Modifying Sexual Risk Health Behavior Change Models to Incorporate Alcohol-related Factors

Abstract

*Objectives*: Theories and models which address harmful health behaviors often do not incorporate factors related to alcohol. *Methods*: The aim of this article is to review the role of alcohol use on risky sexual behavior and to suggest how alcohol-related factors can be incorporated into health behavior change models. *Results*: Suggestions for modifying health behavior change models are presented, including integrating motivation and volition phases of models with a preconsumption and consumption phase of alcohol use. *Conclusions*: These modifications may be useful in developing interventions designed to increase the occurrence of safer sex behaviors affected by alcohol and other drugs.

Overview

Many theories devised in recent decades to address harmful health behaviors are not applied in ways which link alcohol use to harmful health behavior activity. This may be because most theories assume or require a relatively stable amount of cognitive abilities present in the individual performing the behavior. However, when alcohol becomes a factor in a behavioral situation, the cognitive abilities of the user are reduced and are therefore no longer present in the individual in the manner necessary for him or her to think and act in the way that the theory and its corresponding model require. The aim of this article is to suggest how health behavior change models such as the Health Action Process Approach (HAPA; Schwarzer, 2008) can specifically be applied to health behaviors involving alcohol, specifically condom use by intoxicated individuals.

Health behavior models such as the Theory of Planned Behavior (TPB; Ajzen, 1991) have been criticised for having utility in explaining a large variance of intentions but not behaviors (Conner & Armitage, 1998). Models such as the HAPA have subsequently been developed to address the intention-behavior gap inherent in continuum models such as the TPB by incorporating factors both leading to behavioral intentions and subsequent to intention formation. For instance, the HAPA is a two-stage model: in the *motivational* stage, contemplation and goal setting occur, while in the *volitional* stage, behaviors are implemented provided that intentions have been formed (Schwarzer, 2008). Accordingly, in the motivation phase, risk perceptions initiate a contemplation process including outcome expectancies, and behavioral consequences are weighed up and deliberated. Self-efficacy is a vital factor in this phase as it has been suggested that individuals who lack the necessary self-efficacy in the initial motivation phase may not form intentions or move beyond this phase and therefore will fail to enact the corresponding behavior.

Research has applied the HAPA model to examine the utility of its variables for affecting condom use behavior in homosexual men (Teng & Mak, 2011). The longitudinal study found that intentions were predicted by action self-efficacy, outcome expectancies, and risk perceptions, and that condom use behavior was predicted by planning, maintenance self-efficacy, and intentions. Importantly, planning was shown to mediate between intention and condom use. A more recent longitudinal examination of the HAPA found that preparation of condom use was a significant mediator between intention and behavior in a sample of heterosexual males (Carvalho, Alvarez, Barz, & Schwarzer, 2014). It was concluded that preparatory behaviors are an example of how planning can predict condom use. Results also showed that outcome expectancies influenced intentions and that preparatory behaviors were predicted by self-efficacy and intention. However, these studies did not examine the influence of alcohol on intentions and subsequent behavior. As an effect of alcohol is a reduction cognitive-processing abilities (e.g., planning), it is important to consider how alcohol affects factors in associated health behavior change models in order to design more efficacious related interventions.

Alcohol and risky sexual behavior

The relationship between alcohol use and risky sexual activity has been recognised and investigated for decades. However, despite health promotion and awareness campaigns to reduce the spread of sexually transmitted diseases (STDs), infection rates continue to rise with alcohol use often recognized to be a contributing factor (see Cooper, 2002; 2006). For example, a report in 2011 examined associations using data from surveys conducted in 1990/91 and 2000/01 and found that excessive alcohol consumption was greater for respondents who had condomless sex with two or more partners in the past year than those who had not (Aicken, Nardone, & Mercer, 2011). Other research has provided evidence that alcohol use mediates the effects of expectancies (beliefs about the effects of alcohol) on risky sexual behavior (White, Fleming, Catalano, & Bailey, 2009). More recently, an experimental study (Albery, et al., 2017) found that sexually-active individuals exhibited greater attentional bias towards sex-related words relative to neutral stimuli supporting earlier findings that selective attentional bias to alcohol related stimuli is exhibited by problem drinkers (Sharma, Albery, & Cook, 2001). This evidence suggests that a concurrent pattern exists for substance-related behaviour and sexual behaviour (Albery, et al., 2017) as well as a potential link between alcohol/substance use and sexual compulsivity.

Cues or primes (environmental and situational stimuli related to associated behaviors) have been suggested to trigger alcohol expectancies and related concepts which may in turn affect motivation for behaviors (Morris & Albery, 2001; Moss & Albery, 2009). Additionally, from a cognitive-motivational perspective, a goal or desire can be activated in a situation by the presence of cues which can affect subsequent behaviors (Sheeran, et al., 2005a). Alcohol myopia theory suggests that the pharmacological effects of alcohol limit an intoxicated individual’s cognitive abilities so that only the most salient cues are attended to and processed (Steele & Josephs, 1990). When alcohol consumption results in cognitive impairment, decision-making processes related to sexual risk taking can be affected so that impelling cues (e.g., sexual arousal) become more salient than inhibiting cues (e.g., cognitions for safe sex behavior) thereby increasing the likelihood of sexual risk-taking behaviors (response conflict; see Steele & Josephs, 1990) (Davis, Hendershot, George, Norris, & Heiman, 2007).

Alcohol factors and health behavior change models

Multi-phase models such as the HAPA (Schwarzer, 2008) suggest a theoretical gap between intentions (motivations) and behavior (volition), and that variables (e.g., self-efficacy and expectancies) and their corresponding strengths may differ in each phase. It has been suggested that for (health) behaviors (e.g., condom use) to be enacted, during the motivational phase an individual weighs up costs and benefits and an intention is formed, followed by a volitional phase in which an individual plans and initiates behavioral enactment (Gollwitzer, 1993). Evidence to support this has been provided by the HAPA-based studies previously mentioned (Teng & Mak, 2011; Carvalho, et al., 2014). However, what occurs in such situations when cognitive abilities are reduced by the effects of alcohol?

Dual-process models have been proposed theorising that both *reflective* (explicit cognitive) and *impulsive* (implicit cognitive) processes jointly predict health-related behaviors (such as condom use) (Reflective Impulsive Model (RIM); Strack & Deutsch, 2004). To investigate the effects of alcohol on sexual risk decision making (i.e., condom use), it is necessary to consider how alcohol affects both reflective and impulsive processes among individuals in potential and/or actual sexual situations (Wiers & Hofmann, 2010).The reflective system can be related to models such as the TPB (Ajzen, 1985) while the impulsive system is guided more so by nonconscious automatic associations in memory (see RIM; Strack & Deutsch, 2004). Reflective processes include the ‘ability to exert control over impulses, the motivation to exert such control, and the relevant beliefs or expected outcomes’, while the impulsive system includes ‘attentional processes, memory associations including automatic evaluations, and automatically triggered action tendencies’ (Wiers & Hofmann, 2010, p. 5).

Wiers and Hofmann (2010) suggested that individuals ultimately engage in potentially harmful health behaviors due to the strength of both impulsive and reflective processes (see RIM; Strack & Deutsch, 2004) within the individual and in the specific situation. They refer to concepts in the impulsive system including attentional processes and automaticity which may affect subsequent behavior, and reflective processes to include an individual’s ability for impulsivity regulation and related motivation. However, they note that the reflective system is ‘vulnerable’ to the effects of alcohol in such a way that behaviors may be controlled by the impulsive system as reflective processing capabilities are diminished after alcohol consumption (Wiers & Hofmann, 2010, p. 5). Sexual risk decision making and subsequent sexual activity may thus rely on guidance from the impulsive system and its automatic associations, evaluations and tendencies, after alcohol has been consumed (i.e., alcohol myopia) as evidenced by past experimental research (e.g., MacDonald, Zanna, & Fong, 1996). However, both reckless *and* prudent sexual risk intentions have been shown to result after alcohol consumption depending on the environmental cues made salient in the pertinent situation (e.g., MacDonald, Fong, Zanna, & Martineau, 2000).

Relatedly, a differentiation has been proposed between goal intentions for behavior (what an individual wishes to achieve) and implementation intentions (plans and details necessary to translate goals into action) (Gollwitzer, 1993; see Sheeran, Webb, & Gollwitzer, 2005b). It has been suggested (Gollwitzer, 1993; Milne, Orbell, & Sheeran, 2002; Sheeran, et al., 2005b) that implementation intentions may be affected by contextual cues which can trigger the process of behavioral initiation for goal achievement (see Gollwitzer, 1993; Milne, et al., 2002; Sheeran, et al., 2005ab). However, implementation intentions require conscious processing while behavior initiation can occur automatically due to situational cues; relatedly, implementation intentions may conflict with goal intentions (Gollwitzer, 1999; Sheeran, et al., 2005ab). Therefore, a sexually-active individual in a potentially sexual situation involving alcohol may have competing goals for sexual activity, alcohol intoxication, and safe sex (i.e., condom use), triggered by relevant cues.

A revised health behavior change model to incorporate alcohol-related factors

As referred to previously, models which have been proposed to explain alcohol’s causative role in sexual risk-taking include an expectancy model which incorporates psychological expectations and beliefs (see Goldman, Reich, & Darkes, 2006), and alcohol myopia (see above) which suggests that the pharmacological effects of alcohol include impairment of individuals’ cognitive processes. A dual – process model was developed which theorises that expectancies involving alcohol are activated by environmental/situational cues and can induce myopic-type behavior without alcohol consumption having occurred (Moss & Albery, 2009). Relatedly, it has been suggested that inconsistent evidence points to a need for a model of greater utility which integrates models of expectancy and myopia while also incorporating the phases of preconsumption (before alcohol use) and consumption (after alcohol use) (Moss & Albery, 2009).

As mentioned previously, in the HAPA model, self-efficacy is crucial as it can influence an individual’s effort, motivation, and persistence, and affect goals related to behaviors (Schwarzer & Luszczynska 2008). For sexually-active alcohol drinkers, self-efficacy to perform safe sex behavior is theorised to be deliberated prior to formation of intentions to use condoms. However, during the motivation phase and before alcohol has been consumed (preconsumption phase; see Moss & Albery, 2009), cognitive abilities and reflective thought processes are fully available (see Reflective-Impulsive Model, RIM; Strack & Deutsch, 2004) and thus behavioral intentions may be formed and planning may occur. Although an individual may never consume alcohol, a situational alcohol cue will have activated memory associations and expectancies. The alcohol cue may instigate the formation of a goal to drink and a goal for sexual activity dependent upon the individual’s related expectancies (see Leigh, 1990). An individual who has a stronger positive assessment regarding the variables related to the benefits of sex while drinking rather than of the risks may not be as strongly motivated to engage in protective behaviors as an individual who is more greatly influenced by the risks (see Fromme, Katz, & Rivet, 1997; Fromme, D'Amico, & Katz, 1999) and therefore may not form strong intentions for condom use.

Outcome expectancies including risk perceptions referred to in the HAPA may be considered as cognitive appraisals which include positive consequences/benefits and negative consequences/risks (see Cognitive Appraisal of Risky Events – Revised, *CARE-R;* Katz, Fromme, & D'Amico, 2000) which an individual will deliberate before intentions are formed. Relating expectancies to alcohol consumption levels, a recent study (Townshend, Kambouropoulos, Griffin, Hunt, & Milani, 2014) found that heavy binge drinkers exhibited greater alcohol-related expectancies of risk taking and rates of unplanned sexual activity than did low-binge drinkers. Additionally, a recent study (Johnson, Albery, Frings, & Moss, 2018) found that increasing levels of binge drinking were negatively associated with STI-protective self-efficacy, and also that for binge drinkers, stronger appraisals of the positive consequences for having sexual intercourse while intoxicated predicted lower STI-protective self-efficacy indirectly through increasing rates of sex-related alcohol risk expectancies. Further relating expectancies to consumption, an association between positive expectancies and higher levels of consumption has been found, but not with frequency of consumption (Baldwin, Oei, & Young,1993). As binge drinking has specifically been linked to risky sexual behavior (e.g. Standerwick, Davies, Tucker, & Sheron, 2007; Townshend, et al. 2014; Johnson, et al. 2018), it would therefore be useful to incorporate alcohol consumption levels of frequency, quantity, and bingeing with expectancies and consequences, and to examine their relationships and influence on self-efficacy in alcohol-related applications of models such as the HAPA.

For example, a revised model of the HAPA for alcohol-related behaviors (see Figure 1) could incorporate additional variables: *alcohol use differentiated by frequency, quantity and bingeing* (e.g. AUDIT-C measure; adapted from Saunders, Aasland, Babor, Fuente, & Grant, 1993); *risk perceptions* to include *sex-related alcohol expectancies of risk* as well as *negative consequences of engaging in sexual activity while under the influence of alcohol*; *positive outcome expectancies* to include *sex-related alcohol expectancies of enhancement, disinhibition*, and *positive consequences of engaging in sexual activity while under the influence of alcohol* (e.g. Dermen & Cooper, 1994; Fromme, et al., 1997; Fromme, et al., 1999; Katz, et al., 2000). As Schwarzer (2008) has suggested that outcome expectancy deliberation may precede self-efficacy consideration, it should also be considered that individuals who exhibit weak appraisals of the negative consequences of unsafe sex may not contemplate their self-efficacy nor intend to use condoms (see Lee, et al., 2010, for a review of alcohol-related consequences).

Relatedly, regarding a revised HAPA model, it is suggested that after alcohol has been consumed, alcohol myopia may occur such that reflective capability processing is reduced due to the pharmacological effects of alcohol, and such affected individuals therefore only possess sufficient ability to attend to situational cues which are the most salient (Steele & Josephs, 1990). Thus in potentially sexual situations, an individual may deliberate impelling cues which instigate sexual arousal and a desire for sexual gratification with competing inhibiting cues such as condom use (Steele & Josephs, 1990; Morris & Albery, 2001). However, due to alcohol myopic effects, after consumption, the individual may only be able to attend to the most salient cue, unlike prior to alcohol consumption when the individual may possess full cognitive processing capabilities and therefore be able to attend to all relevant cues. As reflective processing is weakened after alcohol consumption, the drinker may thus be reliant on automatic processing, and therefore only attend to the most salient cue (i.e., alcohol myopia, Steele & Josephs, 1990; see RIM, Strack & Deutsch, 2004).   
 Integrating this information into the HAPA model specifically for condom use behavior affected by alcohol-related factors, it is suggested that the *motivation* phase can be likened to a *preconsumption* phase (before alcohol use) and the *volition* phase (post/during alcohol use) to a *consumption* phase (see Moss & Albery, 2009). Therefore, in the motivation/preconsumption phase, an individual may be motivated to use a condom and thus form an intention to use a condom, but also to become intoxicated and engage in sexual activity. However, once drinking commences, and the individual is in the volition/consumption phase where safe sex behavior is required, the lack of reflective processing capabilities may contribute to an individual’s reliance on automatic processing resulting in an attentional focus on the more salient cue of sexual gratification rather than on the cue for condom use.

Implications

Future research would benefit from testing this revised model of the HAPA by assessing factors leading to intention formation and how cue exposure affects individuals in the two stages (motivation/preconsumption and volition/consumption). Subsequent to this, testing the effects of various primes (e.g., safe sex messages in semantic and pictorial formats) and their interactions with implementation intentions may be advantageous in providing evidence which could be used to strengthen self-efficacy in both the motivation and volition phases (n.b., self-efficacy strength is suggested to be of crucial importance in the HAPA model). Results from these priming studies would provide utility in the design of interventions which could be implemented during the motivation/preconsumption and volition/consumption phases to increase condom use amongst intoxicated individuals. This would provide the basis for further intervention design to assess the effects and utility of primes regarding such issues as a drinker’s impairment affected by various levels on the blood alcohol concentration (BAC) curve (see Moss & Albery, 2009) and effects of binge drinking versus non-binge drinking, as well as low binge drinking levels versus high binge drinking levels (see Townshend, et al., 2014; Johnson, et al., 2018).   
Conclusion

This article has examined and discussed theoretical and empirical-based evidence which provide justification of incorporating additional factors into health behavior models such as the HAPA, for alcohol-related behaviors - specifically condom use by alcohol users. As alcohol affects cognitive-processing abilities, it is important to recognise and integrate alcohol-related factors into health behavior models for behaviors which may be affected by alcohol. Finally, it should be noted that the suggestions delineated in this commentary may also be useful in further research involving health behaviors as affected by drugs other than ethanol alcohol, which also affect a user’s decision-making process and potentially lead to negative health behavior outcomes.

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**Figure 1.** **A revised model of the Health Action Process Approach (HAPA; Schwarzer, 2008) for behaviors affected by alcohol (i.e. condom use).** A situational cue will trigger an alcohol user’s contemplation of expectancies and consequences of engaging in sexual activity while intoxicated, such as sex-related alcohol expectancies of enhancement and disinhibition (Dermen & Cooper, 1994), along with associated risks. Self-efficacy for condom use while intoxicated will be contemplated and will be moderated by the individual’s levels of alcohol use differentiated by frequency, quantity, and bingeing. These factors will influence intention formation. However, an individual with weak self-efficacy may not form an intention, and an individual’s self-efficacy strength will mediate the intention-behavior gap (see Schwarzer, 2008). The HAPA motivation stage can be likened to a preconsumption phase of alcohol use when full cognitive processing abilities are available, and the volition stage to the consumption phase (after alcohol use has been initiated) during which reflective processing abilities are reduced (see Moss & Albery, 2009).

**Alcohol use levels: frequency, quantity, bingeing**

**Self-efficacy**

**VOLITION STAGE / CONSUMPTION PHASE**

**MOTIVATION STAGE / PRECONSUMPTION PHASE**

**CUE**

**INTENTION**

**BEHAVIOR**