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The theory of preloading: A cognitive-behavioural motivational model

Jacob G. Sorbello[1*] and Grant J. Devilly[1,2]

Abstract

Preloading of alcohol and/or drugs before an event has been examined in the research literature for the past two decades. Despite the considerable interest and scrutiny on the behaviour, there are limited, if any, attempts to conceptualise a theoretical understanding of why people preload before an event. Here we propose a Theory of Preloading (TOP)—a general cognitive-behavioural motivational model for alcohol and drug preloading. This conceptualisation reviewed and borrowed relevant cognitive, motivational and behavioural constructs from previous models—i.e., the Motivational Model of Alcohol Use, (Cox & Klinger, 2011), PRIME theory (West, 2007); SORCK analysis (Kanfer & Sanslow, 1965)—applied to the target behaviour of preloading with alcohol and/or drugs. The TOP proposed that a central construct of affective management—guided by distal and cognitive factors—contributes to decisional factors for preloading. Consequential reinforcers and punishers create a reinforcement loop that feeds back into distal and immediate environmental factors for preloading, increasing the likelihood of future occurrences of preloading behaviours. Our proposed theoretical formulation concludes with practical and clinical implications, along with future directions for testing the model.

Keywords Alcohol, Drugs, Preloading, Motivations, Behavioural reinforcement, Interventions

Introduction

Preloading is a behaviour and a preparatory phase for an event—one usually involved with continued drinking. Preloading has been defined as the use of alcohol and/or a substance in either an individual or group setting before going to a target-event—i.e., a party, event, bar, pub or nightclub [46]. The term preloading is synonymous with: pre-gaming [6], pre-partying [64], and pre-drinking [61]. The prevalence in preloading behaviours has been estimated between 60—90% of alcohol consuming individuals [30, 45, 109]. The widespread application of the behaviour across cultures has often found a relationship between preloading and experiencing alcohol-related harms of assaults [73],risky sexual encounters [62] and 'blacking-out' [30, 83]. The increased likelihood of particularly young people experiencing these harms led to a concerted interest in developing interventions to reduce preloading [40, 82].

Despite the interest from researchers and policy makers alike to intervene on the preloading phenomena, atheoretical intervention efforts have insofar found limited success in reducing preloading outcomes (e.g., [25]). Past applications of general alcohol theories—e.g., the Motivational Model of Alcohol Use (MMAU [21])—have evidenced mixed applicability to nuanced preloading behaviours [84]. The literature presently lacks a specific and coherent theoretical foundation that explains the cognitive, motivational and behavioural components that inform an individual's decision to preload before a target-event. Without theoretical guidance, individualised treatments and community interventions lack specificity. Relying on incidental statistics (and

*Correspondence:
Jacob G. Sorbello
jsorbello.psy@gmail.com
[1] School of Applied Psychology, Griffith University, 176 Messines Ridge Road, Mt Gravatt, QLD 4122, Australia
[2] School of Applied Psychology, Griffith Criminology Institute, Griffith University, 176 Messines Ridge Road, Mt Gravatt, QLD 4122, Australia

"shooting-from-the-hip"), the conceptualisations of the problem and the interventions recommended cannot be empirically and systematically tested until we have a case formulation of the problem.

The aim of our paper is to conceptualise such a model—a comprehensive cognitive-behavioural motivational model specific to preloading. Before a new Theory of Preloading (TOP) is proposed, we will review what is already known in the literature about preloading and applicable theoretical models to inform this conceptualisation.

Review of the relevant literature

Since the start of the new century, there has been research interest towards understanding why individuals preload. It is, perhaps, colloquially known that people desire a safe and social space to consume alcohol and/or drugs before a party, event or night-out. In addition, the increased taxation on alcoholic beverages in certain countries—particularly in target-events—has led to strategic decisions for individuals to drink excessively at the start of a night to offset the overall financial cost of intoxication [69], or otherwise consume drugs as an alternative. Early research on alcohol preloading discovered many nuanced motivations, some which functioned to reduce social anxiety before a night-out, assist in pursuing sexual partners or facilitate cultural-specific practices (e.g., drinking games; [26, 83, 106]). This research identified that alcohol preloading was—in most parts—evidentially distinct from general alcohol consuming behaviours.

From a conceptual perspective, one of the core problems found in the literature was the lack of concurrence between general drinking characteristics and preloading motivations. Early research into the preloading phenomena found general drinking motivations (as measured from the DMQ-R; [18]) evidenced mixed validity when correlated with preloading frequency and quantity of alcohol consumed [84, 106]. In our study [94], we found conformity and personal-enhancement general drinking motivations were concurrent with similar preloading motivations. General drinking for coping and socialising was not the same as the preloading counterparts. In fact, 'socialisation' preloading motivations shared elements of coping, conformity and personal-enhancement. Moreover, there was no similar general drinking motivation for 'saving money', a key motivation reported in qualitative research (see [26]). This lack of concurrence is one of the key theoretical limitations for the applicability of general alcohol use models (like the MMAU) to preloading. These findings suggest the expectations and motivations facilitating preloading are theoretically different from general alcohol consumption.

There is limited research on the expectancy outcomes for preloading behaviours. Despite this limitation, one can extrapolate possible preloading expectations. Wells and colleagues [102] proposed that 'saving money' and 'socialising' were the two most salient outcomes of preloading—but there remained further unexamined functions of preloading behaviours. The qualitative literature has found support for Wells and colleagues' [102] proposal where individuals expected preloading to provide a fun, safe and cost-effective social phase to begin alcohol intoxication, with varying activities participated in by the genders [8, 26, 44, 68]. In our field research, we see the most valued motivations for preloading are also to 'save money' 'socialising' and 'enhancement/intoxication' [94]. The function of preloading expectations were different to the expected functions of general alcohol consumption—i.e., to immediately change affective states [21]. Preloading of alcohol can, therefore, be hypothesised to function under three different expectations: to reduce the overall perceived cost of a night-out,to promote social and safe alcohol and/or drug consumption; and to increase the enjoyment of a night-out.

With regards to motivational research, several research groups have attempted to establish preliminary theoretical foundations to conceptualise why individuals preload. These efforts culminated in the creation of three different scales to measure pregaming [6], pre-partying [64] and pre-drinking [61]—all three scales are synonymous with preloading, but with different motivations throughout. These research efforts contributed impactful scales for further investigations of preloading in the regions of their development. However, the three scales feature various cultural nuances which reduce the generalisability to other regions. For example, LaBrie and colleagues [64] Prepartying Motivations Inventory (PMI) includes a motivation group titled 'barriers to consumption'. This motivation is relevant for individuals below the legal drinking age of 21 years in North American regions. However, 'barriers to consumption' is irrelevant for many other cultures where the legal drinking age is less restrictive. Moreover, all three models do not account for whether the individual partakes in drug preloading—particularly when the availability of alcohol is constrained. This lack of consensus among theoretical efforts suggests a uniform conceptualisation for alcohol and drug preloading is needed.

Perhaps another missing piece of the conceptual puzzle is what happens after an individual preloads. The consequences resulting from preloading may reinforce future preloading behaviours. In particular, enhancement-based and, to a lesser extent, coping-related preloading motivations have been directly and indirectly associated with past harm [83, 93, 94]. Despite these findings, the

literature often conceptualises harm as the finalis exitus of preloading [41, 45, 73, 93]. What we propose may appear circular, but these past harms may actually reinforce the expectations and motivations for one's preloading. For example, if one has experienced an assault in the target-event, the experience of harm may reinforce the want or need for further intoxication to manage distressed affect in the next event. This hypothesised reinforcement cycle will be examined further in the following section where we review relevant cognitive, motivational and behaviour models in our efforts to inform a new theoretical conceptualisation for alcohol and/or drug preloading.

In summary, general drinking and preloading expectations/motivations are theoretically different and the behavioural consequences resulting from preloading may reinforce the relevant factors linked to the next preloading event.

Review of theoretical models

Motivational Model of Alcohol Use (MMAU)

The Motivational Model of Alcohol Use [20, 21] is a broad biopsychosocial model that explains alcohol consumption as a purpose driven behaviour. The model outlines distal factors (i.e., biological, sociocultural and idiosyncratic differences) that influence one's decision to consume alcohol, which is mediated by cognitive factors and influenced by the immediate situational context. Affect change is the central construct behind the motivations for guiding non-conscious decisions for alcohol consumption. The function of affect change is through the direct pharmacological effect of alcohol on the brain and the indirect social effect communicated by alcohol consumption. Cooper [18] was the first to specify this function by extracting four unique motivational factors for general alcohol use: socialising, personal-enhancement, coping and conformity. These motivations guide the decision to consume alcohol under varying intensity. The MMAU, in essence, is a cognitive-motivational model outlining the factors and processes guiding conscious and non-conscious decision making towards alcohol consumption.

Strengths

The MMAU is a well-established theory in the alcohol research literature. The theory draws broadly from biological, genetic, psychological and social learning perspectives to explain one's decision to drink alcohol. The four motivation domains have evidenced strong reliability being validated across youth, adult and cross-cultural samples [22, 36, 69]. Moreover, the model has strong predictive validity for alcohol problems and misuse. For example, coping motivations are often cross-culturally associated with heavy consumption [13, 19, 49], conformity and personal-enhancement motivations are associated with alcohol misuse in youth samples [98], [58], and socialising motivations shift from moderate to heavy alcohol use over time [91]. The generalisability of the MMAU allows for applicability across alcohol consuming behaviours where affect change is the intended effect.

Limitations

The model was never designed for preloading motivations and, therefore, lacks specificity to this behaviour. For example, past research has found mixed evidence for predicting preloading frequency, quantity and intoxication [6, 64, 84, 106]. Other researchers see preloading as a fundamentally different alcohol consuming behaviour and previous theories did not account for nuanced motivations like saving money (e.g., [8, 26]) or barriers to consumption (see. [64]). This may suggest that the MMAU lacks certain concepts such as planning and preparation factors that are very relevant to preloading. Another limitation is that the motivational formulation neglects the behavioural components which may reinforce decisions to drink. Cox and Klinger [21] briefly discuss the negative consequences of repetitive adverse consequences when targeting therapeutic factors. The function of this behavioural component is not, however, included in the theoretical formulation. Overall, the MMAU provides a broad cognitive-motivational formulation for general alcohol use that lacks specificity to nuanced preloading behaviours.

P.R.I.M.E theory

P.RI.M.E Theory (Plans, Responses, Impulses, Motives & Evaluations; [103]) is a broad cognitive-motivational model applied to human behaviour. A motivated behaviour is directed by five components outlined in the acronym which is divided into two systems. The reflective system is comprised of plans to facilitate the behaviour and evaluations that are beliefs or judgements about the behaviours. The automatic system is comprised of motives which function in line with an individual's wants or needs, and impulses that facilitate or inhibit the final component—the response. The reflective and automatic system share a relationship with the individual's internal environment (e.g., drives, perceived identity and mood/affect states) and the external environment (e.g., stimuli and information). The reflective system, in particular, may provide a useful addition to a theory like the MMAU when developing a conceptualisation for preloading behaviours. Overall, P.R.I.M.E argues that any human behaviour is facilitated by these five components and the interaction with internal and external environments.

Strengths

PRIME theory offers a broad top-down approach for individuals to arrive at a motivated response. The individual components have evidenced a relationship with alcohol consumption and elements of preloading. For example, drinking intentions have been found to be related to preloaded alcohol consumption and overall alcohol consumption [60]. Further, there are certain evaluations and motives which are linked to higher preloaded alcohol consumption. Positive expectancy motivations are indirectly linked to drinking game participation commonly practiced at preloading [101, 108]. Moreover, individuals who report preloading motivations related to wanting to enjoy the feeling of intoxication are found to consume more at preloading [83, 93, 94]. Perhaps PRIME theory's greatest strength is the inclusion of the external environmental factors influencing the motivational system. Environmental factors such as drinking games [107] and legislative interventions [31] have led to greater preloading intensity. PRIME remains a broad theory that can be applied to many behaviours in some way or another.

Limitations

The theory—in its approach to formulating a broad and integrative conceptualisation applicable to almost every behaviour—often lacks a fundamental clarity for its defining theoretical features. For example, in the earliest writings, the theory had five central themes that guided the theoretical formulation towards synthesis of multiple motivational constructs [103]. The MMAU in contrast has one central construct—an individual consumes alcohol to change their affect. This central construct allows the components to form around the concept of the theory, as well provides an understandable explanation to the lay-person. PRIME theory, using an integrative approach, does not present a single central construct without excluding all the components of the theory. Consistent with the criticisms of the MMAU, PRIME theory also lacks a behavioural component which explains how the response feeds back into the motivational system. The individual's response to the external environment may reinforce or alter the five levels of the motivational system. This assertion is not, however, addressed in PRIME theory and the focus is primarily on the cognitive-motivational components preceding behavioural responses. Accordingly, the MMAU and PRIME theory could benefit from integrating a method of behavioural analysis into the theoretical formulation.

SORCK analysis

SORCK (Stimuli, Organismic Variables, Response, Contingency, 'K'ontingency Reinforcement Schedule; [54]) is a method of behavioural analysis. SORCK aims to examine the function of a behaviour and then learn how to alter the behaviour through changing reinforcement schedules [39]. The analysis begins with identifying a target behaviour—i.e., 'R' for the Response. The antecedents (S for Stimuli) are examined with regards to the historical and contextual stimuli contributing to the likelihood of the behaviour occurring, while the immediate stimuli directly elicits the behaviour. Cognitions, personality, motivations, and mood states—O for the Organismic factors—are stated to moderate the stimuli-response relationship. What is unique about SORCK is the analysis of the immediate/short-term and long-term/delayed consequences—C for Consequences. These link into the contingencies or reinforcement schedule (K for Contingencies) which identify whether a consequence is a positive/negative reinforcer or a punisher/reward. The contingencies act as a feedback loop, reinforcing, punishing or rewarding the contextual and immediate stimuli. These consequences and contingencies are the components for intervention when using SORCK analysis.

Strengths

SORCK analysis provides an efficient conceptualisation for examining a target behaviour and the consequences maintaining a reinforcement cycle to the antecedents. Very few theoretical formulations consider how a behaviour is reinforced and may increase the likelihood of the behaviour occurring under similar stimulation. The first well known clinical application was used by Sanders and Dadd (1993) for behavioural parent interventions. Since this application, Frost and Devilly [39] used SORCK analysis to apply principles of behavioural intervention in health and medical systems. SORCK analysis pairs well with other cognitive models and conceptualisations which house a behavioural element. While SORCK has relatively little application since it's conceptual development, it has broad applicability when analysing and intervening on a target-behaviour. This ability to provide a behavioural mechanism for intervention is a very attractive component. In this way, the SORCK analysis provides a framework at both the population and individual level for both theory and intervention. This will be explained further below.

Limitations

The limitations for SORCK analysis are linked to the oversimplification of cognitive factors in the function of eliciting target-behaviours. The method often relies on clinical or theoretical judgements for one to specify the relevant cognitions, motivations or personality trait/states that moderate the stimuli-response relationship. This will cause a reduced consistency on the relevant organismic factors applied in a theoretical

conceptualisation. Another problem, akin to PRIME theory, is that the SORCK method has not been applied to alcohol consuming behaviours in the research literature. Yet clinicians often use SORCK analysis as a useful tool for clinical formulations with their patients. Careful consideration is required for the impact on organismic factors and the individual's own interpretation on how consequences are perceived to reinforce stimuli. With that said, the behavioural components of the SORCK method can account for the shortcomings of the MMAU and PRIME theory, as could these models account for SORCK's own limitations.

Summary of conceptual models:

1. MMAU provides a cognitive motivational model that specifies alcohol consumption is used to change affective states. It presently lacks validity with preloading behaviours.
2. PRIME theory applies a broad conceptualisation of human motivation balanced by the interaction between a reflective and automatic system influenced by an internal/external environment. The model is too integrative and broad in applicability.
3. SORCK analysis is a conceptual framework which seeks to understand the function of a behaviour and learn how to intervene on the components reinforcing the behaviour. This method downplays the role of cognitions and motivations when integrating the formulation.

A proposal for a new theory

Our Theory of Preloading (TOP) will provide a cognitive-behavioural motivational model for further research and intervention development. While much of the presented evidence thus far has only considered the preloading of alcohol, there is an argument for including both alcohol and recreational drug use in the conceptualisation of a comprehensive model. Recreational substances—i.e., through the use of stimulants (e.g., cocaine), hallucinogens (e.g., cannabis) and depressants (e.g., GHB; [28])—are used with or without alcohol at some point in the night-out [48, 85]. Despite this, drug preloading is relatively overlooked, with a preferred investigation of analysis for alcohol preloading [46]. In the TOP, alcohol and drug use share the same central construct—the expected effect of alcohol and drugs is for behavioural, affective, and cognitive management before a target-event. The inclusion of drugs within a preloading theory allows for conceptualisation to consider the evolving nature of preloading behaviours.

This following section will provide a framework for the TOP and examine each component of the theory. Like the MMAU, we will outline the distal factors that contribute to alcohol and drug preloading. Distal factors will be argued to influence the cognitive components (i.e., plans and expectations) for the preloading phase. Drawing from PRIME Theory, we then outline a two-level motivation system that facilitates the non-conscious processes to acquire or avoid a desired or undesirable affect state for the target-event. Following this, we will examine the perceived reinforcers and punishers that incentivise decisional factors to preload or not preload with alcohol and/or drugs. The final component draws from SORCK analysis to examine the target-behaviour and resulting consequences, of which we argue to reinforce the distal components of the TOP model. First, a summary of the components is outlined in Table 1.

Distal factors for preloading—individual, social and personality factors

Distal factors are the predisposing vulnerabilities that hold influence on one's preloading behaviour. The TOP shares similar biopsychosocial factors (i.e., biological, sociocultural/environmental and individual differences) with the MMAU which influence general alcohol consumption [21]. Biological predispositions predispose some individuals to greater pleasure reactions to alcohol and drug use [57, 89]. Individual differences describe how exposed one is to greater or lesser patterns of substance consumption. Personality traits that are higher in impulsivity and reward sensitivity can influence decisions to consume substances [38, 67]. At the state level, the desire to consume alcohol and substances is influenced by the person's affective state or 'set' [11, 37, 42, 74]. Likewise, sociocultural and environment factors through family, culture and peer influences are potent contributors to initiating and normalising alcohol and cannabis use [12, 15, 43, 59, 100]. Certainly, the practices of alcohol and drug preloading are largely influenced by the learning experiences of sociocultural and environmental factors.

Contextual and environmental factors influence and facilitate the likelihood of preloading occurring. Contextual factors are where one is (i.e., at a domestic residence or college room, [8, 83]) and when the preloading typically occurs (i.e., weekend nights, early evening [30]). Immediate environmental factors—those including stimuli, cues and peers—contribute to the intensity of preloading behaviours through external environmental influences. The triggering cues of stimuli associated with preloading (e.g., the presence of music or drinking games) initiate drinking and substance taking, contributing to the rapid or slow rate of consumption (e.g., [44, 107],). Lastly, the presence of peers at the preloading phase contributes to whether alcohol and/or drugs are socially acceptable

Table 1 Components of TOP (with an example provided)

Stimuli	*Organismic Variables*		*Responses*	*Consequences*	*(K)ontingencies*
Distal Factors	*Cognitive Factors*	*Motivations*	*Target Behaviour*	*Behavioural Outcomes (examples)*	*Assumed Contingencies To Be Tested*
Biological • Brain chemistry • Physiology Socio-cultural • Family/peer influence • Learning experiences Individual differences • Personality / biological traits • Personality / biological states Contextual • Where • When • How Immediate environment • Triggering Cues ○ Stimuli ○ Peers	Planning • Situation • Persons • Substance • Temporal • Cost/quantity Expectations • Cost-effective • Safety • Fun/enjoyment	Non-Conscious *Acquire (+ve experience)* • Enhancement • Money • Socialise *Avoid (-ve experience)* • Emotional control • Conformity • Apprehension Conscious *Decisional* • Perceived Incentives ○ Reinforcer ○ Reward ○ Punisher	Behaviour • Preload with alcohol • Preload with drugs • Preload with alcohol and drugs • No preloading	Short term • Perceived decrease in money spent • Perceived increase fun • Enhanced sociability • Unplanned sexual experience • Avoid social stigma Long-term (immediate) • Injuries • Poor sleep • Substance toxicity Long-term (distal) • Hangovers • Peer rejection • Withdrawals • Shared narrative with friends Incubating • Pathological use • Tolerance • Work, social, relationship interference	• Negative reinforcer • Positive reinforcer • Positive reinforcer • Positive reinforcer • Negative reinforcer • Punisher • Punisher • Punisher • Punisher • Punisher • Punisher • Reward Approach pleasure and avoid punishment

Intervention Factors

Assets: What assets does the person have? Are they affluent, intelligent, sociable, humorous, in a malleable job, have high levels of positive social support, many friends, etc.?

Deficits: What deficits does the person have? Do they have poor social skills, a lack of money, few friends, etc.?

Excesses: Behavioural excesses associated with the problem

Inappropriate Stimulus Control: Do they respond inappropriately (naturally or through prior learning) to different stimuli? Do they have a gambling problem, are they affectively labile, do they find it difficult to cessate behaviours or interactions once they have begun, etc.?

and available [34, 105]. While not essential, some individuals may preload in a solitary setting, particularly those with high social anxiety traits or states [56]. These contextual and immediate environmental factors hold a contributing input into the cognitive and motivational systems that engage the decision-making process towards preloading.

In summary, these distal factors can be summarised as the following.

1. Biological, sociocultural, individual differences are predisposing factors that influence the individual's cognitive, motivational and behavioural outcomes;
2. Contextual factors (i.e., where and when) and immediate environmental factors of triggering cues (i.e., stimuli and peers) influence the quantity and intensity of a preloading phase.

Cognitive factors—plans and expectations for preloading

Most purposeful preloading is an inherent preparatory behaviour that begins with a planning phase [46]. Plans for preloading are linked to the distal contextual factors and past learning experiences. Planning includes five possible components: situational; persons; substance; temporal; and cost/quantity. Situational factors refer to where the preloading is to take place—i.e., in most cases it is a domestic residence [8, 30]—and what activities will occur at preloading, e.g., drinking games [107] or trying on clothes/make up [7]. Person factors are the peer group where individuals plan to share in the preloading of alcohol and/or drugs. Accordingly, this planned peer group is likely to be the same peers at the transition point into the target-event [8].

Substance factors link into the type of alcohol and substances scheduled for consumption at the preloading phase. Certain exchanges with the social supply of alcohol and drugs [16] are planned between peers for preloading and the target-event. Temporal factors are the hour at which preloading is initiated (e.g., 8 p.m.) and the length of the preloading session. Past research has found the average length of a preloading session was 100 min with a large standard deviation of 104 min [30]. The temporal calculations align with strategic quantity/cost factors—i.e., the amount of money the individual intends to spend in preloading to save money for the target-event, and how much alcohol or drugs are to be consumed based on the individual's desired level of intoxication and intended experience. The degree of planning varies between individuals depending on their idiosyncratic distal factors.

It is possible for preloading to occur with limited preparation or planning. For example, many individuals may not intend for a night-out and through a 'spur-of the moment decision' (i.e., typically through peer pressure) engage in unplanned preloading. Individuals who partake in unplanned substance use typically consumed less than their peers who plan their substance use [35, 97]. Here, the components of the preparation phase are constrained—particularly in the availability of alcohol or substances and the foreseeable time allocated before entry into the target-event. Unplanned preloading is limited by the choices available to the individual in their given contextual environment. Although universally, the preparation phase—whether planned or unplanned—is linked to three expectations that serve as the function for preloading.

Expectation 1: Strategic cost-effective consumption

Individuals have encountered past learning experiences where desired levels of alcohol consumption were difficult to obtain in the target-event. Preloading is expected to mitigate or reduce the difficulty to access a desired state of alcohol intoxication—or alternatively a different type of mind-altering effect through drug consumption—for the target-event. The expectation holds that if an individual preloads with alcohol or drugs before the target-event, they will gain a better experience by having more financial assets for the target-event. For some individuals, the preloading of drugs is a more cost-effective option for the target-event because of longer dosage effects. For example, MDMA has a half-life of approximately eight hours [53], the potential length of a target-event. Strategic cost-effective expectations are perceived to benefit the individual because the total financial cost for transport, food, entry fees and alcohol/drugs is reduced for the entire night-out by earlier preloading. The expectation is particularly relevant for younger individuals [102] who have fewer financial assets and face age restriction boundaries for legal alcohol consumption [64, 76]. The strategic cost-effective expectations are, however, frequently developed alongside two other expectations for preloading.

Expectation 2: Safety

The perception of social inclusion and safety declined as fewer individuals began to start their night at a target-event without prior substance consumption. Sociocultural and individual experiences of violence in and/or around target-events contributes to further perceptions of the night-out being dangerous for one's safety [10, 68]. Preloading is expected to provide a secure and safe environment for individuals to initially consume alcohol and/or drugs before the target-event. Reducing one's anticipated anxiety related to the target-event is expected at the preloading phase for some individuals [14]. Concomitantly, drug preloading is expected to be safer and more secure in a private location, rather than at the target-event. In many ways, the preloading phase has become a normative cultural engagement for individuals to comfortably socialise with peers prior to the target-event [44, 61]. This underlying expectation for a safe environment is related to the final expectation for preloading.

Expectation 3: Fun and enjoyment

Target-events can perceivably be an unattractive and undesirable environment for many individuals to begin a substance consuming episode. The target-event is expected to be less enjoyable for the individual without prior alcohol or drug consumption. Preloading is expected to compensate for the temporal gap by facilitating fun and enjoyment in the previously mentioned safe and social environment. Prior alcohol consumption is expected to enhance one's mood for the target-event [83], facilitate social interactions at preloading [26, 61] and prepare the individual for target-event specific behaviours (e.g., dancing, [3]). Prior drug consumption allows the individual to enjoy the effect of a particular drug (e.g., cannabis) which are unavailable in the target-event.

A preloading event provides early accessibility to alcohol and drug use, which is desirable and rewarding to the individual, when compared to delayed or unavailable substance use in the target-event. While there is evidence of increased preloading and later entry to target events when substances have a perceived lack of availability [31] there is also the possibility that, for some subsamples, the perceived availability of certain substances at the preloading event could also lead to increased preloading, with an anticipated lack of availability at the target-event not demonstrating any particular attentional bias in their

specific case [51, 52]. With that said, we would argue that the majority of individuals are seeking to acquire a fun and enjoyable experience related to desired alcohol intoxication and drug effects earlier in the evening, before transitioning to the target-event.

In summary, the cognitive factors are comprised of three main areas:

1. The planning phase for preloading consists of five intended components: situational; temporal; persons; substance and quantity/cost.
2. Preloading is expected to compensate for a desired experience that the individual cannot achieve in a target-event without prior alcohol or drug consumption.
3. Preloading has three expectations: strategic cost-effectiveness; safety; fun & enjoyment.

Proximal preloading motivation systems—acquire and avoid

The proximal motivational factors for preloading receive input from the distal and cognitive factors in preparation for decisional processes. Affective management for the target-event is the central construct of the TOP. The motivational system of the TOP guides the decision making process and behavioural responses to engage in preloading. Accordingly, preloading motivations are the non-conscious processes that facilitate alcohol and/or drug use to acquire a desirable affective state or avoid an undesirable affective state for the target-event. These motivations guide the individual's affective wants or needs to enjoy the target-event through earlier alcohol and drug consumption. Like the MMAU [21], we argue that alcohol and drug consumption has a direct pharmacological effect, as well an indirect social and facilitative function. The conceptualised effect for these motivations fall under two subsystems: the acquire subsystem and the avoid subsystem.

Gaining a desirable experience: The acquire subsystem

The acquire subsystem of preloading motivations guides individuals to an expected affective outcome in a positive direction for the target-event. The most salient effect of alcohol and/or substance use is the initial enhancement of an affective state in a positive direction through direct pharmacological effects [9, 21]. These are known as enhancement-based preloading motivations, commonly reported as—'to feel a buzz', 'to get as drunk/high as possible' or 'to get into the party mood' [30, 47, 83]. Pharmacological effects from drug consumption vary in terms of the anticipated positive effect (e.g., stimulant, hallucinogen or dissociative) and it is unsurprising that these motivations are prevalent among drug preloading [47]. Drug use has often been described as 'a shortcut to euphoria' [9] because the euphoric pharmacological effect of the substance can be achieved in a shorter length of time when compared to alcohol. It cannot be underestimated that individuals enjoy the direct pharmacological effect of alcohol and drug intoxication and will attempt to acquire this effect before a target-event.

Alcohol and drug preloading to acquire a desirable affective experience is also guided by the instrumental effects of consumption. Preloading with alcohol enhances socialisation with known peers and reduces one's inhibitions to facilitate new social connections [26, 83]. Consistent with this, certain drugs like cannabis or cocaine are used to socialise or develop connections among drug endorsing peers [99]. The expectation that preloading is a cost-effective behaviour indirectly allows one to gain their desired affective experience at the preloading phase. Spending a small cost towards off-premise drinks and/or drugs at preloading ensures the individual has acquired sufficient intoxication for the possibility that further consumption could be difficult at the target-event. Socialising and saving money are the two leading preloading motivations reported in the field for alcohol consumption [30, 73, 77]. However, these motivations function secondary to enhancement-based motivations for drug preloading [47], perhaps due to perceived social norms for drug use and the relative expense for some party drugs. While many individuals use the acquire subsystem for preloading, others are motivated by a different system to avoid negative affective experiences.

Needing a desirable experience: The avoid subsystem

Some individuals use emotional control preloading motivations to avoid or dull an undesirable affective response when transitioning into the target-event. Like the MMAU, the direct pharmacological effect of alcohol is argued to reduce negative affective states and shift affect into a positive direction [21]. The 'rush' effect from initial drug consumption with the shift to a euphoric state (i.e., the high [75]), is the key mechanism for the negative affective management process of drug preloading. Emotional control preloading motivations facilitate earlier alcohol or drug consumption assuming that the target-event will be unsafe or uncomfortable—which the individual is predicting will elicit tension, distress, anxiety or embarrassment [14, 23, 87]. These preloading motivations reduce the anticipated negative affective states commonly reported as reasons 'to feel more comfortable' and 'to increase confidence'. Emotional control motivations may also contribute to nuanced intimate partner pursuit goals (see [64]). Individuals with distal risk factors (e.g., anxious temperaments) could use alcohol or drugs at

preloading to shift from a negative state (i.e., nervous) to a positive interpretation (e.g., excitement) and thereby a positive state (i.e., confident and self-assured) when pursuing intimate partners in the target-event. As such, one component of the avoid subsystem uses the direct pharmacological effect of alcohol and/or drugs to pull away from undesirable affective states and situations.

The second component of the avoid subsystem uses the instrumental effects of alcohol and drug consumption. Preloading with alcohol in a social peer group communicates acceptance and conviviality [61]. Drug use functions to a lesser extent as a social lubricant, but it is still enjoyed by many in the social context [105]. When the social context is overvalued by the individual, the fear of missing out [88] or, more precisely, the fear of being left out and excluded from the social group, will motivate their actions to conform with alcohol and/or drug preloading. These individuals preload for conformity-based reasons reported as 'feeling pressure from friends' or 'because my friends preloaded'. The anticipated negative state attributed to perceived peer rejection from declining alcohol or drug use is shifted to a perceived positive state of peer acceptance when the individual partakes in alcohol or drug preloading. For these individuals, the alternative predicted reality suggests they will have to attend the target-event alone and attempt to meet peers after preloading. Conforming to the social expectation of alcohol or drug use at preloading, therefore, allows one to avoid an undesirable affective state attributed to peer rejection at the target-event.

A third component of the avoid subsystem is specific to drug preloading and cultures where alcohol consumption is illegal in public. Individuals are motivated to avoid detection and apprehension for the use, possession, and exchange of pre-purchased alcohol and party drugs in or around the target-event. For drug use, this is dependent on the drug of choice and is related to the route of administration. Certain drugs are characteristically more discreet to consume via snorting or swallowing and have shorter peak effects, requiring dosing in or outside the target-event [9, 71, 78]. Being caught with pre-purchased alcohol or party drugs in or around the target-event imposes large consequences for some individuals (e.g., fines, arrests, and criminal charges). Older adults holding greater responsibilities are more risk-averse and, therefore, will use drugs in a private residence with close friends [4]. Drug preloading functions for the individual to avoid the consequences of legal apprehension along with the anticipated negative affective states such as shame, fear, disappointment, and anxiety. Consistent with this intended purpose, apprehension motives for preloading will often function secondary to the enhancing and affective reduction motives of drug consumption.

In summary:

1. The central construct for the TOP is affective management for the target-event.
2. Preloading motivations are non-conscious processes that facilitate earlier alcohol and/or drug use to acquire a desirable experience or avoid an undesirable affective state for the target-event.
3. Alcohol and drug preloading use direct pharmacological effects of a substance to prepare one's affect for the target-event and instrumental effects of consumption for social, monetary, conformity and apprehension-avoidance purposes.

Decisional components—integration of incentives and the target behaviour

Individuals make a conscious decision to preload with alcohol and/or drugs prior to the behavioural response. Taken from the MMAU [21], the process in deciding to preload is a balance of perceived reinforcers, punishers and expected benefits. Incentives perceived in a positive direction to prepare one's affect for the target-event will increase the likelihood that an individual decides to preload with alcohol and/or drugs. These incentives function to positively or negatively reinforce the behaviour. Perhaps the most potent reinforcer for alcohol preloading is the perception of increased financial assets for the target-event [26, 69, 102]. Drug preloading is strongly incentivised by rapid and prolonged intoxication by varying pharmacological interactions [75]. Moreover, it cannot be discounted that the indirect instrumental effects for alcohol and drug consumption reinforces peer connection and punishes rejection from an established social group [5, 50, 105]). The computation of these incentives perceived in a positive direction contribute to three behavioural responses for preloading: preload with alcohol only; preload with drugs only; and preload with both alcohol and drugs.

The alternative outcome in deciding not to engage in preloading is counterbalanced by competing punishers or lower perceived rewards. When the incentives are perceived in a non-positive direction—those outweighed by significant costs and negative consequences—then the individual will decide not to consume alcohol or drugs at preloading. A social environment where the individual has fewer social connections with peers or little need to reduce discomfort provides limited rewarding incentives for alcohol consumption [1, 2]. Consistent with this, individuals who hold strong moral convictions, disapproval, and concerns for the consequences of drug use would see limited incentives for drug preloading [86]. Anticipated

consequences are perhaps a strong punishing incentive to avoid alcohol and drug use. For example, individuals may decide to avoid preloading when one is expected to be the designated driver [81], or an individual has anticipated drug testing for work commitments. Finally, older individuals often have less available time and greater access to financial assets—here, the cost-effective expectation of preloading is not rewarding for these individuals. Therefore, the perceived benefit from preloading is influenced by contextual, environmental, and idiosyncratic factors when an individual decides to engage in or avoid preloading.

So, these conscious decisions can be summarised as:

1. The decision to preload with alcohol, preload with drugs or preload with both is influenced by incentives perceived in a positive direction functioning as positive or negative reinforcers.
2. The decision to not preload before the target-event is influenced when incentives are not perceived to be rewarding, or is punishing to the individual.

Consequences—reinforcers, rewards and punishers

The behavioural response of preloading is to consume alcohol and/or drugs. Accordingly, this consumption produces consequences for the individual. When this consumption is planned in advanced, it is associated with greater occurrences of negative consequences due to the larger quantities of consumed substances when compared to unplanned alcohol and drug consumption [35, 65, 97]. The negative consequences of alcohol and drug preloading have been extensively discussed and investigated in the literature (e.g., [41, 73, 85]). However, there has yet to be a consistent conceptualisation for how these consequences are organised and reinforce further preloading. For the following section, we conceptualise consequences to occur across four temporal domains: short-term consequences; long-term immediate consequences; long-term distal consequences; & incubating consequences. Consequences reinforce, reward or punish the behaviour, as demonstrated by either an increase or decrease in the subsequent behaviour. We may even make the assumption that these increases or decreases in behaviour have cognitive correlates. The effect of these consequences feedback into the distal system, guiding the next preloading session.

Short-term consequences

Short-term consequences are the immediate effects of alcohol or drug consumption that occur at the preloading phase and within the target-event. Short-term consequences also include the effects of not engaging in the preloading of alcohol and/or drugs. The effect of the consequence can operate as either a positive or negative reinforcer, or a punisher. For example, reduced financial expenditure in the target-event may negatively reinforce preloading because the noxious stimuli (i.e., spending excessive finances to consume more alcohol) has perceivably been removed [5, 8, 26]. Assaults and aggressive behaviour at the target-event may positively reinforce preloading with alcohol or drugs for individuals in certain cultures holding beliefs for aggression-related behaviours [66]. For individuals averse to violence, assaults and the management of intense affective states related to a previous assault will negatively reinforce preloading for the next event. Preloading with alcohol and drugs reduces the negative affect and anxiety associated with navigating the target-event where one was previously victimised. Short-term consequences will reinforce different responses and cognitive evaluations for the next preloading session depending on the individual.

Long-term consequences—immediate and distal

Long-term consequences occur after the individual has left the preloading event. These are divided between two different categories: immediate and distal consequences. Immediate long-term consequences are the outcomes of alcohol and drug intoxication directly after the preloading event. Some examples can include, peer acceptance, alcohol related injuries due to accidents, vomiting from alcohol/drug induced overdoses and poor sleep/biological functioning impacted by alcohol and drugs [55, 63, 75, 79]. Such outcomes can be quite paradoxical in nature, such as increasing the likelihood of being assaulted (due to excessive inebriation). This in turn can influence distal long-term consequences—such as reinforcing anticipatory anxiety when next attending a target-event and reinforcing future preloading to manage the noxious affective state.

Distal long-term consequences refer to delayed effects of alcohol and/or drug consumption, or the decision for abstaining from alcohol and drug preloading. Individuals who decide not to engage in alcohol or drug preloading may encounter peer rejection from the social group for the next preloading session. Conversely, the delayed effects of alcohol and/or drug use can include biological damage to vital organs, hangovers, withdrawals and the 'comedown', increased unanticipated expenditure during the target-event, unexpected sexual encounters and decreased mood and cognitive functioning over the next day to week [34, 75, 79, 92, 107].

Long-term consequences function as a reward or a punisher to the distal system of preloading. Some events may initially be punishing but are then perceived as rewarding to the individual's preloading behaviour. For example, if an individual 'blacks-out' or vomits while on the way to the target-event, it is initially perceived as punishing because the individual could miss the target-event. However, if the individual's friends share in a collective positive narrative—e.g., "Jim got messed up on the beers and pills and he still made it out!"—the initially negative event becomes rewarding to the individual. The perception of events being either rewarding or punishing is altered by the impact of poor memory consolidation under intoxication and by the reinforcement of peers. Over time, a long-term pattern for avoiding perceived punishment can push individuals towards developing long-term patterns of reward focused preloading.

Incubating consequences

The repetitive and reinforced cycle of preloading and target-event consumption produces long-term delayed effects to the individual. These effects incubate over time, evolving in a longitudinal manner that predispose problems associated with alcohol and drug use. The development of psychopathology is a possible consequence that unintentionally incubates over time. Some possible examples include the development of alcohol or drug dependence [63, 71, 75], dependence on substances to regulate experiences of trauma and harm [87] or mood instability [27, 79]. Tolerance to alcohol and drugs develops over these repetitive cycles of preloading and target-event substance use. These incubating consequences push individuals towards desiring increased frequency and intensity of substances at preloading. Like any problem, the incubating consequences of alcohol and drug preloading may begin to interfere with the individuals work, relationship and social domains. Incubating consequences function in a broad mechanism of moving the individual away from punishment and towards the desire for pleasure in acquiring a positive affective state. As such, the entrenched pattern of incubating consequences for preloading is likely to become difficult to change.

In short, the consequences of preloading can be summarised as:

1. Behavioural responses for alcohol and drug preloading are followed by short-term consequences during the preloading session and target-event, and long term (immediate and distal) consequences thereafter.
2. Incubating consequences develop longitudinally after repeated reinforcement cycles of alcohol and drug preloading.

Intervention factors

The preliminary components for individual and broad interventions can be identified by considering how individuals engage with the consequences and contingencies of their preloading behaviours. When intervening on a behaviour, there are four factors of the individual which contribute to the behaviour: assets; excesses, deficits; and inappropriate stimulus control (explained further in [39]). Assets refer to the resources a person has available to them. Salient examples include the availability of funds, whether the person is extroverted and sociable, or whether they have a positive friendship group. Excesses are involved in the behavioural problem. Excess intoxication by alcohol or drugs is linked to the higher likelihood of experiencing alcohol related harms [45, 73] but also the likelihood of the individual having an enjoyable experience [8, 68]. Excesses can also include such factors as time in which to preload (with the deficit of employment), having too large a group of friends (and hence increased preloading), [32] or any other excess behaviour or availability. Deficits are what the individual lacks which influences the behaviour. Certain individuals have an anxious temperament, a lack of funds, or lack a cohesive social system—all of which predispose one to preload in order to manage the perceived deficits. Finally, inappropriate stimulus control refers to where adaptive behaviours are used for the incorrect situation. In the field, many individuals attribute their own subjective intoxication to be much lower relative to their peers or others around them and, therefore, consume more alcohol in the target-event to control this misperception [17, 31, 33]. Interventions can be proposed under the TOP by considering how an individual's assets, deficits, excesses and inappropriate stimulus control maintain their preloading behaviours.

Summary of the TOP

Preloading with alcohol and/or drugs has become a nuanced substance consuming behaviour and largely a preparatory phase before a target-event. The lack of success for reducing preloading behaviours highlights the need for theoretical insight into conceptualising the preloading phenomena. The TOP represents the first cognitive, motivational and behavioural conceptualisation to specifically explain and predict preloading behaviours. Affective management for the target-event is the core construct for individuals engaging in preloading. Distal factors predispose individuals to different cognitive, motivational and behavioural patterns of preloading, while contextual and immediate situational factors function as antecedents for these components. The cognitive components are comprised of plans for preloading and one's expected experience for preloading. Motivational factors guide the non-conscious process for one

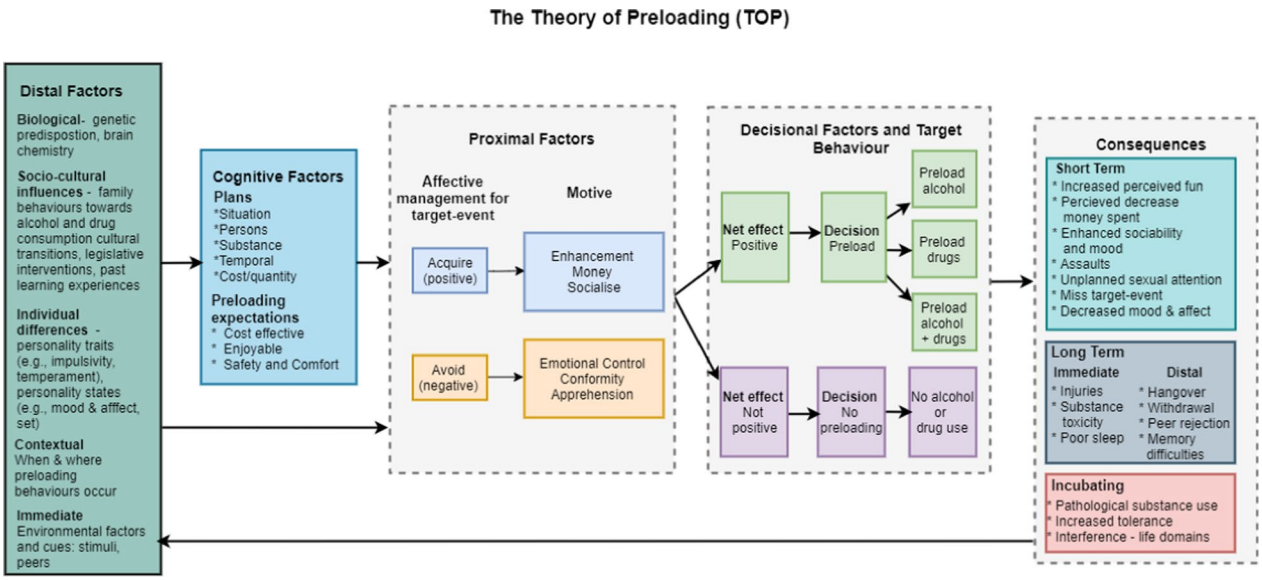

Fig. 1 Theory of preloading—components and hypothesised mechanisms

to acquire a desirable affective state or to avoid an undesirable affective state prior to the target-event. The final decision to engage in alcohol or drug preloading is a calibration of incentives (i.e., reinforcers, rewards and punishers) perceived in a positive or non-positive direction, integrated with information from the distal, cognitive and motivational systems. Individuals decide to either preload with alcohol, preload with drugs, preload with both alcohol and drugs, or not to preload at all. The short-term, long-term (immediate and distal) and incubating consequences from the preloading session and target-event function to reinforce, reward or punish future preloading. The relevant components of the TOP are summarised visually in Fig. 1. A simplified version of the TOP is provided in Fig. 2.

Implications, future directions and conclusions

According to Pedersen [82], the preloading literature needed to move its focus onto intervention development. The TOP has taken this first stride in laying down a theoretical framework to be used in practical, clinical and research applications. Practical interventions can look to the components of the TOP to structure harm reduction efforts. Altering the perceived rewarding experience of the preloading session is one possible approach to reducing harmful preloading. This can be achieved by interventions that intentionally reward earlier entry into target-events and align with the three key compensatory expectations for preloading. Some examples may include offering discounted food and services (targeting cost-effectiveness), having early concerts, games and events in venues (targeting fun and enjoyment); and comfortable, well-lit, secure social spaces (targeting safety). Key stakeholders can target these expectations in various ways, but it remains important for the unintentional effects of an intervention to be considered before implementation [80].

The TOP has relevant implications for clinicians working within clinical practice. Individuals will likely access alcohol and drug support when the short, long-term and incubating consequences of their substance use is substantially interfering with their work, social and home relationships. Consistent with this, individuals who engage in harmful preloading may have deficits which are co-morbid with mental health presentations—e.g., poor impulse control; mood regulation difficulties; social anxiety & prior traumatic experiences in target-events [14, 67, 79, 87]. It would be beneficial for clinicians working with alcohol and drug problems to be aware of nuanced substance consuming behaviours, like preloading, that is related to their clinical work. Using a relevant theoretical framework like the TOP can provide the clinician with a template for appropriate assessment, formulation and treatment of an individual with harmful preloading behaviours.

The TOP[1] has numerous future directions for research initiatives. Perhaps the first imminent steps are to test the model's key components and mechanisms. Future

[1] NB: We, the authors, are happy for researchers to adopt the terminology of their choice when referring to our theoretical formulation—i.e., the Theory of Preloading/Pregaming/Pre-partying/Pre-drinking (TOP).

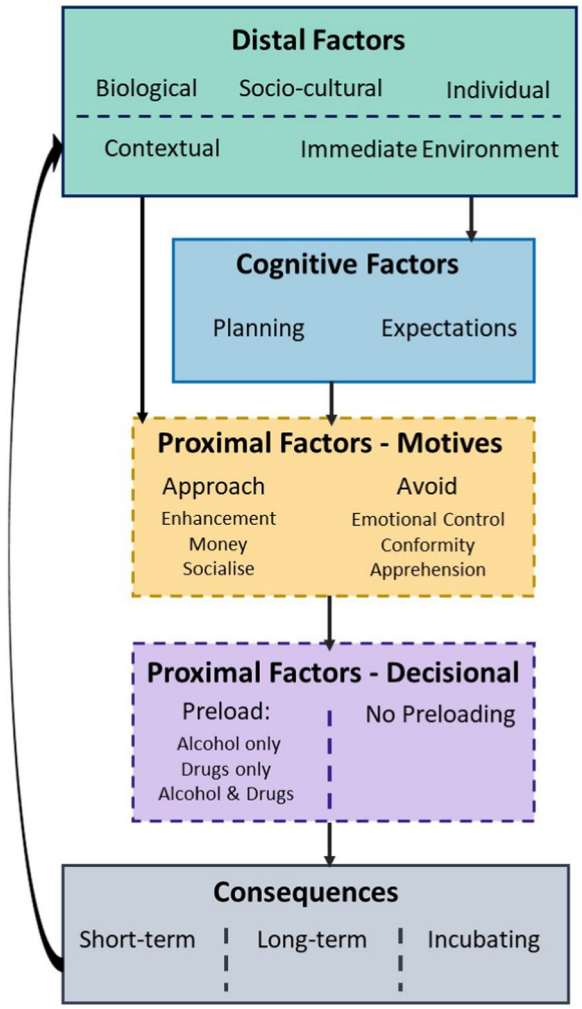

Fig. 2 Theory of preloading—simplified model

researchers may wish to investigate the 'preparation' phase for planning a preloading session, examine the motivations for drug preloading or test the function of consequences across multiple preloading events using longitudinal research. Other research projects may find value in testing intervention components—i.e., assets, excess, deficits, inappropriate stimulus control—we had previously mentioned. Now, it is always a possibility that the theory is wrong or requires significant adjustment to conform with experimental data. Despite this concern, we see this process necessary to progress our understanding of preloading behaviours for alcohol and drug use. Effective harm reduction can begin once we have a consistent and specific understanding of the preloading phenomena.

Abbreviations

TOP	Theory of preloading
MMAU	Motivational model of alcohol use
PRIME	Plans, responses, impulses, motives, expectations theory
SORCK	Stimuli, organismic, response behavior, consequences, kontingencies framework.
DMQ-R	Drinking motivations questionnaire revised
GHB	Gamma-hydroxybutyrate
WHO	World Health Organization

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