### Designing an Engaging Mobile Social Tool for Moderating Drinking

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#### Abstract:

Binge drinking is an important health issue worldwide, resulting in a range of health and social harms. The portability and connectivity of mobile technology can be used to encourage the practice of monitoring and mediating alcohol use. Social networking services, if used among peer-support networks to promote responsible drinking, could be effective in moderating alcohol consumption. This paper presents the design of a novel mobile social networking tool to facilitate responsible drinking, and a qualitative analysis of focus groups to evaluate the proposed tool. The focus group results confirm the usability of the design and potential usefulness of the proposed functionalities. A follow-up interview with field trial participants confirm that tool is easy to use for intervening excessive alcohol consumption by encouraging drink counting and facilitating peer-supports for moderate alcohol consumption during drinking session.
Designing an Engaging Mobile Social Tool for Moderating Drinking

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Abstract

Binge drinking is an important health issue worldwide, resulting in a range of health and social harms. The portability and connectivity of mobile technology can be used to encourage the practice of monitoring and mediating alcohol use. Social networking services, if used among peer-support networks to promote responsible drinking, could be effective in moderating alcohol consumption. This paper presents the design of a novel mobile social networking tool to facilitate responsible drinking, and a qualitative analysis of focus groups to evaluate the proposed tool. The focus group results confirm the usability of the design and potential usefulness of the proposed functionalities. A follow-up interview with field trial participants confirm that tool is easy to use for intervening excessive alcohol consumption by encouraging drink counting and facilitating peer-supports for moderate alcohol consumption during drinking session.

Keywords: mobile social application, design, focus group, qualitative analysis, alcohol

1. Introduction

Binge drinking by young adults is an increasing problem resulting in a range of health
transition and establishment of adulthood. For example in Australia, by the age of 18, approximately 50% of males and females were drinking at risky levels, but the majority of this group perceived themselves as ‘social drinkers’ and did not consider their consumption pattern to be problematic (Australian Medical Association, 2009). In the US, approximately 90% of the alcohol consumption in under 21-year-olds is in the form of binge drinks (Office of Juvenile Justice and Delinquency Prevention, 2005). In Europe, Denmark has the highest number of binge drinking, with 60% of 15–16-year-olds reporting participating in this behavior, compared to 54% in the UK which is the fourth highest (Grube, 2005).

Only a few young people seek assistance for high-risk drinking (Cunningham, 2011). Common reasons for not seeking treatment include stigma, embarrassment, and a desire to handle problems on their own (Cunningham, 2001). Governments and health authorities have attempted to transition young adults towards drinking less via legislation, increased taxes on ‘ready mix’ drinks and advertising campaigns. However, these strategies have had only a limited impact on community-wide levels of drinking by young people (Kisely, et al, 2013).

For an intervention strategy to be effective at the time and place it occurs, it needs to take the context of consumption into consideration (National Preventative Health Taskforce Alcohol Working Group, 2009; Norman, 1998). To date there has been little research on the use of mobile technologies to promote low-risk drinking. Research on internet-based alcohol interventions for young people has typically focused on the provision of information and normative feedback, which has small but significant effects, at least in the short term (White, 2010). However, they are not designed for use in the drinking situation itself, which suggests that there may be opportunities to do much more with a mobile phone app since it is typically used in the drinking session.
The convenience, portability and connectivity of mobile technology have resulted in a high proportion of young people using mobile phones (Roy Morgan Research Single Source, 2012). As such, this technology has the potential to be harnessed to facilitate moderate drinking in that target group. Most of existing mobile applications that are effective in engaging and retaining users incorporate social networking and peer-support functionalities. In particular, online communities facilitating peer-to-peer support have significant potential to directly promote health and behavior change (Cunningham, 2008). However, most apps to reduce alcohol consumption typically employ single-user interactions (e.g. drink counter). This project fills this gap by developing a novel alcohol-related mobile app that leverages the positive benefits of peer support (by employing a ‘trusted circle of friends’) to mediate and reduce high-risk drinking.

This paper presents the design of mobile social networking tool to facilitate responsible drinking during drinking sessions. The proposed mobile tool focuses on facilitating peer support to ensure safety, whilst simultaneously promoting moderate drinking during a social event. A qualitative analysis of three focus groups with young women aged 18 to 24 is discussed, to determine if the proposed design were seen as attractive, engaging, and as having potential utility. We also provide results from an interview with two representative users who have participated in the field trial. The choice of focusing on young women as our first main target group is based on findings that young women look out for each other on social occasions to avoid potential harm to any group members (Crespigny, 1999). While women typically do not drink as heavily as men, those that do consume alcohol at risky levels have equal or more problems than men from their drinking (U.S Department of Health and Human Services, 2008). Women are known to be more vulnerable than men to the physical harms of alcohol and are at risk of sexual assault when they are intoxicated in public places (Lindsay, 2005). Anderson et al (2014) report young women’s who binge drink are more likely to continue risky drinking
drinking. Moreover, frequent binge drinking in late adolescent influences levels of depression in 22-27 year old women (Powers, 2013).

2. Design of the Mobile Tool

Cohn et al.'s (2011) inventory assessment reported that in 2011 approximately 767 out of 350,000 mobile tools (apps) in iTunes focused on alcohol use. Of those, 545 apps (71%) were identified as facilitating alcohol use, with 222 apps (29%) identified as intervening (i.e. aimed at reducing alcohol use).

As Figure 1 illustrates, facilitating alcohol mobile tools typically include:

- Information on where and what to drink;

![Figure 1. Classification of Alcohol Related Apps](image-url)
• Tools to order and track drinks, and photo booth to capture drink sessions, and events in general;
• Social event management.

Whereas, intervening alcohol mobile tools provide:
• Health and well being messages such as weight management;
• Intoxication warnings (blood alcohol concentration, drunk face emulation);
• Sobriety tests (coordination controls);
• Financial management (tracking spending);
• Social marketing (to give warnings and advice).

The proposed mobile social tool is novel as it aims to combine both (intervening and facilitating) approaches by supporting functionalities and features used before, during, and after a drink session:

1) Facilitating a peer-support for moderate alcohol consumption

Formation of a peer support group prior to the event and a quick-dial feature elicited assistance with alcohol control and safety

2) Intervening excessive alcohol consumption.

An event timeline and drink counter can potentially promote awareness of alcohol use, while sharing with peers was intended to engage social pressure for alcohol control.

The following section details the functionality of the mobile app.

2.1. Facilitating a peer-support network before event

The peer support functionality encourages users to identify, schedule, and plan a social event that could involve the consumption of alcohol. They do this by creating an event and inviting friends to attend. Once an event has been created and confirmed, it appears on the organizer’s list of upcoming events, and the invited friends receive a push notification, and a new event in their event list.
Figure 2 depicts the **start of a night out** interfaces, whereby the event name, venue, date, time and invited friends are inserted by users, enabling creation of a personal profile and record of relevant information (e.g. favorite places, drinks, emergency contacts and address). Friends can be added from the friend list, or “bumping” phones together. When an event is started, a timeline for the event is established.

![Event Interfaces](image)

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2.2. Intervening excessive alcohol consumption

Figure 3 displays the interfaces used during an event. The **Timeline** interface for the
from social networking tools, such as Facebook and Path, as a means to provide a chronological account of events. The timeline forms the main communication platform for a particular event. It represents the social environment, and encouraging activities (e.g. taking and sharing photos) other than the consumption of alcohol. The user’s main interaction with timeline is sharing their activities with the peers and promotes a sense of looking out for everyone’s safety and monitoring behavior during a drinking session. This includes: Post status on timeline, similar to group chatting functionality, including indicating I’m home” status on timeline (ensuring safety). The timeline also provides a reflective tool on the user’s drinking and the drinking of their friends.

Figure 3. During Event: Timeline (a); User Primary Interaction with Timeline (b); Quick Dial (c); Photo booth (d); Drink Table (e); Drink menu (f)
Event timeline and peer sharing functionalities are aligned with the intervention strategy to influence the context of consumption. Instead of monitoring consumption, the mobile tool focuses on the social costs of high alcohol consumption, such as losing credibility by appearing out of control in front of their peers, known as the *theory of planned behavior* (Norman, 1998; Norman, 2006). As part of the timeline, the **Photo Booth** function encourages users to capture photos and share to their peers via the timeline, and the additional feature of customized frames and stickers can add the fun element. A necessary condition for reductions in dysfunctional behavior is that the person is aware of the behavior. Reviewing photos can help to remind users how they behave during a drinking session.

For monitoring and moderating drinking, the **Drink table** interface can be easily accessed from the timeline view. First, they need to “order” or specify a drink by tapping ‘+’ button. A list of drink categories will appear as a simple **Drink Menu**. Once a drink is selected from the list, choice of drink will be put up on the hanging board. Users can tap and hold the table to add the drink. This is intuitive design as we use the analogy that the user is actually tapping on the table to get more drinks of the same kind, until they order a new one. The immediate visual feedback of how many glass or bottles counted on the table will help users to track their alcohol consumption. Each time a drink is added on the table, the timeline will broadcast (to the peers) the name of the person who just added a drink to allow peer-supported self-monitoring of moderate drinking intention.

### 3. Focus Groups

In the design phase of the responsible drinking mobile app, three focus groups were conducted with young women in August 2012 to gather their views about the proposed mobile social tool design. Focus group facilitators encouraged participants to discuss their experiences with smart phone technologies and alcohol consumption, as well as
alcohol consumption Discussion themes focused on examining tool functionalities for supporting before- and during- a night out event where alcohol was likely to be consumed. All participants gave informed consent to the study. Each participant was compensated with a gift voucher valued at 20AUD. focus groups were audio-recorded with two facilitators guiding discussions and taking notes. Interview data were analyzed using constant comparison method as outlined by Strauss and Corbin (1998). Comparison method is particularly useful when there are multiple focus groups within the same study as it allows researchers to assess saturation in general and across-group saturation in particular.

3.1. Participant Details

In total, fourteen young women aged between 18-24 years old participated in three focus groups. All participants were university students. All participants, except one, were smartphone users and engage with apps for information, entertainment and utility frequently. Nine participants self-identified themselves as binge drinkers or frequent drinkers, with three being moderate drinkers and two being non-drinkers. For moderate and non-drinkers the choice to drink responsibly was due to health, fitness and study commitments and further supports recent research examining responsible drinking motivations (Herring et al., 2012; Fry, 2011, Anderson et al., 2011; Piancentini & Banister, 2009). The sample distribution is appropriate for our purpose, as the app is designed to engage any young people that go out to a drink session (e.g. for social events), even for non-drinkers.

3.2. Feedback on Tool Design and Features

Organizing an event

Participants liked the fact that the app allows them to view all events, to reflect on the past events as a memory and to organize future events. The participants agree that the
perceived it similar to Facebook messages, and reported frustrating experiences with Facebook messages in setting up events, as many people would not reply to invitations.

Eight participants preferred keeping the communication within a confined social circle.

Impact on final design: we have ensured the peer network formation is kept within a confined social circle. Friends need to be added manually and no import from existing network like Facebook. Bump technology is used to make it easier to add new friends.

**Timeline**

All participants perceived the timeline as a useful feature, which facilitated coordination during a night out if they became separated from friends, needed help or were running late. All participants liked being able to keep exchanges private and within their social group, who they considered would not judge them. They also liked app-based communication within the small circle, as they confessed most things they would put on the timeline would be things they could not say out loud (e.g., about “meeting a hot guy”). Six participants prefer not to share the entire night out on Facebook, to avoid the information being exposed to people they did not want to know about the night (e.g. parents or bosses). They would like to have the option to choose whether they wanted to share something or not. Some suggested a feature of requiring “group permission” to post the conversation or timeline to Facebook after the event. The ‘I’m home’ button attracted attention from most participants, who liked the idea. The button saved them calling or messaging each other to make sure everyone was safe and sound at home.

Impact on final design: we ensured that the timeline posts could only be viewed by the confined circle of friends, and could not be shared to public social networks.

**Quick Dial**
confirmed, or the buttons kept apart to avoid miss-dial. Eight participants agreed that it was useful to include train or night bus timetables, and loved the idea of putting close friends and newly met friends on Quick Dial. When asked whether they would ever call their friends’ parents when out drinking, none said they would do so, unless the situation were very serious. In those cases, they would call police or hospitals first and would only call parents when they arrived at police station or hospital.

Impact on final design: the quick dial mainly features the emergency contacts, such as police and ambulance. While it was useful to add public transport timetable, we kept it out of the current scope, as the information integration would require further redesign of the quick dial interface (too much information will make it too cluttered). The option to add other “emergency contacts” is left entirely to an individual if they wish to provide, and not required or probed.

Photo booths and gallery

All participants liked taking photos when going out and perceived photos as an important part of identity and memory building. One mentioned it’s ‘like a scrapbook on the mobile phone’. Others nodded in agreement. They liked the fact that “past event timelines” remained available for review. Participants mentioned being tagged in a ‘bad’ photo as a bad experience. They usually requested that those photos be removed via private messages: they saw this as another reason for containing information within a confined group.

Impact on final design: the timeline gallery of photos are retained so that the closed peer-network would be able to review and support each other to learn from their past behavior during a drinking session.
When asked whether they would use the function of logging drinks during the night out, ten participants initially gave negative answers. They saw it bothersome or distracting on a good night out, especially when dancing or talking. As the discussions went on, safety concerns emerged as a major motivation for logging drinks (e.g. when they were driving). Another motivation was the opportunity to reflect on their drinking behavior.

Four participants mentioned that recalling the number of drinks consumed on the previous night was a regular discussion amongst friends when they got up next morning. Five participants said that knowledge about their blackout points would help planning for future drinking occasions based on how much they could handle. They generally did not know how much they drank because they often got refills, and did not have standard drinks. More interest and willingness to log their drinks was expressed if it could be done faster and more easily, for example, by using bumping technology. Information that would help them to choose drinks included price, alcohol content, and calories. Participants agreed it would be useful to have the calories consumed converted to physical exercise required to burn those calories, so that they had a clearer idea of the meaning of the calories.

Impact on final design: we have retained the drink counting mechanism, which was uniquely designed compared to existing apps, so that it can be tested during a field trial. We did not use additional information such as cost and calories even though they could work as deterrents, as these types of information use is not within the scope of this study. Our focus was on supporting peer-network that looks out for each other.

4. Interview of Field Trial Participants

A follow up interview was conducted on 8 May 2014 to learn from a peer-group of two participants who have used the completed mobile tool during field trials (i.e. actual
When asked about “what worked”, both respondents agreed they really liked that the timeline feature is like Facebook event, as they can add and edit photos during an event. This confirms the usefulness of photo booths and gallery functionality. When asked about counting drinks functionality, one respondent said, “counting drinks wasn’t a big issue because I only had a couple when we went out”, while the other highlighted, “I’m a little bit more particular about how much I’m having because I don’t want a hangover the next day so I feel like I’m already mentally doing what the app is doing.” However, both of them agreed that sharing their drinks in the timeline make them more conscious. When asked about the motivation for counting drinks, economic reason was the key, i.e. amount of money is more important than amount of alcohol, as both respondents are aware of her own limit (e.g. one said, “I don’t go above 5 otherwise I’m too silly”).

On the use case scenario of using timeline to send anonymous message to say that a friend is drinking too much, one respondent said she liked that idea as she drives a lot (for her friend). Respondents also like the QuickDial as “it easier to contact (their friends) if you do loose them or need to get in touch”, and both agreed of the safety aspect because it is about girls looking after each other.

When asked about “What do you think the barriers or the motivators would be while you’re drinking to use it?” A respondent said “Forgetting to pick (the phone) up”, another said “forgetting to (count) every time you have a drink...like mentally thinking that you need to count it when you haven’t done in the past”. When asked if they would be comfortable using the phone during a drinking session, both respondents said “Yeah, normally the phone’s out. And if I knew that I was having a night out where I didn’t have to restrict the number of drinks if I was driving, then I would be more likely to use it.”
These findings demonstrate that the tool is accepted and easy to use for intervening excessive alcohol consumption by encouraging drink counting and facilitating peer-supports for moderate alcohol consumption during drinking session.

3. Discussion

Based on the discussion with focus group participants, current smartphone experiences show that friends’ or partners’ adoption is a major motivator to use certain apps. Other motivators include novelty, convenience and free access to the app. Incorporation of bumping technology in setting up events or logging drinks, and being able to add from a list of favorite drinks or create events based on ‘favorite places’ and a ‘friends list’ may therefore increase the chances of an app’s adoption.

Leveraging social dynamics in the app design is consistent with young women’s behavior, and there has already been some success in enlisting friends’ support in achieving moderate drinking goals. While the aim is to facilitate moderate drinking, mobile app designers need to consider social dynamics before, during and after drinking events. Features such as the ‘timeline’, ‘I’m home’ button, ‘photo sharing and gallery’, and ‘quick dial’ not only facilitate the coordination before, during and after the event, but also help participants to create a shared memory. Customizable contacts on ‘quick dial’ also appeal to young women’s strong sense of maintaining their social groups.

While using the mobile to update their status or post photos during the night out was seen as interrupting the experience, the wish to review the event was a motivator. Norms of responsible behavior on social media and concerns over privacy appeared to drive a preference to keep communication within a confined social circle. ‘Check-in’ was reported to be frequently used by young women, and geo-location may therefore provide a motivation to use the app.
Using the mobile app for drink counting was perceived as bothersome or distracting, but safety concerns and the opportunity to later reflect on their drinking behavior (and in particular, to know when they were at risk of blackout) may increase the likelihood of alcohol monitoring. Translating drinks into meaningful indicators such as calories would add appeal to users. Adding push notifications to reduce the need to check the mobile frequently and enabling users to deliver moderate drinking reminders to their peers may lessen negative perceptions while enhancing the app’s perceived utility.

While participants reported that drink monitoring would be more attractive if it was linked to drink driving limits. Estimations of Blood Alcohol Content (BAC) are subject to substantial individual variation (e.g. based on body size and composition and liver function) and on foods that are consumed. They also require accurate assessments of drink size and ethanol content. Since underestimations of BAC have potential to place users at significant risk (e.g. of accidents or drink-driving offenses), we consider that the inclusion of this feature may cause the app to have serious negative consequences.

**Suggestions for More Features**

The focus groups gave suggestions for useful features for future developments.

*Information and pickup organizations* - twelve participants mentioned they would like to communicate with each other and share information before the event, and were glad to know they could do it as soon as they set up the event. One mentioned it would be good to know who would be driving and their routes before they went out. This would help them organize pickups.

*Alcohol calculation linked to calorie counting and drive drinking limit* - Two participants would like to have the drinking calculation linked to their driving limits (e.g. how long
Push notifications - participants proposed adding push notifications to avoid the need to check the mobile constantly. One said she would like to have something like a Facebook ‘poke’ button as a way to allow friends to remind her when she is drinking too much or for her to provide similar reminders to them. She said that this could also be a useful reminder when someone was not aware of their behavior when drinking.

The interview with field trial participants highlighted that it is not so much about what did not work in the app, it is about how to encourage people to download and use it to curb their behavior (actively use on the go). They suggested to make the tool like Facebook “add-on” i.e. the event can be organized and advertised via Facebook event, but as soon as they check in, it is all seamlessly only become private on the phone. In addition: adding photos of group, grouping of friends are useful for event organization.

Setting up pre-drinks had been suggested as part of ritual for setting the event. They also suggested counting calories and give messages after certain amount of drinks. For example, “if … I’ve had 5 drinks and it came up with a message ‘you’re totally wasted’ I’d be like ‘really!’” That would be funny to me if my phone was telling me at what stage of drinking I was at. Another suggestion was to add a button for “move to another venue”, instead of just “I’m home” especially if the functionality has a location awareness so if a person was in big groups and someone has gone to another pub (but they did not notify anyone) at least they would know whether their friend(s) have gone to another location.

4. Conclusion and Future Work

This paper proposes a novel design for a mobile social tool that supports facilitating a peer-support for moderate alcohol consumption. The focus groups confirmed the potential usefulness of organizing event, event timeline, quick dial for facilitating peer
tuning the design of the tool. The field study participants have confirmed the usability and acceptability of the functionalities. Future research directions include updating the design based on the suggested features and conducting a longer-term study with more participants to use the mobile tool in the natural environment to test its feasibility and utility in practice. We also will implement some of the suggested features such as adding calories information, as it was highlighted in both focus groups and follow-up interview.

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