀ · · · · · · · · · · · · · **Parental influence**

Alcohol advertising

24 hour opening hours · · · · · · · · · · ▶ **Availability of alcohol** ◀ · · · · · · · · **Age**

Boredom

Peer pressure

KEY:

		Sample proportion	
	High	Medium	Low
Path strength High	━━━━━━	━ ━ ━ ━	• • • • • • • • •
Medium	———————	– – – – –	· · · · · · · · · · · ·
Low	———————	- - - - - - -	····························
	High 100-70	**Medium 69-40**	**Low 39-10**

Figure 1. Composite network diagram for the UK sample.

Table 2

Percentage of Australian Participants Including Paths in Network Diagrams and Mean Strength of Paths in Network
for Binge Drinking

Source factor	Target factors	Percentage including the path (*n*)[a]	Mean path strength (*SD*)[b]
Income	Binge drinking	69.61% (72)	50.21 (27.08)
Age	Binge drinking	80.39% (82)	64.39 (26.02)
	Income	11.76% (12)	65.41 (30.60)
	Peer Pressure	18.63% (19)	71.84 (19.80)
	Availability of alcohol	10.78% (11)	51.82 (18.34)
	Drinking culture	19.60% (20)	66.84 (24.96)
Availability of alcohol	Binge drinking	73.57% (73)	61.16 (27.05)
Drinking culture	Binge drinking	89.21% (91)	81.48 (17.18)
	Peer Pressure	18.63% (19)	74.47 (21.91)
Low cost of alcohol	Binge drinking	65.69% (67)	59.48 (25.67)
	Income	18.63% (19)	57.89 (23.94)
	Availability	10.78% (11)	74.44 (24.55)
	Supermarket Discounts	16.67% (17)	74.71 (20.65)
	Drinking culture	10.78% (11)	67.22 (15.63)
Alcohol advertising	Binge drinking	53.92% (55)	53.21 (26.82)
	Drinking Culture	10.78% (11)	59.44 (27.89)
Stress	Binge drinking	77.45% (79)	60.09 (23.28)
Peer pressure	Binge drinking	83.34% (85)	74.84 (22.72)
	Age	10.78% (11)	64.50 (28.91)
Supermarket discounts	Binge drinking	42.16% (43)	44.53 (23.57)
Parental influence	Binge drinking	72.54% (74)	59.26 (26.34)
	Age	10.78% (11)	74.00 (29.14)
	Drinking culture	16.67% (17)	63.33 (26.90)
24 hour opening hours	Binge drinking	45.10% (46)	42.83 (28.00)
	Availability of alcohol	14.73% (14)	42.14 (22.16)
Boredom	Binge drinking	57.83% (59)	40.92 (26.99)

Note. [a]For inclusion, paths had to be identified by at least 10% of participants; [b]Mean path strength between a factor and binge drinking was calculated by summing all relevant paths for that factor [see 17].
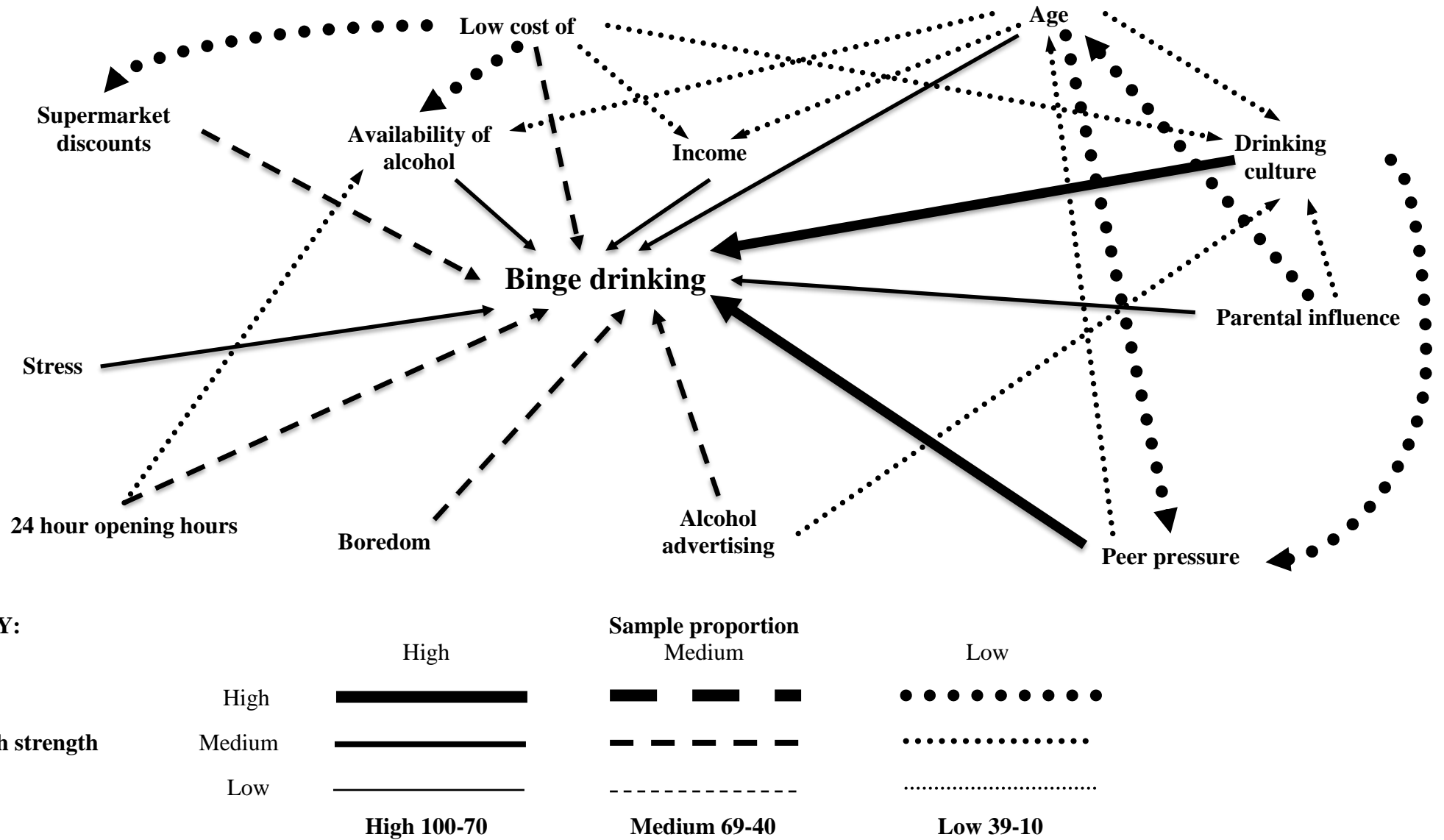
Figure 2. *Composite network diagram for the Australian sample.*