Should we promote alcohol problems as a continuum? Implications for policy and practice

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Abstract

The highly heterogeneous nature of alcohol use and problems has presented significant challenges to those attempting to understand, treat or prevent what is commonly termed alcohol use disorder (AUD). However, any attempts to capture this complex phenomenon, including the various current criteria of AUD, come with a number of limitations. One particular limitation has been how alcohol problems are represented or understood in ways which do not capture the broad spectrum of alcohol use and harms and the many potential routes to prevention, treatment, and recovery. One possible response to this has been proposed as more explicitly framing or conceptualizing a continuum model of alcohol use and harms. In this commentary, we attempt to identify the key implications of a continuum model for policy and practice, examining the historical and current context of alcohol problem classifications and models. We argue a continuum model of alcohol use and problems holds a number of advantages for advancing public health goals, but also some potential limitations, both of which require further examination.

Introduction

In 2013, the introduction of the *Diagnostic and Statistical Manual for Mental Disorders, Fifth Edition* (DSM-5) resulted in a significant change to how the DSM classified alcohol problems via the introduction of an ostensibly single, unidimensional construct of alcohol use disorder (AUD) (American Psychiatric Association, 2013). That is, rather than separate categories of abuse and dependence as per DSM-IV and DSM-III, AUD was classified by severity as either mild, moderate, or severe depending on the number of criteria met across four conceptual symptom clusters, namely impaired control, social impairment, risky use, and pharmacological criteria (APA, 2013; pp. 483-484). Whilst classes of severity and symptom clusters still represent categories of AUD, the broader conceptual implication of the DSM-5 is that alcohol-related problems lie along a single continuum in which all individuals with AUD have essentially more or less severe expressions of the same *disorder.* However, representing alcohol problems via continuum-orientated conceptualizations such as in the DSM-5 raises a number of important questions related to policy and practice which we attempt to address in this commentary.

Before doing so, we attempt to clarify several key alcohol terms and concepts. Firstly, we propose that a broad spectrum of *alcohol problems* exists as highly heterogeneous and complex phenomena embedded within social systems (Heather & Robertson, 1997; Litten et al., 2015; Witkiewitz & Tucker, 2021), and as such are difficult to measure via unidimensional constructs and diagnostic systems. Nonetheless, concepts and classifications (such as DSM-5) are required in our attempts to make sense of and respond to such phenomena through research, policy and interventions. As such, we use the term ‘alcohol problems’ as a broad top-level descriptor of the complex and multi-factorial *existence* of

problems that may arise as a result of alcohol use[1]. This definition is consistent with the 1990 Institute of Medicine (IoM) report on the treatment of alcohol problems, which highlighted the policy case for addressing alcohol problems without attempting to classify or conceptualize them or their causes (Institute of Medicine, 1990).

We use the term AUD separately to refer specifically to *models/conceptualizations* (e.g., as a continuum or disease model) or *classifications/assessments* of alcohol problems such as the DSM-5, or the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001; NICE, 2011). Our use of the term AUD therefore represents attempts at capturing and conveying a model that at least partially includes alcohol problems (but may also capture other features such as physiological adaptations to use, e.g., tolerance, withdrawal, such as in the case of the DSM-5), typically applied in the context of research, policy or treatment[2]. Notably, different AUD models come with their own strengths and limitations, including how they frame alcohol-related problems, and in turn how policy makers, practitioners and the public make sense of and respond to them (Carter, 2013; Entman, 1993; Morris, Albery, et al., 2021).

In particular, we examine issues pertaining to how AUD models may attempt to frame alcohol problems as existing on a continuum. We define a continuum of alcohol problems as one in which there are no categorical boundaries in terms of symptoms or the groups of people who experience them. That is, under a continuum concept, any diagnostic 'cut-offs' (e.g., between 'mild' and 'moderate' AUD) or descriptive labels (such as 'person with AUD') are pragmatic attempts at sense making for diagnosis or treatment, rather than real categorical phenomena. This includes cut-offs between alcohol use which does not rise to the level of an

[1] Including but not limited to a wide range of health conditions, dependence, injury, harm to others, and increased risk of these harms, even if not yet experienced

[2] We therefore refer to AUD where it reflects an operationalized model of alcohol problems in the context of treatment or policy (e.g., DSM-5) or research (e.g., as a measure or experimental depiction of alcohol problems in accordance with a particular model)

AUD and that which does. For example, under UK clinical guidance, any level of use above 14 units is considered an AUD (NICE, 2011), yet any level of alcohol use carries *some* risk of harms, particularly for certain groups (Bellis & Jones, 2016). Similarly, many people may not meet DSM-5 criteria for an AUD but still experience significant alcohol problems (Grant et al., 2015; Hagman et al., 2014).

To what extent alcohol problems actually exist as continuous, or indeed, should be represented as such in public, policy, or treatment contexts, raises a number of complex issues. Firstly, alcohol *use* itself as a degree of consumption could indeed be graded on a true continuum such as other truly unidimensional measures like temperature or pressure. However, alcohol problems, which AUD classifications have been at least partially developed to capture, are highly heterogeneous (Litten et al., 2015) and potentially varying in severities themselves (Boness et al., 2019; Lane et al., 2016), and do not neatly fit on a continuous single dimensional scale (Watts et al., 2021). Rather, every person has a unique set of complex biopsychosocial factors and circumstances such that no two person's risk or harms from alcohol use could truly be the same. Physiological, environmental and other socioecological differences, for example, can account for very different health outcomes amongst people with otherwise similar patterns of consumption (Rehm et al., 2013, 2015). Thus, any two people with a specific outcome, such as alcohol-related liver disease, physiological dependence, or any other alcohol-related problem, will have a unique set of physiological responses interacting with their cultural context and their own unique lived experiences. Inevitably, this makes attempts to universally classify or 'diagnose' alcohol-related problems inherently difficult. An obvious example of this diagnostic complexity is the DSM-5 criterion of "Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home" which is not applicable to individuals who do not have major role obligations in those settings. Another example is the DSM-5 criterion of "There is

a persistent desire or unsuccessful efforts to cut down or control alcohol use" which cannot be endorsed by individuals who never desire or make efforts to cut down or control alcohol use. Thus, problems related to drinking are inherently complex and as such, any efforts to capture this complexity is unlikely to succeed via a single unidimensional measure. Rather, the very different causes and manifestations of alcohol problems reflect very different *types* of problems within and across drinking populations (Bailey et al., 2021; Boness et al., 2021; Witkiewitz & Tucker, 2021).

Alcohol problems and associated behaviors therefore exist as an inherently complex and dynamic phenomena, but require schema-friendly conceptualizations in our efforts to understand, identify, prevent and treat them. Thus, AUD concepts are contemporary attempts to respond to alcohol problems across various policy, clinical, and research spheres. In this commentary, we aim to assess key implications for policy and practice of a continuum model of alcohol problems and how AUD concepts may seek to represent them as such. First, we present a brief history of AUD conceptualization. Next, we explore the positive implications of continuum-based models of alcohol problems, followed by and the extent to which AUD concepts (as attempts at capturing alcohol problems) may be considered as a binary or a continuous phenomenon of dysfunction associated with alcohol use. We then offer an examination of negative implications or limitations and other consequences of continuum-based conceptualizations followed by some concluding thoughts and recommendations on the use of continuum models of alcohol problems in policy and practice.

From category to continuum: a short history of recent AUD concepts

As noted above, the key implication of DSM-5 AUD concept is its top-level representation of alcohol problems as a single unidimensional disorder. Nonetheless, classifications that attempt to recognise the broader existence of alcohol problems beyond

disease-orientated models only began to emerge in the later part of the 20th century. Notably, drinking patterns of alcohol 'abuse' as separate to alcohol 'dependence' were first introduced in the 1980s via DSM-III and ICD-9. The current ICD-11 retains hazardous and harmful drinking as drinking behaviours distinct (but not mutually exclusive) from alcohol dependence. However, through most of the 20th Century conceptualizations of alcohol problems were primarily characterizations of 'alcoholism', typically understood in terms of loss of control and the necessity of lifelong abstinence for recovery. This model still dominates public ideas of alcohol problems as a severe and heavily stigmatized issue of chronic addiction (Crisp et al., 2005; Kilian et al., 2021; Morris, 2022; Pienaar et al., 2017; Schomerus et al., 2013; Tikkinen et al., 2012; Witkiewitz & Tucker, 2021).

The dominance of the alcoholism model came to prominence through a combination of the rising popularity of Alcoholics Anonymous (AA) and acceptance of medical models of alcoholism, particularly E.M Jellink's hugely influential development of *'The disease concept of alcoholism'* (Jellinek, 1960). However, the interpretation of alcoholism was and continues to be widely varied (Heather & Robertson, 1997). Indeed, AA's philosophy towards the nature of alcoholism has been a long running topic of debate, but is generally seen as intending to point to alcoholism as a disease (or illness as referred to in its main texts) in a more general metaphorical or spiritual sense (Meurk et al., 2014). It is through this disease-as-metaphor paradigm that members may be able to make sense of their experience and pursue recovery (Hill & Leeming, 2014; Humphreys, 2000). Nonetheless, according to Miller & Kurtz (1994), AA came to be specifically regarded in accordance with a *dispositional disease model* in which alcoholism is:

"…a unitary disease entity that is qualitatively distinct and discontinuous from normality. As with pregnancy there are no grey areas; one either is or is not alcoholic"

(Miller & Kurtz, 1994, p. 160)

In the mid-1970s, the development of an *alcohol dependence syndrome* concept marked a major progression from the dominant alcoholism models, at least in scientific and clinical contexts (Edwards & Gross, 1976). The dependence syndrome identified a number of elements that are still today widely utilized as markers of dependence (including in current DSM and ICD iterations), but notably highlighted that "…these elements exist in degree, thus giving the syndrome a range of severity" (Edwards & Gross, 1976, p. 1058). The development of the alcohol dependence syndrome reflected a broader picture of psychiatric diagnoses derived from patterns of symptoms observed within clinical populations (Day & Morris, 2021; Scull, 2021) and thus still arguably represented a treatment paradigm of AUD conceptualization (Storbjörk & Room, 2008). The 1990 IoM report (Institute of Medicine, 1990) attempted to re-conceptualize alcohol problems on a continuum, with a broader focus on population health, prevention and early intervention, and addressing heterogeneity via matching severity of problems to the intensity of the prevention or treatment approach. Unfortunately, this important work was overshadowed by a growing body of neuroscience research throughout the 1990s that provided diffuse evidence for a brain disease biomedical model of addiction (Koob, 1992; Koob & Weiss, 1992; Leshner, 1997; Robinson & Berridge, 1993; Volkow et al., 1992).

Despite the strengthening of dependence-oriented models of AUD via biomedical models and their general endorsement amongst the public (Pescosolido et al., 2010; Schomerus et al., 2013, 2014a), public health groups have continued to pursue broader approaches that focus on prevention (Burton et al., 2017; Witkiewitz & Tucker, 2021). Such efforts reflect prevention paradox principles whereby small changes in larger groups with lower severity problems result in more significant population level outcomes than large changes in smaller numbers of people with more severe cases (Davison et al., 2008). It is likely the case that the most effective of public health measures to reduce alcohol problems

are policy levers relating to controlling price, availability, and advertising (Burton et al., 2017), but there has also been an international effort to implement alcohol brief interventions (ABIs) targeting individuals within larger non-clinical AUD populations (Johnson et al., 2011).

ABI efforts have significantly contributed to the increasing use and recognition of the value of screening (i.e., opportunistic assessment), often with the Alcohol Use Disorder Identification Test, commonly known as the 'AUDIT' (Babor et al., 2001). Developed with support from the World Health Organization, the AUDIT is an internationally used and validated assessment tool with a possible scoring range of 0-40. Scores of less than 8 indicate the person is 'lower risk', essentially indicating a level of drinking which is unlikely to significantly increase the risk of alcohol-related conditions (Department of Health, 2016). AUDIT scores of 8 or above indicate what can be considered an AUD category (in non-DSM terms) including hazardous (8-15), harmful (16-19) or probable/possible dependence (20-40).

The AUDIT (and short form derivatives such as the AUDIT-C) has now become the most widely used assessment tool, particularly as part of global ABI programmes, but also as a widely used outcome measure for interventions and research (NICE, 2011; Reinert & Allen, 2007). As such, the widespread use of the AUDIT signifies a shift towards a more continuum aligned understanding of alcohol problems, particularly compared to earlier assessment approaches that tended to focus more on dependence criteria (e.g., the CAGE, which is not recommended) (Dhalla & Kopec, 2007). Indeed in the UK, the National Institute of Health and Care Excellence (NICE) classifies AUD based on the same categorizations as the AUDIT (NICE, 2011), thus includes hazardous patterns of use which may not necessarily achieve an AUD diagnosis under DSM-5. Using the AUDIT, AUD may then be considered more broadly whereby any level of alcohol use above lower risk guidelines is included (e.g., as per the UK's NICE definition).

Despite widespread use of the AUDIT and further continuum-based conceptualizations of alcohol risk globally, the extent of public endorsement of continuum beliefs towards alcohol problems are not widespread. For example, in a nationally representative German sample, participants read a brief vignette describing a person with alcohol dependence and were asked to identify agreement with a statement intended to capture beliefs in a continuum model, specifically: ‘‘Basically, we are all sometimes like this person. It’s just a question as to how pronounced this state is.’’ By agreeing to this statement, ccontinuum beliefs about alcohol dependence were endorsed by just 27% of respondents, whilst 40% disagreed with the statement and 30% were undecided (Schomerus et al., 2013). Broader analysis of public discourse and attitudes suggests categorical and disease-based framings of alcohol problems predominate (Melia et al., 2021; Morris et al., 2022; Pescosolido et al., 2010; Piras et al., 2016; Tikkinen et al., 2012).

Positive implications from a continuum model of alcohol problems

In recent years there have been growing calls for further recognition of continuum models of alcohol problems and recovery (Morris et al., 2020; Rehm et al., 2013; Wiens & Walker, 2015; Witkiewitz et al., 2020). Notably, continuum models have been proposed as holding positive implications via a number of potential public health benefits (Witkiewitz et al., 2021). By shifting public perceptions of alcohol problems away from severe characterizations of ‘alcoholism’ or dependence towards models which capture a broader range of typologies and experiences, it is proposed that greater problem recognition and improved outcomes can be achieved across broader populations of those who experience alcohol problems (Morris et al., 2022). In particular, this includes the opportunity to increase recognition and acceptability of under-utilized non-abstinent pathways to reduce alcohol-related problems and improve quality of life (Witkiewitz & Tucker, 2021). Importantly, continuum based models have also been proposed as holding promise for reducing the very

significant public stigma burden tied to those perceived as having AUD (Kilian et al., 2021), particularly associated with characterizations of 'alcoholism' and binary disease model representations (Heather & Robertson, 1997; Morris, 2022).

More specifically, it has been argued that low alcohol problem recognition is a significant but under recognized public health barrier owing to large numbers of people who drink at harmful levels but do not consider their drinking as problematic (Morris, Albery, et al., 2021; Morris, Moss, et al., 2021). This largely reflects the social acceptability of alcohol use - including heavy drinking - so long as it does not violate normative ideas about what problem drinking is (Garnett et al., 2015; Melia et al., 2021). That is, amongst the public at large, alcohol problems are not typically judged by levels of consumption, but rather by social transgressions such as failure to fulfill one's personal responsibilities, such as family or employment responsibilities (Lovatt et al., 2015; Melia et al., 2021). As such, a range of literature identifies how many different individuals who meet AUD criteria construct their own drinking as 'responsible' and in contrast to the *problematized other* (Davies et al., 2022; Emslie et al., 2012; Madden et al., 2019; Morris, Moss, et al., 2021; Thurnell-Read, 2017; Wallhed Finn et al., 2014).

This *othering* of problem drinkers by people who themselves meet AUD criteria has particular relevance to how stigma is enacted as a major issue in AUD prevention and treatment (Kilian et al., 2021; May et al., 2019; Morris, 2022; Schomerus, Lucht, et al., 2011). Those perceived as having alcohol problems are amongst the most stigmatized in society (Kilian et al., 2021; Rundle et al., 2021), thus othering is enacted by many who meet AUD criteria to normalize their own drinking and separate 'us from them' (Morris, Moss, et al., 2021; van Lettow et al., 2013). Separation is a key stage in the stigma process whereby stigma targets are marked as different and become targets for discrimination (Link & Phelan, 2001). This approach to understanding stigma is consistent with social identity theory

whereby people favor their own perceived social groups but hold negative biases towards perceived 'outgroup' members (Abrams & Hogg, 1990; Hornsey, 2008). However, 'contact' with outgroup members is a key mechanism for reducing intergroup conflict (Brown & Hewstone, 2005) and a key strategy in addiction and mental health stigma reduction efforts (Corrigan et al., 2016; McGinty & Barry, 2020; Michaels et al., 2017). As such, continuum models are argued to hold promise in terms of stigma reduction by reframing AUD away from stigma-laden binary models towards schemas in which people with problems are seen to be *not so different* from those without (Kilian et al., 2021; Peter et al., 2021). Promoting a sense of 'us' rather than them in stigma reduction has been referred to as *perceived similarity* (Wiesjahn et al., 2016) and is also an objective in socio-political attempts to counter dehumanizing phenomena such as race and class based discrimination (Powell & Menedian, 2016). A core facet of endorsing continuum beliefs therefore appears to be accepting degrees of similarity over difference towards those who experience problems related to alcohol use. Thus, continuum models are directly at odds with categorical conceptualizations of alcohol problems as characterized by disease models of alcoholism in which 'alcoholics' in particular are subjected to negative public stereotyping (Crisp et al., 2005; Morris, 2022; Young, 2011) and in turn are seen as *neurobiological others* (Buchman et al., 2011; Heather & Robertson, 1997; Morris, 2022).

A growing empirical evidence base supports the potential value of continuum belief endorsement for reducing stigma and increasing problem recognition across a wider range of disorders. A recent systematic review of 13 studies concluded that continuum beliefs regarding mental health issues were associated with lower stigmatizing attitudes, particularly where a feeling of 'us' (rather than 'us' vs 'them') was captured (Peter et al., 2021). A small number of experimental studies have tested continuum or continuum aligned beliefs on alcohol-related outcomes. Morris et al. (2020) found continuum beliefs were associated with

higher problem recognition amongst harmful drinkers[3] without lifetime addiction experience (Morris et al., 2020). The authors interpreted that perceived similarity with a person describing their AUD via a continuum-based model in a brief audio-visual vignette allowed harmful drinking participants to reflect on their own alcohol use whilst avoiding the identity threat of a problem drinking identity. However, this effect was not replicated in a subsequent study when using a more factually presented script based representation of a continuum model of AUD (Morris, Moss, et al., 2021), indicating that perceived similarity with people with AUD may have mediated the positive effect of continuum beliefs on problem recognition as found by Morris et al. (2020). Further, the script based binary representation of AUD which included stigmatizing language (i.e., 'alcoholic') was associated with *lower* problem recognition (Morris, Moss, et al., 2021) which was not found when representing the same "alcoholism model" via an audio-visual vignette in Morris et al. (2020).

Thus, when represented in a way that facilitates perceived similarity, continuum beliefs may enhance problem recognition, whilst perceived similarity may buffer against the stigma-related threats associated with alcohol problems, consistent with intergroup contact theory (Brown & Hewstone, 2005) and other findings (Corrigan et al., 2016; Schomerus et al., 2013). However, in a study amongst a small sample of students diagnosed with AUD, positive effects on continuum beliefs were only found when combined with a vignette depicting moderation as an achievable drinking goal (Leonhard et al., 2022), which was also depicted in both experimental studies by Morris et al (2020, 2021). The authors found that a non-abstinent drinking recovery narrative directly increased continuum beliefs without a specific description of a continuum model of AUD, and both in combination were associated with higher problem recognition amongst a subgroup that was not diagnosed with AUD.

[3] Harmful drinkers were identified as scoring 8 or more for women or 9 or more for men on the AUDIT-C

One barrier to continuum beliefs is the notion that abstinence is the only acceptable pathway to recovery from AUD. Yet, a significant body of literature shows that despite the still common public misperception and often clinical cynicism towards reduced drinking goals, non-abstinent based recovery is a major route to positive long terms outcomes (Witkiewitz et al., 2019, 2020; Witkiewitz & Tucker, 2020). Indeed, a recent systematic review and meta-analysis found that outcomes of AUD treatment among those with controlled drinking goals were not inferior to the outcomes of AUD treatment among those with abstinence orientated goals (Henssler et al., 2020). However, the pervasive skepticism towards non-abstinent recovery has been argued to hold back progress on AUD recovery for a number of reasons, including the fear that people may need to give up alcohol altogether (Morris et al., 2022), or the common belief that Alcoholics Anonymous is the only option to support recovery (Khadjesari et al., 2018). As such, continuum models of alcohol problems challenge long-standing harmful assumptions about alcohol problems as severe forms of 'alcoholism' in which lifelong abstinence is the only solution (Glassman et al., 2022).

AUD framings also have relevance for recovery outcomes in terms of prognostic beliefs, namely optimism or pessimism about capacity to change (or 'recover' from AUD). Indeed self-efficacy is a central predictor of recovery from AUD (Adamson et al., 2009) and an important mechanism in several substance use disorder (SUD) treatment approaches (Moniz-Lewis et al., 2022; Witkiewitz et al., 2022), whilst prognostic pessimism is a core facet of public stigma towards people with addiction and AUD (Dar-Nimrod et al., 2013). Further, self-stigma, i.e., internalized negative stereotypes about AUD, has found to be associated with lower drinking refusal self-efficacy (Schomerus, Corrigan, et al., 2011). Such effects have been identified as linked to beliefs about disease model representations of AUD in which the person's loss of control is a central component (Morris, 2022; Young, 2011). As such, continuum beliefs may potentially increase self-efficacy towards control over alcohol

use, particularly via increasing acceptability of drinking reduction goals, or at least offer an alternative to binary disease models which may induce lower self-efficacy, locus of control, or help-seeking (Burnette et al., 2019; Lindgren et al., 2020; Morris, Moss, et al., 2021; Wiens & Walker, 2015; Young, 2011).

Continuum models of alcohol problems may also conceptually overlap with several other valuable addiction models. Whilst continuum models appear to focus on emphasizing perceived similarity and/or the validity of drinking reduction goals, they may also point to the psychological nature of alcohol problems in which people's lived experiences, circumstances, or wellbeing are emphasized rather than biological factors. That is, if people with alcohol problems are not *fundamentally* different, as often understood via binary disease models (Morris, 2022), then psychological or environmental factors must at least partially account for those problems. For instance, Weine et al., (2016) found that providing life event explanations for AUD (e.g., loss of limb following a car accident) were associated with lower perceived 'abnormality' and lower stigma versus no explanation for AUD. Other empirical findings have found positive associations between psychological AUD framings versus binary disease models. In one recent study, psychological and nature models of AUD were associated with lower stigma ratings versus disease and moral models of control (Rundle et al., 2021). Wiens and Walker (2015) found measures of locus of control, drinking self-efficacy and addiction entitisation were associated with effects either favourable towards psychosocial AUD beliefs or unfavourable towards disease model beliefs. Similarly, Lindgren et al. (2020) tested a malleability (growth mindset) belief of AUD versus a permanent nature (fixed mindset) belief of AUD, finding growth mindsets were associated with larger drinking reductions in United States college students diagnosed with AUD. The authors highlight that growth mindsets predict motivation and self-regulation and therefore should be promoted over AUD models that tend to induce fixed mindset beliefs.

Continuum models of alcohol problems, for instance via AUD representations which depict grades of severity or the viability of non-abstinent recovery, may also hold other potential benefits. For example, promoting continuum models of alcohol problems could potentially increase support for effective public health policy measures which suffer from public and political skepticism, in part due to activity associated with alcohol industry bodies (McCambridge et al., 2014, 2020). Indeed it has been suggested that certain industry bodies have deliberately framed alcohol problems in terms of "alcoholism" (McCambridge et al., 2021) or personal responsibility (Maani Hessari & Petticrew, 2018) in order to avert public health policies that would hinder their financial interests (Bhattacharya et al., 2018). Studies have found that awareness of the link between cancer and alcohol use is associated with greater support for public health policies (Bates et al., 2018; Buykx et al., 2015). This could point to how understanding alcohol health risks as existing across the broader spectrum of drinkers could increase support for population level policies.

Costs, 'mixed effects' and other issues presented by a continuum model

Whilst the still limited empirical evidence base for a continuum model appear largely positive, some studies and theoretical questions highlight potential questions and negative effects. Indeed, this likely reflects the complexity of such models and their context-dependent attributional effects. For example, meta-analyses have shown that in the context of mental health problems, biogenetic attributions (which may be seen as antithetical to continuum models) may result in reduced blame, but with potential costs of social distance, prognostic pessimism and perceived dangerousness (Haslam & Kvaale, 2015). Kelly et al. (2021) identified that whilst a 'chronically relapsing brain disease' framing of opioid addiction was associated with the lowest blame, it was also associated with the lowest prognostic optimism. In contrast, framing addiction as a 'problem' was associated with perceiving the person as less dangerous and less likely to require continuing care, but without the benefit of reduced

blame identified in the disease model framing. In a meta-analysis considering neuroscientific explanations of mental health, a general pattern of negative stigma effects as seen for biogenetic attributions such as increased social distance was found, but without the benefit of reduced blame (Loughman & Haslam, 2018).

Such findings highlight the possible 'mixed blessing' effects (Haslam & Kvaale, 2015) of different addiction framings and raise questions over the role of different stigma associated attitudes and measures. For instance, some have suggested that while continuum models of alcohol problems should be advanced in general, for severe conditions such as alcohol-related liver disease, an illness model of alcohol problems may be important to specifically reduce blame-orientated stigma amongst healthcare clinicians (Schomerus et al., 2022). One study identified that biogenetic AUD beliefs were found to increase social acceptance of people diagnosed with AUD, albeit again with other mixed effects (Schomerus et al., 2014b). However, Rundle et al. (2021) found no significant effects on disease model framing of AUD on public stigma, whilst psychological and moral models were associated with lower public stigma. Other mixed effects have also been seen in terms of perceiving effective treatment approaches. For example, Lebowitz and Appelbaum (2017) found biogenetic AUD attributions were associated with greater endorsement of pharmacological treatment efficacy but lower endorsement of psychosocial intervention efficacy, with psychological AUD attributions having the reverse effect.

These complex findings highlight the need to further consider specific questions about the role of alcohol problem framing and implications in different contexts. This includes how stigma and other framing-related variables may be involved with potential consequences for people who experience problems related to alcohol, such as problem recognition, recovery self-efficacy, help-seeking, and the acceptability of non-abstinent outcomes. For instance, a number of contexts exist in which disease or illness models of AUD may be considered

important or even fundamental. Most notably, Alcoholics Anonymous (AA) is a worldwide mutual aid organization in which self-labelling as an alcoholic is expected. Thus, for many who recover through AA, alcoholic label adoption and its associated implications may be a valuable sense-making process in which the person adopts a new recovery focused identity (Buckingham et al., 2013; Frings & Albery, 2016) whilst ensuring there is no uncertainty in their mind about their problem and the need for abstinence (Glassman et al., 2022). That said, empirical evidence suggests AA's primary mechanism is the social network elements involved (Kelly et al., 2020), whilst AA members may experience degrees of ambivalence about alcoholic label adoption and its implications (Hill & Leeming, 2014; Romo et al., 2016). As such, we are not suggesting people should not self-identify with AUD models or labels that they wish to. However, for many diagnosed with AUD and those individuals with low levels of problem recognition, alternative continuum aligned models, particularly where promoting the acceptability of reduced drinking goals, are likely to be significantly more beneficial over categorical based models (Morris, 2022; Morris, Moss, et al., 2021; Witkiewitz & Tucker, 2021).

Importantly, in countries where diagnostic labels are necessary for access to and reimbursement for health care services, a continuum model would be difficult without some cutoff. Many proponents of the disease model advocate for considering addiction as a disease because of the importance of the medical systems and structures that rely on disease-based entities for treatment access, insurance reimbursement, pharmaceutical development and labeling, and access to essential medical services (Heilig et al., 2021). A public health and prevention approach to alcohol-related problems is essential to also work towards providing coverage and treatment access for individuals across the spectrum of alcohol-related problems, as advocated by the 1990 IOM report. Others have also urge careful consideration over the implications of lowering thresholds for a variety of disorders as "concept creep",

which may risk undermining the seriousness of severe cases whilst "pathologizing everyday life" through a focus on less severe manifestations (Haslam, 2016).

Is AUD a continuous 'disorder' according to empirical data?

Another issue relates to what extent AUD is a continuous entity in scientific terms as a number of recent studies employing various statistical methodologies have sought to address. Prior to the publication of the DSM-5, attention was brought to the DSM-IV AUD diagnosis which separated alcohol "abuse" and alcohol dependence. Based on extensive factor-analytic and item-response theory results of DSM-IV criteria, AUD appeared to be a unidimensional construct rather than one that separates into distinct abuse and dependence components (Hasin et al., 2013). DSM-5 AUD thus collapsed abuse and dependence into a single diagnosis – dropping the legal problems criterion and adding the craving criterion instead. Although one might have expected improved validity of this diagnosis, this has not been the case. Indeed, AUD as a unidimensional diagnosis has not improved the predictive validity of important external criteria such as heavy drinking (Wakefield & Schmitz, 2015). Recent work by Watts and colleagues (2021) challenges the notion that AUD is a purely unidimensional construct and highlights that previous approaches to evaluating dimensionality have had significant limitations, including having too few indicators of AUD to extract more than a single factor. In their analysis of 87 AUD items, they found support for multidimensional models of AUD over a unidimensional model in terms of variance explained in theoretically relevant external criteria (e.g., consumption, treatment use) and therefore suggest AUD may be better described by a hierarchically organized model of AUD with three broad dimensions that reflect tolerance, withdrawal, and loss of control. Thus, it may be appropriate and, in some cases useful, to conceptualize AUD as existing on a continuum, but may be more accurately represented by increasingly specific factors, which may also exist on their own continuum.

Conclusion

Promoting alcohol problems as existing on a continuum, for instance via AUD models that emphasize dimensionality and the viability of non-abstinent recovery, has a number of important implications. Firstly, we propose that increasing public understanding of alcohol problems as a continuum has a number of significant benefits from a public health perspective. These benefits particularly relate to countering long-standing problems associated with public misperceptions of alcohol problems as a binary 'all or nothing' problem amongst a fixed subgroup of the population. This false dichotomy is typified by categorical diagnostic thresholds and ideas of 'alcoholism' as a severe and biological condition, in turn susceptible to othering and negative stereotypes. Rather, continuum models can serve to counter 'us and them' binary AUD representations and increase the acceptability of non-abstinent outcomes for individuals who experience problems. In turn, facilitating public beliefs about alcohol problems as a continuum has the potential to increase problem recognition, natural recovery and reduce the heavy stigma associated with those labelled as problem drinkers. Continuum beliefs may hold other as yet untested benefits such as increasing support for effective but politically unpopular public health measures.

Nonetheless, we also propose that a continuum model of alcohol problems should be understood as a top-level construct which still includes approaches that recognise the unequivocal heterogeneity of such problems. For instance, existing ICD categories of hazardous and harmful patterns of alcohol use may be useful for identifying persons who should be targeted with preventative or lower intensity interventions, particularly those which promote or support non-abstinent drinking outcomes and self-change. Other taxonomic or qualitative approaches are also valuable in other contexts, whether identifying physiological AUD risk factors, to understanding drinking motives through a social practice lens (Ally et al., 2016). Advocating for a continuum model of alcohol problems therefore is not to suggest

that AUD *exists* as a single unidimensional construct in a strict sense, rather, that at the broadest level, AUD symptoms exist on continuums of severity, even if some measures cluster under certain conditions. Therefore, while taxometric, clustering or other approaches to identifying specific AUD groups or characteristics are often important, such labelling must not serve to maintain or facilitate historically embedded reductionist approaches to AUD which can facilitate stigma via othering and stereotyping.

Owing to the overall significant benefits likely available from broader recognition of alcohol problems as continuous in a general sense, we call for further research into understanding the extent to which alcohol problems are understood and represented (i.e., as AUD). Specifically, this includes how changes to alcohol problem framings amongst the public can benefit, or also potentially hinder, important factors in the prevention and treatment of alcohol problems. Further conceptual understanding is also required to understand what continuum beliefs actually do represent, or should represent, to have the most positive impacts. Notably, the role of perceived similarity, acceptability of drinking reduction goals, self-efficacy and stigma-related mechanisms appear important to identify in the potential role of continuum models of alcohol problems.

Presently, we propose defining a continuum approach to alcohol problems based upon a broad continuum of alcohol use and harms, whereby any level of alcohol use or associated harm can exist in multiple degrees of severity. This does not mean that alcohol problems (and AUD) should not also be understood, studied, and treated as a complex and heterogeneous issue, as indeed in every individual case there are multiple factors and consequences which contribute to and maintain problems, interacting with others and changing over time in particular environmental contexts. As such, despite the inherent complexity of alcohol problems, the broad promotion of ideas that endorse them as a continuum of alcohol use and harms as a high level conceptualization should not restrict or deny the significant

heterogeneity that exits. By emphasizing the very wide ranging degrees of severity that alcohol use and the many associated harms can each exist on, this in fact does itself demonstrate the very complex but still continuous nature of alcohol problems.

A high level conceptualization as described in the 1990 IoM report, described as the 'alcohol problems perspective' which spans alcohol use and harms, included various approaches to capturing alcohol use and AUD whilst emphasizing the multi-dimensional and over-lapping nature of existing representations. Although largely ignored by the field over the last three decades, the approach described in the 1990 IoM report is recommended for broader adoption. Without reinventing the IOM's conceptualization, reframing it in such a way that more explicitly relates the continuum nature of alcohol use and harms may be necessary[4]. Such an approach may assist efforts to convey a continuum model of alcohol use whilst incorporating existing AUD symptoms and diagnostic systems.

[4] For example, an 'Alcohol Use Continuum' could be a possible shorthand for communicating the IOM's alcohol problems perspective in a way that explicitly emphasizes the continuum nature of use and harms without being susceptible to potential implicit binary associations with words such as 'problem' or 'disorder'.

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