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Development and acceptability of a co-produced online intervention to prevent alcohol misuse in adolescents: A think aloud study

Authors: Emma L Davies[1], Jilly Martin[2], David R Foxcroft[3]

1. Department of Psychology, Social Work and Public Health, Faculty of Health and Life Sciences, Oxford Brookes University, Headington Campus, Gipsy Lane, Oxford, OX3 0BP, United Kingdom, edavies@brookes.ac.uk 01865 484056

2. Department of Psychology, University of Sheffield, Western Bank, Sheffield, S10 2TN, United Kingdom, jilly.martin@sheffield.ac.uk 0114 222 6513

3. Department of Psychology, Social Work and Public Health, Faculty of Health and Life Sciences, Oxford Brookes University, Jack Straw's Lane, Marston, Oxford, OX3 0FL, United Kingdom david.foxcroft@brookes.ac.uk 01865 485283

Corresponding author: Emma L Davies edavies@brookes.ac.uk

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Background: The Prototype Willingness Model (PWM) may offer an appropriate basis for explaining and preventing adolescent alcohol misuse. An intervention was developed using a co-production approach, and consisted of an online quiz featuring 10 questions linked to PWM.

Objectives: This study sought to determine the acceptability and relevance of the intervention content to young people, in order to incorporate their feedback into a final version.

Methods: A qualitative think aloud study with follow up semi-structured interviews was undertaken with 16 young people aged 11-15 (50% female), Transcripts were analysed using thematic analysis.

Results: Three main themes relating the acceptability of the intervention were identified; '*challenging expectations of alcohol education*'; '*motivations for drinking or not drinking'* and '*the inevitability of drinking'.* Participants found the intervention appealing because it was counter to their expectations. The content appeared to reflect their experiences of social pressure and drinking encounters. There was evidence that a focus on drinker/non-drinker prototypes was too narrow and that because adolescents perceived drinking as inevitable, it would be challenging to enact any plans to resist pressure to drink.

Conclusions: An online intervention based on the PWM has the potential to engage and interest adolescents. A wide range of alcohol prototypes should be targeted and a focus on short term harms should ensure that the intervention is credible to young people.

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Introduction

Underage alcohol consumption is higher in the United Kingdom (UK) than in other parts of Europe [1] and evidence suggests teenagers aged 11-15 who consume alcohol are at risk of short term harm [2, 3] and later dependence [4]. National surveys suggest that the number of young people in England aged 11-15 who report ever having tried alcohol is falling [5], however other evidence suggests that those who do drink tend to consume harmful quantities [6, 7]. This evidence points to a need for the development of effective intervention measures to reduce adolescent alcohol misuse and associated harms.

Many interventions aimed at adolescents rely on popular models, such as The Theory of Planned Behaviour [8], which rest on assumptions of reasoned decision making and intention driven behaviour. However, there is often a discrepancy between what people intend to do and what they actually do [9, 10]. This 'intention-behaviour gap' is particularly problematic in explaining adolescent health risk behaviours [11]. In support of this, a recent meta-analysis suggests that adult alcohol intentions mat be better accounted for by the TPB than adolescent alcohol intentions [12]. This may be because adolescence is characterised by high levels of impulsivity, which is linked to risk taking behaviours, such as drinking alcohol [13], and tends to peak between the ages of 13-19 [14, 15]. Drinking at this age tends to occur in social situations where peer influences are strong [16, 17] and may provide a challenge to the developing brain [18].

Some evidence suggests that theory based health behaviour change interventions tend to have larger effect sizes than those that are not based in theory [19]. However, a recent meta-analysis suggests that some theory-based interventions may fail to appropriately target each construct within the selected theory, and furthermore, not all Behaviour Change Techniques (BCTs) are linked to theory [20]. It is therefore essential to identify an appropriate theoretical basis for an

intervention to reduce alcohol misuse in adolescents, and to ensure that it is appropriately applied within the intervention.

The Prototype Willingness Model (PWM) [21, 22] accounts for adolescent health risk-taking on the basis that this type of behaviour is driven by social reactions to risk-conducive situations, as well as intentions (Figure 1). In common with other dual process models, there are two routes to behaviour within the PWM; the first a rational, planned route via intentions, and a second reactive pathway, which is a faster, more spontaneous route, operating outside of conscious control [22]. The spontaneous pathway takes into account that for young people risky behaviours tend to occur in a social context and are often unplanned [23]. Within this pathway, the images or 'prototypes' that young people have about typical people their age that drink or abstain from drinking are influential for 'willingness' to consume alcohol. This is due to the importance of self-image and social comparison in adolescence [17].
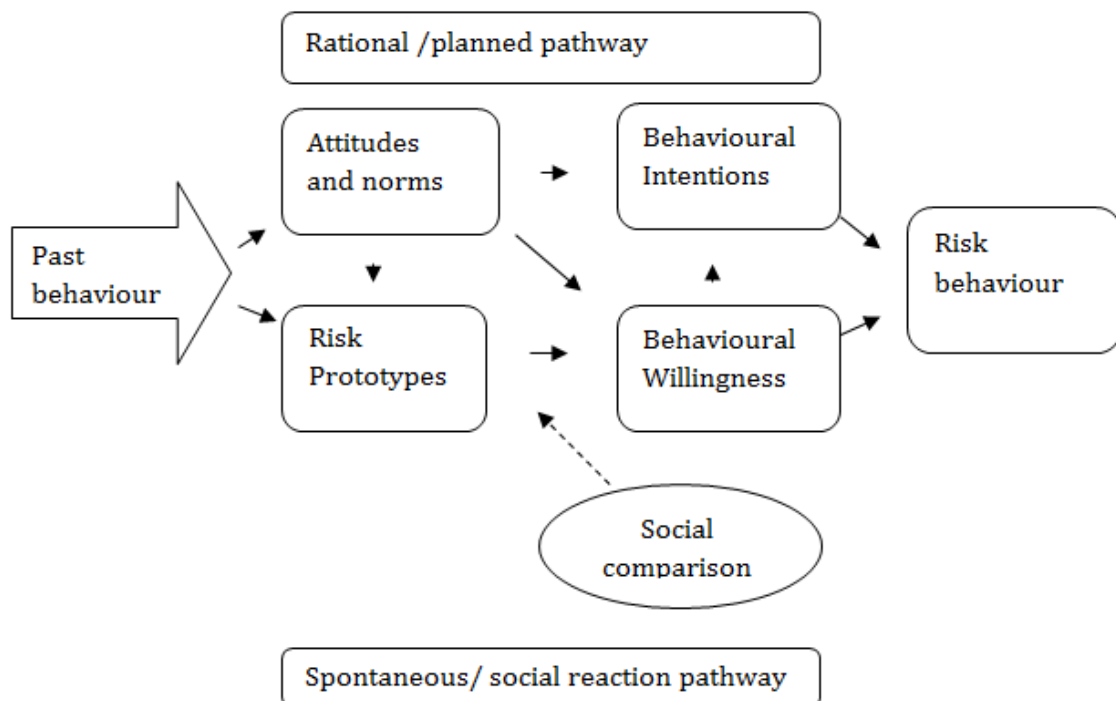

Figure 1: *The Prototype Willingness Model. Adapted from Gerrard et al 2008*

Previous research has shown that the PWM is able to offer a good explanation for risk behaviours, such as alcohol consumption in young people [24-26]. Studies have also shown that the PWM may offer a suitable basis for an intervention, for example in substance misuse [27] and physical activity [28]. A number of studies have applied this model to alcohol consumption in the UK, by university students [29] and in adolescents aged 16 [30]. However, there is less research that specifically examines the PWM in relation to preventing alcohol misuse in young adolescents, under the age of 16, in the UK. The current project therefore sought to develop an intervention based on the PWM to explore its application to this population.

Intervention development

Intervention development has been conceptualised within a number of phases by the Medical Research Council [31]. The 'development' phase within this framework covers the important process of identifying the evidence base and ensuring the intervention is clearly linked to theory, a step that is sometimes neglected [32]. In order to specify a clear pathway though the development phase, we set out a number of steps at the outset of the project, starting with a scoping focus group study and a survey [33, 34]. A co-production approach was taken, involving input from adolescents, teachers and parents as key stakeholders in the intervention at different stages of its development. Co-production aims to acknowledge and empower young people (and other stakeholders) through collaboration in the intervention development process [35].

There were two important findings from the focus group study. Firstly, it showed that that young people in the UK were able to describe drinker and non-drinker prototypes that potentially could be targeted in an intervention. Secondly, the findings also suggested a distinction between 'planned' drinking by older participants (aged-16-17) and 'unplanned' drinking in younger participants (aged 11-13) [34]. A survey of 178 adolescents aged 11-17 built on these findings by exploring the relationship between prototypes, willingness, intentions and alcohol consumption. The survey results suggested that young people aged 11-15 were

likely to be a more appropriate age group for an intervention targeting prototypes and willingness than those aged 16-17. Furthermore an exploratory factor analysis suggested that targeting prototype characteristics that were related to 'sociability' might be an appropriate focus within the intervention [33].

Although there has been a drive in recent years to classify behaviour change techniques (BCTs) according to theoretical and behavioural features, at the time of development no clear BCTs related to the PWM had been specifically defined and agreed. Thus, within the development of the current project, we identified techniques used in eight existing PWM interventions, comparing them to a taxonomy of BCTs [36] and identifying if they adequately reflected the assumed change processes in the PWM. This process was evaluated in a Delphi study, reported elsewhere [37], which resulted in four BCTs being identified that were relevant to the social reaction pathway of the PWM. Table 1 presents the identified BCTs and how they relate to the PWM.

Table 1 *Logic model to specify BCTs, processes and outcomes for PWM intervention in the social reaction pathway*

Input: BCT	Process in PWM	Outcome
1) Present information on other people's drinking to reduce perception of drinker prototype as the norm to enhance similarity to non-drinker	Images are often based on misperceptions. Similarity to prototype drinker is strongly related to willingness and drinking	Drinker prototype similarity decreases. Corrects norm misperception
2) Present a positive non-drinker and or negative drinker prototype and enhance similarity to non-drinker	Target prototype favourability and similarity. Enhance positive features of non-drinker. Present negative image of drinker	Drinkers and drinking are less favourable and less similar to self. Non-drinkers and non-drinking more favourable and more similar to self
3) Teach awareness of social/ environmental cues to behaviour (that reactive or unplanned is more risky)	Spontaneous influences on behaviour may occur when young people do not plan to drink	Young people are aware of reactive nature of their behaviour
4) Provide examples of how other young people resist social pressure in social situations	Reduce unplanned behaviour and decrease willingness to drink.	Young people are able to recognise and deal with social pressure themselves

It is important to ensure that the content and format of an intervention are matched to the preferences of the intended recipients [38]. Discussions from the focus group study suggested that the participants may not be receptive to a classroom intervention delivered by a teacher [34]. Adolescents who attended schools that took part in the focus groups and surveys were consulted in the process of selecting the most appropriate means of delivering the intervention within the classroom. They reported that they preferred to engage with interactive online materials rather than written information. Furthermore, other evidence highlighted the

benefits of using computer games to enhance learning within a school context [39] and that online interventions might be a useful means of reaching younger populations [40]. Research with young people suggests a familiarity with using the internet for school work, and that 46% of young people complete quizzes online [41]. A quiz format was selected as an appropriate mode of delivering the intervention because it required engagement with the content and has been used in other interventions targeting adolescents [42]. At this point we named the intervention 'The Alcohol Smart Quiz' (ASQ) in consultation with adolescents.

The quiz consisted of ten multiple choice questions linked to the identified BCTs. In line with previous PWM intervention research [43, 44] the information in the quiz was presented as originating from a survey of adolescents the same age as the intended recipients. The answers were provided as explanations from other young people talking about their own experiences. The first five questions targeted alcohol prototypes. For example there were questions that require the participant to select characteristics of the typical drinker or non-drinker who is the same age as they are. The second five questions target social pressure and unplanned drinking. This part included questions and answers where young people describe that they resist pressure to drink by making a plan in advance of what they will say if they are in a social situation where alcohol is present. The quiz materials can be accessed from the main author on request.

Think aloud

In a think aloud study participants are required to talk out loud about what they think as they complete a task or a questionnaire. Think aloud interviews have been widely used in psychology as a method of cognitive interviewing [45, 46]. For example, French et al [45], used this method to explore what participants understood when reading TPB questionnaires. Think aloud interviews have more recently been used by intervention designers who saw the potential of the method in contributing to an understanding of how users interpret theoretical techniques and relate intervention content to their own experiences [47, 48]. This method is also useful for

ensuring that the terminology used is understandable to particular samples [47]. It therefore offers an appropriate method of gaining feedback from young people.

The overall aim of the study was to explore adolescent views about the ASQ intervention in order to determine the acceptability and relevance of the content to young people, and in order to incorporate their feedback into a final version, as part of the development process.

Method

Participants

There were 16 participants; eight boys and eight girls aged from 11-15, in years 6-11 at school. The participants attended 12 different schools in the XXXXXXX area. Interviews were conducted and analysed until data saturation was reached. Participants were recruited through advertisements to parents and offered a £10 voucher to thank them for taking part. The study received ethical approval from Oxford Brookes University (reference number 120619).

Materials

A paper version of the intervention was constructed using a printed and laminated PowerPoint slide to represent each page of the website. This was presented on a document stand so that participants could flip between pages. A paper version was used in order that changes could be made to the content following the study prior to funds being used to build the website. Paper versions of online interventions have used in similar studies [47]. The pages represented the quiz questions and answers presented in Table 1, with pictures of young people of a similar age depicted as giving answers to the questions. Participants were told that once we put the intervention online, we would be using videos of real people to give the answers.

Think aloud interviews

Interviews took place in a quiet room on University premises and consent was obtained from both the parent and participant. At the start of the session the researcher checked the parent

had talked about the study to the participant and if they were happy to proceed. The interviewer read out some standardised instructions and demonstrated thinking aloud by completing a similar task consisting of answering questions in a quiz about favourite foods. Participants then worked though each page of the intervention and were prompted to tell the interviewer what they thought of each question. This was followed with some semi-structured interview questions to explore factors related to intervention acceptability (see Box 1). Interviews lasted between 25-40 minutes, were audio recorded and then fully transcribed.

Box 1 *Semi structured interview schedule of follow up questions used in think aloud study*

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1) Overall views about the quiz

What did you think of the quiz?

Was it easy to understand what you have to do?

What would you think if you were given this quiz to play at school? At home?

What improvements could you make?

2) What did you think about the answers?

Some of the questions talked about how drinkers and non-drinkers were described – what did you think about the answers?

What do you think about the answers on peer pressure?

There were some questions about making plans – what did you think about them?

3) Learning about alcohol

What do you think that other people your age would think about this?

Is a quiz or a game a good way to find out information about alcohol?

Have you seen anything similar? Can you tell me about it?

Are there any other good ways to find out information about alcohol?

4) Ending questions

Do you have anything else you would like to add about the materials you have seen, or the topic we have been talking about

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Analysis

Transcripts were subjected to thematic analysis using the stages set out by Braun and Clarke [49]. During familiarization the transcripts were read and re-read and ideas for codes were noted. An initial set of 36 codes were identified and applied across the data set. These codes were reviewed during the search for themes resulting in some being merged or renamed. Other codes were combined to form overarching themes relating to the data set. An initial thematic map consisting of three main themes (relating to 'expectations about alcohol education', 'perceptions of drinking and drinkers', and 'experiences with alcohol') was generated. Each theme had a number of related sub-themes. This thematic map was developed through testing with the data and discussion between all authors until agreement was reached on a final set of themes relating to 'challenging expectations of alcohol education', 'motivations for drinking or not drinking', and 'the inevitability of drinking' (Table 2).

Results

In line with other intervention development research employing the think aloud method, [48] this paper focuses on the themes in relation to positive and negative features of the ASQ, because of their implications for intervention development. Supporting quotes for each theme and subtheme are presented using pseudonyms and indicating the gender and age of the participant.

Table 2 **Themes and sub-themes related to aspects of the acceptability of the Alcohol Smart Quiz identified in analysis of think aloud interviews**

Main theme	Sub-Theme
Challenging expectations of alcohol education	A different mode of delivery
	This is not 'the usual message'
Motivations for drinking or not drinking	Experiences of pressure
	Consequences of drinking
	Perceptions of drinkers
The inevitability of drinking	Normative nature of 'drinking as cool'
	Barriers to making plans in the real world

Challenging expectations of alcohol education

The theme 'challenging expectations of alcohol education' encapsulates the participants' responses to the ASQ as something unexpected when compared to their experiences of alcohol education in school, as well as what they had been told by parents and other adults. These expectations appeared to be related to both the format and the content of the intervention.

   A different mode of delivery

The online mode of delivery and the quiz format appeared to be well received by the participants in this study. In particular, they liked that it was presented as an online game with interactive features.

   I like it because, if it is just something written down, then that would be boring, but having it as a game is more interesting (Archie, m, 14)

It was also favourably compared with school based alcohol education, where a teacher might stand up at the front of the class and present information.

> *If you get a teacher to talk to the students about alcohol, then no-one is going to say anything because they are with their friends (Lucas, m, 15)*

There was also support for using video clips of young people presenting the answers to the quiz once the ASQ had been put on a website because participants felt that people of the same age would be easier to relate to than a teacher. Furthermore, presenting the information as a quiz with a number of possible options appeared to be a positive feature.

> *If you just tell someone a fact, they won't think for themselves, but here if you get it wrong then it makes you think (Matthew, m, 13)*

This is not 'the usual message'

Intervention content seemed to be different to the information that the participants had expected. They appeared surprised to find out that the number of young people aged 11-15 who report drinking alcohol has fallen in recent years. This unexpected content may have challenged their preconceptions that 'everybody drinks'. As this was the first question it seemed to set the scene that they weren't going to hear the usual messages about drinking and that this might be something different.

> *Quite often, in school, you will get told 'don't drink, or you will die' sort of thing, which isn't that helpful (Kasia, f, 14)*

The idea of making plans in advance to deal with a situation also seemed to be unexpected and something that participants found interesting.

> *Things about peer pressure, they just tell you not to give in, but this is something that you could actually do (Vicky, f, 13)*

There was also information that seemed surprising in some of the questions about making plans to avoid drinking. In particular, most participants were apparently unaware about the amount

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of calories in a bottle of wine when this was mentioned in a quiz question about planning to refuse alcohol:

> *I didn't even know you could get calories in a drink! (Muna, f, 11)*

Overall it appeared that the topics covered in the quiz questions had the potential to capture the participants' attention, in particular because they were in contrast to their expectations.

> *If something surprises you about a subject, then it probably makes you think twice (Matthew, m, 13)*

Motivations for drinking or not drinking

The theme 'motivations for drinking or not drinking' draws together the complex reasons behind alcohol consumption for the young people in this study. As expected based on the literature, peer pressure was a common feature of the participants' talk. The consequences of drinking appeared to be described in a negative way, but this did not seem to discourage the participants or their friends. Non-drinkers tended to be described in a negative way.

Experiences of pressure

A positive feature of the ASQ was that the content of the quiz questions and the scenarios described appeared to relate to the participants' experiences with alcohol and social pressure. Most of the participants reported feeling some pressure in relation to alcohol, as well as smoking. The presence of other people was often acknowledged as a reason for drinking.

> *If there's a lot of people around you and they're all doing it and then they're saying to do it then you are more likely to do it than if you were on your own and there was beer in the fridge (Lucas, m, 15)*

> *If everyone else was doing it then you wouldn't want to be the odd one out (Alice, f, 12)*

There was also evidence of further distinction evident in the participants' experiences of pressure, which could be either explicit and involve direct coercion:

Oh that's so stupid and babyish if you don't (Emily, f, 12)

They say 'don't be a pussy' and stuff (Natalia, f, 14)

Or it could be implied pressure:

When other people start drinking and smoking even if they don't actually pressure you, you will be pressurised even though they are not saying anything to you… because you know at some point you will lose out of the group by not doing the same thing (Muna, f, 11)

If you are at a party and everyone else is doing it, they could be quite persuasive, you would feel boring or anti-social (Vicky, f, 13,)

This apparent distinction between explicit and implied pressure is important to take into account when describing social pressure to drink with the intervention.

Consequences of drinking

A number of the questions talked about the consequences of drinking, and this was another aspect that appeared to be reflective of participants' experiences. These were mainly the short term negative outcomes, such as being sick or suffering an injury. Some participants talked about friends who had been to hospital to have their 'stomach pumped out' or who had come into contact with the police. Participants appeared to focus on the negative physical or social consequences of drinking alcohol, for example, some participants talked about attending parties and seeing people who had too much to drink:

A girl I know didn't eat for three days before the party, she wanted to be skinny or something, yeah she was sick all night long (Natalia, f, 14)

I don't think people know their limits, or when to stop (Rachel, f, 15)

Consequences relating to short term embarrassment also seemed important.

> *Having an embarrassing photo, that's a good answer, because everyone has Facebook now, it is likely that you would do that (Chloe, f, 12)*

Perceptions of drinkers

Quiz questions about prototypical non-drinkers described them as sociable, confident and independent. Participants tended to agree with this answer and some talked about other positive characteristics of non-drinkers in response.

> *Like really cool and strong and you know being able to not drink if lots of people are drinking (Emily, f, 12)*

> *I don't necessarily think they'd use these three words [sociable, confident, independent] they'd use other ones like chilled, relaxed and things like that (Lucas, m, 15)*

However there was some evidence within the transcripts that suggested that non-drinkers would be viewed negatively by other people.

> *At parties you know everyone joins in but then there's some people that just decide not to and then they just get sort of judged in a way sometimes cos they are the odd one out (Alice, f, 12)*

The findings also suggest caution in the way that drinker prototypes are presented. Drinkers appeared to be perceived as cool by many of the participants:

> *There's a system, if someone is not cool, you can't hang out with them if you want to be cool too, and people think the drinkers are cool (Jon, m, 11)*

However there appeared to be caveats to this. Heavy drinking and drunkenness tended to be described using negative language.

> *People who have got really drunk at parties, that's not cool, it looks a bit sad (Kasia, f, 14)*

However, drinking a little was usually described as normal by the older participants.

> *I think it is normal to have a drink, maybe a glass of cider or something, alcohol in*
>
> *moderation is fine (Matthew, 13, m)*

Other comments revealed that it might be importance to tailor drinker and non-drinker descriptions carefully.

> *You can't stereotype people as those who go out and those that stay at home, I am*
>
> *somewhere in between (Sam, m, 15)*

These quotations suggest that it a focus on moderate drinking compared to heavy or binge drinking might be a more appropriate focus with the intervention.

The inevitability of drinking

Regardless of the positive response from these participants towards the ASQ, there was a sense of drinking as an inevitable feature of teenage life. The theme 'the inevitability of drinking' reflects the findings that alcohol was appeared to be perceived as something 'cool', and as such, resisting its draw might be challenging.

Normative nature of 'drinking as cool'

The perception of drinking as cool was frequently identified in participants talk about the intervention as they completed the quiz questions, possibly because it was prohibited.

> *I think probably because it's actually not allowed to people like older than about 18 so it's*
>
> *kind of like, to be honest if someone's banned something then it makes it all the more cool if*
>
> *you do it (Jon, m, 11)*

> *In the shops they have a special section for all of this tobacco and stuff like that so I think*
>
> *that makes it, oh look, I'm special, I'm going here too (Muna, f, 11)*

It possible that this 'coolness' contributed to participants' reasons for trying alcohol for the first time. Although they acknowledged the power of peer pressure, many participants suggested that their reasons for initially trying alcohol were out of curiosity for this 'cool' and 'forbidden' substance

> *I wanted to see what it tasted like, I was just really curious cos I mean I'd tried like wine and things from a young age, it tastes horrible, it's like rat poison and suddenly like you try it at about 14 and it's rocket fuel, it's brilliant, and so then you are like oh, damn I want to try all these things, it's like an adventure of discovery (Sam, m, 15)*

> *I would have thought that quite a lot of people would be peer pressured into it a bit but also that people would be kind of curious (Vicky, f, 13)*

These comments suggest that it is important to take into account that young adolescents are likely to be curious about alcohol. It may be challenging to alter their perception of it as a 'cool thing to do', and so a clear focus on reducing harm appears to be more appropriate that a focus on avoiding alcohol.

Barriers to making plans in the real world

Although the idea of making plans to deal with pressure to drink social situations was unexpected and positively received, there were many pieces of evidence in the transcripts that indicated participants felt unsure about whether this could really be applied in real life. Firstly, the issue of whether you would actually be able to enact a plan:

> *I think the idea of making a plan is quite a good idea but I think it's a different matter whether you actually stick to the plan....it is quite unlikely that you will actually stick to it in the situation (Kasia, f, 14)*

Then there was the issue that the situational pressure may prove too powerful

> *Um, if they think it is cool to drink they will laugh at you and won't listen (Joe, m, 12)*

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Even if you made a plan in advance, you could still be tempted (Alice, f, 12)

Overall, it appears that participants believed making plans in advance to deal with social pressure was an interesting concept, but not something that was realistically something they could enact in a real life situation. This might be because the social pressure in a given situation would overwhelm any intended plans. Participants came up with a number of alternatives to making plans to avoid alcohol that they thought would be useful for drinking less in alcohol related scenarios.

Maybe if you had like a friend who was like responsible... if you had an older friend then sort of arrange with them saying if I am not there at that time then I'm drunk so come and find me, something like that (Vicky, f, 13)

This suggests that it may be possible to encourage young adolescents to focus on plans to avoid harms from drinking, rather than plans to avoid or refuse alcohol.

Discussion

This paper presented themes and sub themes from the analysis of think aloud interviews with 16 young people. The findings demonstrate that the ASQ had a number of features that demonstrate high levels of acceptability and relevance to the target population. An intervention delivered in schools that is different to what is expected has the potential to capture young people's attention and engage them in the topic. Moreover, because the content of the ASQ related to participants' experiences of drinking and pressure, this has the potential to enhance its credibility. In particular, the focus on short term potential harms such as social embarrassment, and increased calorie consumption were reflective of genuine concerns.

However, the identified themes also revealed important areas where improvements to the planned intervention should be considered. Firstly, there is a need to consider how to describe alcohol prototypes in the ASQ. Participants disagreed about how they would describe the typical person of the same age as them who drank alcohol. Younger participants described them

as 'sad' or 'stupid' and others who were older described them as 'normal'. However, the evidence from the transcripts suggested that a 'drunk' prototype would be seen as negative. The perception of non-drinkers was also mixed; negative views were that they were boring or the odd one out. However, some of the participants also said that non-drinkers were sensible or relaxed, which were more positive descriptions. There is little research that explores young adolescents' perceptions of non-drinkers. Research with university students suggests that non-drinkers struggle to be accepted socially, and that a negative perception is normative in the UK [50]. In our previous focus group study with younger age groups, we found that non-drinkers were perceived as unusual or boring [51].

Secondly, there was evidence to suggest that although participants were generally positive about the idea of making plans to avoid pressure, they were concerned about whether this would actually be effective in practice. The planning questions in the ASQ were based on implementation intentions, or 'if-then' plans [52]. However, it is possible that the plans were not presented in the most optimal manner with the ASQ. They were simply presented as examples and did not explicitly encourage the participants to develop and contemplate their own personal plans.

One way to improve the application of technique in the present intervention could be to use volitional help sheets. In their study, Arden and Armitage [53] supplied a list of potential situations within which undergraduate students might be tempted to binge drink, together with possible solutions they could use to avoid this behaviour . Linking the situations with the solutions created the personal if-then statements, which are central to implementation intentions [52]. Similarly, in another study, students were given options of things that they could say in order to refuse drinks [54]. The options included saying 'no thanks, I do not want to get drunk' or 'no thanks, I am watching my weight'. Participants were also asked to detail the time and place at which they would enact these plans. These studies were successful in reducing binge drinking in student participants [53, 54].

It is possible therefore, that young people will be able to make successful plans even if they think that it would not work, as long as they could be convinced to do so. Studies that have explored younger adolescents' ability and motivation to make successful plans about alcohol consumption have not been identified. However a recent study has demonstrated a successful application of implementation intentions to alcohol use with sixth form students aged 16 [55]. Thus, a major improvement to the ASQ would be to provide a range of potential scenarios and refusal options with the quiz questions and to explore the effectiveness of this approach.

Finally, it is important to consider how drinking behaviour is perceived by the intended population. Drinking was perceived to be cool because it was forbidden and therefore it gave adolescents status among their peers. This supports Crossley's [56] suggestion that risk taking behaviours symbolise a transgression of social rules and rebellion for young people. Although some participants who had tried alcohol said that they had done so out of curiosity and not because they thought it would make them appear cool, it was clear that this was an important driver in maintaining the behaviour. Trying alcohol for the first time was seen as inevitable during the teenage years. Evidence shows that 90% of 15-16 year olds in the UK have tried alcohol at least once and half have engaged in heavy episodic drinking (>5 drinks) in the last 30 days [1]. Within the ASQ, the quiz questions discuss short term harms such as being sick, or having an embarrassing photo uploaded to a social media site, which appeared to be in line with participants' concerns. However, further improvements could be made to ensure that the aspects of the ASQ that target prototypes are credible. Because of the inevitability of drinking for these participants, a focus on abstinence and enhancing non-drinker prototypes is probably an unrealistic goal. These findings suggest that in UK adolescents a 'non-drinker' prototype target may not be seen as credible. A better focus could perhaps be to look at heavy or binge drinkers compared with moderate drinkers. Some research in the Netherlands identified different dimensions of drinker prototypes such as 'tipsy', 'moderate' and 'heavy' drinkers [57], but this was in an older sample. Within British culture, drinking during the teenage years appears to be seen as part of growing up [51]and once adolescents reach young adulthood,

many engage in heavy drinking [58]. Other qualitative research has highlighted the importance of tailoring intervention content to the intended population, suggesting a focus on encouraging young people who drink not to get 'too drunk' [38].

Participants in this study described their perception of how peer pressure operates and revealed it to be a complex interplay between perceptions of drinking and the reactions you might receive if you did not drink. There also was a sense of inevitability about pressure to drink, which highlights the importance of this aspect of the intervention.

Limitations to this study should be taken into account. Firstly, the participants were sampled through convenience, and were self-selected via their parents. Although the sample size is appropriate for this type of study, a wider range of young people may have been able to bring different issues to light in relation to the intervention. Furthermore, it would be useful to explore differences by age and sex in detail, which was not possible with this sample size. Parents were required to bring participants to the University and meet the interviewer leading to a possibility that the participants doubted the anonymity of what they said. In addition it is important to note the influence of the researcher; participants may have been attempting to provide socially desirable answers. However, all efforts were made to ensure participants were assured of confidentiality, and they were not asked directly to discuss their own drinking behaviour. Furthermore participants' responses to the ASQ were most likely influenced by their previous experiences of alcohol education in school. The think aloud section of the interview always took place first, and thus it is possible that the content of the ASQ influenced the participants' responses to the follow up questions. Furthermore their reported attitudes and perceptions may well have been primed by the intervention content. Although we developed the ASQ to be delivered online, for the purposes of illustration, the current study used a paper version. This alternative mode of delivery may not reflect the exact findings of our online version of the intervention, designed to enhance its appeal, which will feature videos and interactive content.

This study was conducted in the UK, where drinking rates amongst adolescents tend to be higher than in most other European counties and the United States [1]. While this limits the generalizability of the findings, it is important to develop culturally relevant intervention programmes as well as explore the application of popular theories, such as the PWM, across different cultures and contexts.

Implications

The think aloud method meant that the content and format of the planned intervention could be tested with young people to explore their views prior to a trial. Increasingly, the value of conducting qualitative work prior to and alongside randomised controlled trials is being acknowledged [38, 59, 60] and the benefits of co-producing interventions is recognised. Although this method has been used to test other online interventions aimed at adults [47, 48, 60], no similar studies have been identified that have done so to test an alcohol misuse intervention with adolescents. The current study has therefore demonstrated that this method can be used to obtain feedback from this population, and generate detailed discussions on the topic.

In conclusion, there are a number of specific implications of this for improving the ASQ. The quiz format was well received but the final version should consider how it will be delivered in a classroom setting, in order to build on the positive features identified by the participants. The findings of this study suggest three main areas of focus for improvements.

Firstly, the range of prototypes described in the quiz needs to be widened. Presenting a negative drunk prototype, rather than a negative drinker prototype may be a more appropriate focus. Secondly, it is important to enable young people to enact plans to avoid harmful consequences of drinking. Finally, although the intervention does consider the complex perceptions of drinking as cool and how peer pressure impacts young people's decisions, it appears that pressure was an inevitable experience for these participants. Further work may be

needed to explore the most effective means of delivering credible intervention messages both

within the current intervention and more widely within an adolescent population.

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