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Identifying the Structure and Effect of Drinking-Related Self-Schemas

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Abstract

Self-schemas have received increased attention as favorable targets for therapeutic intervention because of their central role in self-perception and behavior. The purpose of this integrative review was to identify, evaluate and synthesize existing research pertaining to drinking-related self-schemas. Russell's (2005) integrative review strategy guided the search. Sixteen published works were identified, meeting criteria for evaluation ($n=12$ data-based publications and $n=4$ models). The retrieved data-based publications rated fair-good using Polit & Beck (2003) criteria; the overall body of literature rated "B" using Grimes & Schulz (2002) criteria. Retrieved models rated 4-7 using Fitzpatrick & Whall (2004) criteria. The existing literature strongly supports the availability of a drinking-related self-schema among moderate-to-heavy drinking samples, and suggests a positive relationship between elaboration and drinking behavior. The relationship between valenced content of the schema and drinking behavior remains unexplored. Identifying variation in the structural properties of drinking-related self-schemas could lay the foundation for future interventions.

Keywords

self-concept; addiction; alcohol use disorder; self-schema; drinking behavior

The self-concept has long been recognized as playing a crucial role in regulating health behaviors (Beland, 1970; Burgess, 1978; Mitchell, 1973; Oyserman, Fryberg, & Yoder, 2007; Stein & Corte, 2007; Stein & Corte, 2008) and has recently become a promising new target for health, behavioral, and psychotherapeutic intervention (Avants, Beitel, & Margolin, 2005; Oyserman & Destin, 2010; Oyserman et al., 2007). Much of this burgeoning interventions research has been grounded in the self-schema approach to the study of the self-concept. Self-schemas are cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information contained in an individual's social experience (Markus & Wurf, 1987; Markus, 1977). Self-schema based models are frequently used within the social-cognitive literature to identify the structure and functional properties of domain specific self-referential knowledge structures, and to ascertain how these structural properties influence self-perception and behavior (McConnell & Strain, 2007; Oyserman & James, 2009; Stein & Corte, 2008).

Self-schemas have received increased attention as favorable targets for therapeutic intervention because of the central role that they play in influencing self-perception and behavior (Avants & Margolin, 2004; Avants, Margolin, & McKee, 2000; Kendzierski & Costello, 2004; Margolin, Beitel, Schuman-Olivier, & Avants, 2006; Oyserman, Bybee, & Terry, 2006; Shadel, Niaura, & Abrams, 2000). For example, Avants and Margolin (2004) ascertained that the habitual activation of an addict self-schema within a sample of 38 HIV-positive, injection drug-using men and women experiencing heroin addiction, resulted in further elaboration or strengthening of the schema. Furthermore, it was found that increased elaboration of the addict self-schema had the effect of increasing the high-risk behaviors of substance use and risky drug-taking practices (Avants & Margolin, 2004; Margolin et al., 2007). In order to reduce the use of heroin and risk-taking behavior, the authors proposed Spiritual Self-Schema (3-S) therapy, which focused on assisting participants to elaborate a self-schema for abstinence and harm-prevention that conflicted with their substance-use-related schema. The authors found that the elaboration of a conflicting self-schema resulted in decreased reliance upon the "addict" schema, and ultimately resulted in decreasing elaboration of the schema, substance use, and risk-taking behavior (Avants et al., 2000; Margolin et al., 2006). Despite the development of promising schema-based interventions within multiple health-related fields (Avants & Margolin, 2004; Margolin et al., 2006; Shadel, Mermelstein, & Borrelli, 1996; Stein, Corte, Chen, Nuliyalu, & Wing, 2013), such interventions remain unexplored within the domain of alcohol use disorder (AUD). The first step in bringing schema interventions research into the field of AUD, and developing theoretically supported and empirically grounded interventions for addressing these, is identifying the structural properties and functioning of drinking-related self-schemas.

The self-schema literature posits that the self-concept is comprised of multiple domain-specific, self-referential, neurological networks called *self-schemas*. The *structure* of each schema is hierarchically organized with a generalized notion of one's self within a specific

domain at the highest level, attributes descriptive of one's self within the domain at the mid-level, and episodic memories of personal experiences within the domain at the lowest level of the hierarchy (Cantor & Kihlstrom, 1989; McConnell, Rydell, & Brown, 2009). See Figure 1 for a depiction of the structure of the self-concept. The *content* of a self-schema refers to the generalized notion that one has of himself or herself within the domain, the attributes that support that generalized notion, and episodic memories of experiences encountered within the domain. *Availability* of a self-schema refers to the presence or absence of a domain-specific self-referential knowledge structure (Higgins, King, & Mavin, 1982; Stein, 1995). If a self-referential knowledge structure is present and detectable within working memory, then the schema is deemed available.

The structure of the mid-level of the hierarchy has been identified as particularly influential in guiding self-perception and behavior (Markus & Wurf, 1987; McConnell, Rydell, & Brown, 2009; Schleicher & McConnell, 2005). The self-schema approach proposes that the mid-level of a self-schema hierarchy is composed of positively and negatively valenced traits and attributes. *Traits* refer to distinguishing characteristics or qualities of one's personal nature or personality, for example "outgoing", while *attributes* more broadly refer to features regarded as a characteristic of someone, for example behaviors, affective responses, and physical characteristics, as well as other information that is descriptive of one's self within a particular context (Schleicher & McConnell, 2005).

Markus and Kunda (1986) found that the working self-concept was informed by only a portion of the overall number of self-schemas that one possesses at any given time, with some self-schemas being chronically activated in working memory, and other less fully elaborated self-conceptions fluctuating in their accessibility in response to the current social context. A number of researchers agree the more elaborate a self-schema, the more likely it is to be part of the working self-concept, and thus influence cognitive processing and behavior (Markus & Kunda, 1986; Markus & Kitayama, 1991; McConnell, 2010; McConnell & Strain, 2007; Oyserman, 2007; Schleicher & McConnell, 2005; Shadel et al., 2000). *Elaboration* is consistently used within the schema literature to refer to the degree of influence a schema has on information processing or on the overall self-concept, based upon its structural properties (Markus & Kunda, 1986; Markus & Kitayama, 1991; McConnell, 2010; McConnell & Strain, 2007; Rafaeli-Mor & Steinberg, 2002; Scott, 1969). Thus, the self-schema literature identifies the structural properties of self-schemas (valenced content and elaboration) as key elements of the self-concept that influence self-perception and behavior.

This integrative literature review was conducted to synthesize the existing research concerning self-schemas within drinking (alcohol consuming) samples, in order to better understand the structural properties and functions of the drinking-related self-schema. The following questions guided the review:

1. What is known about the availability, structure, and effect of the drinking-related self-schema among persons who regularly consume alcohol?
2. How are drinking-related self-schemas operationalized within the health and psychosocial literature?

Methods

Search Strategy

This integrative review identified, retrieved, graded, and synthesized the existing literature pertaining specifically to self-schemas within drinking samples. A search of the literature was conducted utilizing the methodological approach outlined by (Russell, 2005). PubMed, Medline (OVID), Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PsycInfo databases were searched for data-based studies published from 1920 to August, 2014. Keywords were “*self-schema AND alcohol*” as well as “*drinking identity*”. Search terms were broad in order to maximize the number of publications retrieved. In addition, reference lists of retrieved publications were reviewed for relevant studies.

Inclusion and exclusion criteria—Inclusion criteria for this review were data-based studies published in peer-reviewed journals or books, and theoretical publications, with drinking-related self-schemas as the primary topic. Articles in a language other than English were excluded. A flowchart detailing the complete search strategy, including the number of included and excluded publications, is detailed in Figure 2.

Measures and Analytic Strategy

Retrieved publications were divided into the categories of data-based primary research studies, and models of addiction, as detailed in Table 1. Primary research studies were critiqued using study purpose, study design, study sample, and operationalization of self-schemas. In addition, individual studies were assigned a grade for rigor and quality of *good*, *fair* or *insufficient*, using Polit and Beck’s system for grading the strength of evidence (Polit & Beck, 2004). The overall body of literature was graded using Grimes and Schulz’s methodology for grading a body of literature (Grimes & Schulz, 2002). The rigor and quality of the retrieved models of addiction was graded using Fitzpatrick and Whall’s criteria for evaluating conceptual models (Fitzpatrick & Whall, 2004). The results of the data-based primary research studies were compared and synthesized. The existing models of addiction were then outlined and evaluated with regard to model purpose and key postulates.

Results

A total of 54 publications were identified. Duplicate publications were removed, and 10 additional relevant publications were included after an examination of reference lists provided in the assessed publications. After abstract reviews, an additional 18 publications were excluded because they did not address the stated research questions; 11 focused on topics other than alcohol, and seven focused on the effects of the overall self-concept on alcohol use, not drinking-related self-schemas. Therefore, the review encompassed a total of 16 published works, focusing specifically on the structure or functioning of a drinking-related self-schema within drinking samples.

Of the 16 publications, 12 were primary research studies. The study purpose, design, and sample characteristics for primary research studies are presented in Table 2. Key findings and methodologies used to operationalize drinking-related self-schemas are detailed in Table 3, and the publications are discussed and integrated below.

All of the 12 retrieved primary research studies supported availability of a drinking-related self-schema within moderate drinking samples. Among these, 8 studies examined the relationship between availability and/or elaboration of the schema and drinking behavior (Casey & Dollinger, 2007; Dollinger, Rhodes, & Corcoran, 1993; Foster, 2014; Gray, LaPlante, Bannon, Ambady, & Shaffer, 2011; Lindgren, Foster, Westgate, & Neighbors, 2013a; Lindgren, Neighbors, et al., 2013b; Lindgren, Neighbors, Westgate, & Salemink, 2014). The study by Dollinger et al. (1993) was designed to test the validity of an autophotographic essay technique as a means of establishing the availability of an alcohol schema within a college sample of social drinkers. Researchers asked participants to compile 20 photographs answering the question, "Who are you?" in order to determine the relationship between the availability of an alcohol-related self-schema and drinking behaviors. Availability of a drinking-related self-schema was operationalized as having one or more drinking-related pictures within their autophotographic essay, while a greater number of drinking-related photographs within the essay suggested greater elaboration of the schema. The authors found that an alcohol schema was available within their sample of college students who reported drinking an average of 5.2 drinks per occasion, twice per month, on a self-report measure. Moderate-to-strong correlations were found between the number of reported pictures and amount of alcohol consumed ($r=.45$, $p<.01$ for frequency and $.61$, $p<.001$ for quantity). Similarly, within a separate study, Casey and Dollinger (2007) used the technique within a sample of 135 college students who reported drinking on average six drinks per occasion, three times per month, in order to confirm the results of the previous study, and to evaluate the relationship between the availability of an alcohol schema and alcohol-related problem behaviors. Results revealed that 71% of the sample included at least one alcohol photograph ($M=2.12$, $SD=2.36$), with participants with one to three alcohol photos being 2.4 times more likely to be high-risk problem drinkers than those with no such photos. Those with four or more alcohol photos in their essays were nearly eight times more likely to be high-risk problem drinkers. High-risk drinking included participating in activities such as driving while intoxicated, binge drinking, drinking to induce intoxication, and participating in drinking games.

In contrast, the study by Gray et al. (2011) was designed to examine the validity of a newly created measure, the Alcohol Identity Implicit Associations Test (AI-IAT), as a means of establishing the availability of an alcohol-related self-schema and determining the effect of the schema on information processing and drinking behavior. Implicit Associations Test's are designed to identify associations that are more impulsive and reflexive than those measured using self-report questionnaires, through the use of response latency times (Lindgren et al., 2015). Decreased response latency times are thought to be indicative of the presence of implicit or non-conscious memory structures and the associated enhanced information processing (Fekken & Holden, 1992; Neubauer & Malle, 1997).

Within Gray et al. (2011), availability of a drinking-related self-schema was operationalized using response latency times for personal (Me/Not Me) endorsements of drinking-related and neutral stimulus pictures. The strength of the association between alcohol-relevant pictures and self-relevant words for each participant were calculated by means of standardized D score. Shorter response latency times were indicative of greater elaboration of an implicit drinking-related self-schema. The authors found that an alcohol schema was

available within their sample of 141 college students, who reported consuming an average of 3.58 drinks per occasion 5 times during the preceding month, and the presence of the schema predicted future engagement in risky college drinking practices after controlling for quantity and frequency of alcohol consumption. Moreover, consistent with a schema model, this study found that having an alcohol schema resulted in faster information processing speeds according to response latency times among persons with stronger self/alcohol associations (Gray et al., 2011).

Similar to Gray et al. (2011), Lindgren et al. (2013a), Lindgren et al. (2013b), and Lindgren et al. (2014) also employed an AI-IAT as well as five additional measures created by the researchers (the Alcohol Approach IAT, Alcohol Cope IAT, Alcohol Excitement IAT, and Stress Drinking IAT) to examine the relationship between schematic processing within alcohol-related domains and drinking behavior. These cross-sectional studies examining samples of approximately 300 moderate-drinking college students found that among AIT versions, drinking identity was the most consistent predictor of alcohol consumption and alcohol problems. These findings suggest that drinking-related information as it relates to oneself, is processed separately from other drinking-related information (coping, approach, excitement, and stress drinking).

The study by Foster, Neighbors and Young (2014a) also used a version of the IAT to evaluate the relationship between implicit drinking identity, drink refusal self-efficacy, and self-awareness. Among their sample of 218 moderate-drinking undergraduate college students it was determined that having a drinking-related self-schema (drinking-identity) was positively associated with drinking behavior (peak drinking, drinking frequency, drinks per week and alcohol-related problems). Among participants low in drinking related self-efficacy, high implicit drinking identity was associated with greater drinking frequency when private self-consciousness was low. High implicit drinking identity was associated with greater drinks per week and peak drinks when public self-consciousness was low. Within these studies, elaboration was operationalized as the strength of the association between alcohol-relevant pictures and self-relevant words for each participant through calculating means of standardized D score.

In addition to autophotographic essays and IAT tasks, several studies employed a closed-ended Likert scale task patterned after a smoking-related task created by Shadel, Mermelstein and Borrelli (Shadel, Mermelstein & Borrelli, 1996), to determine the availability of drinker and recovering alcoholic self-schemas. Foster, Young and Barnighausen (2014b) used such a technique to examine the relationship between self-reported drinking identity and alcohol use by considering drink-refusal self-efficacy as a potential mediator, among a sample of 1067 college students. It was determined that self-reported drinking identity was negatively associated with drink-refusal self-efficacy and positively associated with drinking behavior. These findings suggest availability of a drinking-related self-schema within low to moderately drinking college samples. Moreover, availability of a drinking-related self-schema was associated with increased drinking-related behavior as well as decreased confidence in one's ability to control drinking.

In addition to the preceding eight studies, four additional studies established availability of a drinking-related self-schema. However, these studies did not examine the relationship between availability and drinking patterns. Corte and Stein (2007) compared the structural properties of the overall self-concept among a sample of 24 young adults with antisocial alcohol dependence (AAD), 18 young adults in recovery from antisocial alcohol dependence, and 23 community control participants. Using the same closed-ended Likert task that was employed in Foster et al. (2014b), the researchers found higher drinker schema scores within the AAD group compared with those in recovery ($t=5.41$, $p<.001$), and control participants ($t=6.69$, $p<.001$), and the recovery group had higher recovering alcohol schema scores compared with those in the AAD group, ($t=5.72$, $p<.001$) and control participants, ($t=13.87$, $p<.001$). The AAD also group had higher recovering alcoholic schema scores compared with control participants, ($t=7.14$, $p<.001$). However, since this study was focused on identifying the relationship between structural properties of the overall self-concept and drinking behavior, the relationship specifically between the drinking-related self-schema and drinking behavior was not explored.

While the preceding studies strongly support availability of a drinking-related self-schema within low-to-moderately drinking samples, they provide little guidance regarding the valenced content of the schema. The remaining three studies lend some insight as to the content of the drinking-related self-schema among heavy-drinkers. McCartney and O'Donnell (1981) was the first of the studies to associate traits and attributes with drinking-related self-conceptualizations. Researchers had 29 men and women, admitted to inpatient treatment for an AUD, rate how they perceived their own personality traits and personal attributes on a set of bipolar adjective pairs, as well as how they perceived the disposition of drinking roles- including total abstainer, heavy controlled drinker, light controlled drinker, and alcoholic- by ascribing specific traits and attributes to a variety of drinking roles, and then used a formula to calculate psychological distance. Results indicated that the greatest psychological distance existed between the traits ascribed to oneself and those attributed to the conceptualization of alcoholic, and the closest distance was between one's self and heavy controlled drinker (McCartney & O'Donnell, 1981). The authors concluded that men and women with a diagnosable AUD were most likely to see one's self as a heavy controlled drinker, and were least likely to see one's self as alcoholic. Moreover, consistent with a self-schema model, this study suggested that persons experiencing AUD do have declarative knowledge of one's self within the domain of drinking which is supported by traits and attributes.

Results of the study conducted by Daepfen et al. (1999) were congruent with the findings from McCartney and O'Donnell (1981). The researchers conducted the study to determine how high functioning men in ages 30 years to 40 years who met DSM-III criteria for alcohol abuse or dependence rated their alcohol consumption. Researchers had 150 men who did not meet DSM-III criteria for an AUD, 15 men who met criteria for alcohol abuse, and 16 men who met criteria for alcohol dependence rate their drinking patterns over the five years preceding the study. It was determined that 40% of the men who met DSM-III criteria for alcohol abuse rated themselves as infrequent drinkers, and 60% rated themselves as moderate drinkers, while 43.5% of the men who met DSM-III criteria for alcohol dependence rated themselves as moderate drinkers, and 37.5% rated themselves as heavy

drinkers. Furthermore, none of the men in the alcohol abuse group self-identified as a problem-drinker or alcoholic, and only 12.5% of those in the dependence group self-rated as a problem-drinker, while none considered themselves to be alcoholic (Daepfen, Smith, & Schuckit, 1999). Results suggest that men with a high level of alcohol drinking experience demonstrate variability in the way they self-conceptualize and identify as drinkers, and that the generalized notion of self within the domain of drinking varies according to some underlying cognitive mechanism. However, this study lacked generalizability due to a homogeneous sample of males in their thirties.

A more recent study by Doebrick and Todman (2003) adds further insight regarding the structural properties of the drinking-related self-schema by being the first of the retrieved publications to include the concept of valence in their study. Researchers tested the hypothesis that the correlation between cigarette smoking and alcohol use may be partly attributable to a cross-substance facilitation or inhibition effect in which schematic processes derived from personal experience with one substance facilitates or inhibits the processing of information associated with the other. In order to test this hypothesis, the researchers divided 123 participants into four groups: heavy drinking non-smokers ($n=17$); light drinking smokers ($n=31$); heavy drinking smokers ($n=25$); and light drinking non-smokers ($n=40$). They were then presented with a list of 200 attributes and asked to rate applicability of each attribute to describe three types of activities: alcohol-drinking, cigarette-smoking, and newspaper reading, along with completing additional measures of drinking behavior and self-cognition (Doebrick & Todman, 2003). Researchers found that participants had two distinct schematic organizations for smoking and drinking, with very minimal overlap in attributes between the two networks. Moreover, results revealed that heavy drinkers endorsed significantly more positive drinking words than light drinkers ($F(1,120)=24.01$, $p=0.001$), and significantly more positive drinking-related attributes than negative drinking-related attributes (heavy drinking smokers= $p<0.007$; heavy drinking non-smokers= $p<0.001$). In addition, the heavy drinker group recalled significantly more positive drinking attributes than light drinkers ($F(91,117)=12.40$, $p=0.0006$), while no difference in the number and valence of drinking attributes recalled was demonstrated by light drinkers. These results support the availability of a drinking-related schema that influences information processing, and suggest that the schema is composed of related attributes that vary in content and valence predictably by drinking pattern (heavy vs. light drinking).

Models of Addiction

In addition to the preceding 12 data-based publications, four publications were retrieved that were theoretical models developed to explain how self-schemas may be related to drinking and recovery-related behaviors (Avants & Margolin, 2004; Brown, 1996; Denzin, 1993; Galanter, 2014). Table 4 summarizes the available theoretical models pertaining to self-schemas and AUD, including presenting key model postulates.

Of the four publications detailing models, Galanter (2014) proposed a model to explain how the program of Alcoholics Anonymous encourages integration of drinking-related information into the overall self-concept from a neuro-psychological perspective. This model supports the concept that drinking-related information is encoded in self-referential

neurological networks. However, the model did not address where or how within the self-concept drinking-related information is being encoded. For example, is it encoded within a drinking-related self-schema, or elsewhere within the self-concept? The final three published models (Avants & Margolin, 2004; Brown, 1996; and Denzin, 1993) proposed that an addict self-schema becomes an over-riding identity that drives problematic drinking behavior. When these four models are taken as a whole, there is relative consistency across existing schema-based models of alcohol use that a drinking-related self-schema is available and undergirds behavior within the domain of drinking. However, the existing models do not address the structural properties or content of the drinking-related self-schema specifically, or propose a relationship between the structural properties and drinking behavior. Therefore, existing self-schema based models of alcohol use provide limited insight into the cognitive processes occurring within heavily drinking samples.

In summary, when the schema-based models of alcohol use are synthesized with the preceding body of data-based alcohol-schema publications, four insights regarding the structure and effect of drinking-related self-schemas become evident. First, the literature supports the notion that persons with at least moderate drinking experience do display availability of a drinking-related self-schema. Second, the drinking-related self-schema is associated with personal traits and supporting attributes that are easily accessible and reportable by the drinker. Third, the drinking-related self-schema likely varies in content across the drinking spectrum from non-problematic drinkers to persons with diagnosable AUD, including individuals in recovery. Fourth, the drinking-related self-schema varies in elaboration, with greater elaboration resulting in greater influence on schema-consistent behavior (e.g., drinking or recovery-related behaviors).

Grading and strength of individual data-based publications

Retrieved research studies were graded for rigor and quality using Polit and Beck's (2004) system for grading the strength of evidence. Consistent with this system, a publication was assigned a rating of *good* if it met all six of the associated criteria for a rating of good; assigned a rating of *fair* if it met all six criteria for a rating of fair, but did not meet all criteria for good; or *poor* if it did not meet established criteria. It was determined that four studies met the highest possible grade of good, according to the grading rubric, while three studies met the mid-grade of fair. Table 5 displays the assigned grades for each data-based publication using both Polit and Beck's (2004) criteria and Grimes and Schulz's (2002) criteria. Casey and Dollinger (2007) and Dollinger et al. (1993) were assigned the grade of fair because the methodology used to operationalize availability of a self-schema is not traditionally used within the self-schema literature, raising validity concerns. The study by McCartney and O'Donnell (1981) was assigned a fair grade due to an unusually small sample size for schema literature ($n=29$), and having a sample composed of all men, limiting generalizability.

Grading and strength of individual published models

Retrieved self-schema models were graded using criteria for the analysis and evaluation of theory outlined by Fitzpatrick and Whall (2005). Criteria and results are displayed in Table 6. It was determined that two models met the highest possible grade of 7, while one model

was assigned the grade of 6, and one model was assigned a grade of 4. The model published by Denzin (1993) received a grade of 6 because it has not been tested and empirically supported. The model published by Galanter (2014) received a grade of 4 because the linkages within the model were unclear, there appeared to be gaps in the model, and it has not yet been utilized and supported within practice or research.

Assessing the strength of the overall body of literature

Results of this integrative review of the literature reveal that understanding of the structural properties of the drinking-related self-schema is still early with 12 fair-to-good quality research studies addressing the topic. Utilizing Grimes and Schulz's (2002) criteria for grading the overall strength of the literature, the body of reviewed alcohol-focused schema literature received an overall grade of B, indicating that the body of evidence available is fair (see Table 5). The current body of research did not receive the highest score of A because it currently consists of a few isolated publications conducted over the past twenty years, rather than a cohesive line of research. The disparate nature of the body of research has resulted in inconsistent use of terminologies for important variables. For example, the term, "self-schema," could be used to refer to a generalized notion of one's self within a specific domain as employed by Casey and Dollinger (2007), Dollinger et al. (1993), and Gray et al. (2011), or to a group of attributes or self-descriptors within a single domain as was detailed by Daepfen et al. (1999), Doebrick and Todman (2003), and McCartney and O'Donnell (1981). Traditionally, within the broader body of self-schema literature, the term self-schema is used to refer to a single domain-specific organization of knowledge comprised of traits or attributes drawn out of personal experiences within the domain (Markus, 1977; McConnell & Strain, 2007).

Similarly, the concepts of availability and elaboration were operationalized in very diverse ways across the retrieved studies. In four studies, availability was established based upon response latency tasks that assessed implicit alcohol associations, with stronger associations being indicative of greater elaboration. In three studies availability was ascertained based upon the presence or absence of drinking-related photos using an autophotographic essay technique, with multiple photos suggesting increased elaboration. In two studies, availability was ascertained using ratings of trait descriptiveness, with higher ratings suggesting greater elaboration. Two additional studies ascertained availability through the use of a closed-ended Likert measure, with higher ratings suggesting greater elaboration. Finally, one study utilized a recall task to determine elaboration, with higher recall scores being indicative of greater elaboration. All methodologies, with the exception of the autophotographic essay technique have been utilized within the greater body of self-schema literature, lending support to validity. However, the diversity of methods used within the alcohol literature makes comparison of results across studies problematic.

Discussion

The self-schema approach to the study of the self-concept proposes that the content and elaboration of domain-specific self-schemas are the key structural properties of the self-concept that drive self-perception and behavior. As such, understanding these fundamental

components of drinking-related self-schemas is a foundational step toward developing theoretically grounded and empirically supported interventions addressing alcohol use disorder.

There is agreement across the reviewed literature that a drinking-related self-schema is available within drinking samples, and that it varies in elaboration, with a greater degree of elaboration being associated with increased drinking-related behavior. In addition, there is a small body of literature suggesting that traits and attributes are associated with drinking-related self-conceptualizations. However, the literature is disparate and must be pieced together in order to create a complete picture of the structure and content of the drinking-related self-schema. Additionally, the relationship between the structural properties and drinking behavior can only be conjectured as there are no studies that directly explore the relationship between the content of drinking-related self-schemas and drinking-behavior.

Since evidence suggests that self-schema in a content domain motivates behaviors in the domain, failure within the literature to determine the relationship between the content of the drinking-related self-schema and drinking behavior, is a notable limitation within the existing body of schema/alcohol research. The self-schema approach would predict that if one has an elaborate social drinker or light drinker type schema, which would be supported by more benign attributes in comparison to a problem drinking type self-schema, then his or her drinking behavior is likely to vary greatly in comparison to one who has an elaborate problem-drinker, or an elaborate recovery, schema.

Conclusions / Implications for Future Research

This comprehensive review of the literature strongly suggests that drinking-related self-schemas support drinking and recovery-related behavior. Consistent with the self-schema literature, variation within the structural properties of the drinking-related self-schema may serve as the key cognitive feature that determines how one views his or her drinking and a need for treatment, as well as guide drinking and recovery-related behaviors.

Based upon the retrieved literature and the self-schema approach to understanding the self-concept, it can be theorized that:

1. Drinking behavior is guided by an elaborate drinking-related self-schema.
2. The degree of problem-recognition that one has is related to the valence of the content of the drinking-related self-schema.
3. Recovery could begin with elaboration of a new and conflicting self-schema (the recovery-schema), which would become increasingly influential and reliable as experiences in recovery accumulate.
4. As new self-schemas elaborate, one would access the drinking-related schema less frequently, resulting in decreased elaboration and influence on behavior.

Therefore understanding regarding critical cognitive processes which undergird drinking self-perception and behavior could be greatly enhanced by 1) identifying variation in the structural properties of the drinking-related self-schema across the drinking and recovery

spectrum; and 2) empirically establishing the relationship between the valenced content of drinking-related self-schemas and drinking behavior. Identifying these critical properties and relationships would serve as a fruitful step toward developing targeted, schema-based, empirically and theoretically grounded interventions addressing problematic alcohol use.

References

- Avants SK, Beitel M, Margolin A. Making the shift from 'addict self' to 'spiritual self': Results from a Stage I study of Spiritual Self-Schema (3-S) therapy for the treatment of addiction and HIV risk behavior. *Mental Health, Religion & Culture*. 2005; 8(3):167–177. DOI: 10.1080/13694670500138924
- Avants SK, Margolin A. Development of Spiritual Self-Schema (3-S) Therapy for the Treatment of Addictive and HIV Risk Behavior: A Convergence of Cognitive and Buddhist Psychology. *Journal of Psychotherapy Integration*. 2004; 14(3):253–289. DOI: 10.1037/1053-0479.14.3.253
- Avants SK, Margolin A, McKee S. A path analysis of cognitive, affective, and behavioral predictors of treatment response in a methadone maintenance program. *Journal of Substance Abuse*. 2000; 11(3): 215–230. [PubMed: 11026121]
- Beland, IL. *Clinical nursing pathophysiological and psychosocial approaches*. 2nd. London: MacMillan; 1970.
- Brown, S. *Treating the alcoholic: A developmental model of recovery*. New York, NY: John Wiley & Sons; 1996.
- Burgess, AW. *Nursing: Levels of health prevention*. Englewood Cliffs, NJ: Prentice Hall; 1978.
- Cantor, N., Kihlstrom, JF. Social intelligence and cognitive assessments of personality. In: Wyer, RS., Jr, Srull, TK., editors. *Social intelligence and cognitive assessments of personality*. Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc; 1989. p. 1-59.
- Casey PF, Dollinger SJ. College students' alcohol-related problems: An autophotographic approach. *Journal of Alcohol and Drug Education*. 2007; 51(2):8–25.
- Corte C, Stein KF. Self-cognitions in antisocial alcohol dependence and recovery. *Western Journal of Nursing Research*. 2007; 29(1):80–99. DOI: 10.1177/0193945906295480 [PubMed: 17228062]
- Daeppen JB, Smith TL, Schuckit MA. How would you label your own drinking pattern overall? An evaluation of answers provided by 181 high functioning middle-aged men. *Alcohol and Alcoholism*. 1999; 34(5):767–772. DOI: 10.1093/alcalc/34.5.767 [PubMed: 10528820]
- Denzin, NK. *The Alcoholic Society: Addiction & Recovery of the Self*. Piscataway, NJ: Transaction Publishers; 1993.
- Doebrick C, Todman M. Schematic processing of cigarette smoking and drinking information: Separate or shared? *Addiction Research & Theory*. 2003; 11(5):295–315. DOI: 10.1080/1606635031000141085
- Dollinger SJ, Rhodes KA, Corcoran KJ. Photographically portrayed identities, alcohol expectancies, and excessive drinking. *Journal of Personality Assessment*. 1993; 60(3):522–531. DOI: 10.1207/s15327752jpa6003_9 [PubMed: 8336267]
- Fekken GC, H RR. Response latency evidence for viewing personality traits as schema indicators. *Journal of Research in Personality*. 1992; 26:103–120.
- Foster DW, Neighbors C, Young CM. Drink refusal self-efficacy and implicit drinking identity: an evaluation of moderators of the relationship between self-awareness and drinking behavior. *Addictive Behaviors*. 2014a; 39(1):196–204. DOI: 10.1016/j.addbeh.2013.09.024 [PubMed: 24169372]
- Foster DW, Young CM, Barnighausen TW. Self-control as a moderator of the relationship between drinking identity and alcohol use. *Substance Use and Misuse*. 2014b; 49(10):1340–1348. DOI: 10.3109/10826084.2014.901387 [PubMed: 24730565]
- Fitzpatrick, JJ., W, AL. *Conceptual Models of Nursing: Analysis and Application*. 4. Upper Saddle River, NJ: Prentice Hall Health; 2004.

- Foster DW. Drinking identity as a mediator of the relationship between drinking motives and weekly alcohol consumption among heavy drinking undergraduate students. *Addictive Behaviors*. 2014; 39(12):1811–1815. DOI: 10.1016/j.addbeh.2014.07.013 [PubMed: 25127197]
- Gray HM, LaPlante DA, Bannon BL, Ambady N, Shaffer HJ. Development and validation of the Alcohol Identity Implicit Associations Test (AI-IAT). *Addictive Behaviors*. 2011; 36(9):919–926. DOI: 10.1016/j.addbeh.2011.05.003 [PubMed: 21621924]
- Grimes DA, Schulz KF. An overview of clinical research: the lay of the land. *Lancet*. 2002; 359(9300): 57–61. DOI: 10.1016/s0140-6736(02)07283-5 [PubMed: 11809203]
- Higgins ET, King GA, Mavin GH. Individual construct accessibility and subjective impressions and recall. *Journal of Personality and Social Psychology*. 1982; 43(1):35–47. DOI: 10.1037/0022-3514.43.1.35
- Kendzierski D, Costello MC. Healthy Eating Self-Schema and Nutrition Behavior. *Journal of Applied Social Psychology*. 2004; 34(12):2437–2451. DOI: 10.1111/j.1559-1816.2004.tb01985.x
- Lindgren KP, Foster DW, Westgate EC, Neighbors C. Implicit drinking identity: Drinker+me associations predict college student drinking consistently. *Addictive Behaviors*. 2013a; 38(5): 2163–2166. DOI: 10.1016/j.addbeh.2013.01.026 [PubMed: 23454880]
- Lindgren KP, Neighbors C, Teachman BA, Gasser ML, Kaysen D, Norris J, Wiers RW. Habit doesn't make the predictions stronger: implicit alcohol associations and habitualness predict drinking uniquely. *Addictive Behaviors*. 2015; 45:139–145. DOI: 10.1016/j.addbeh.2015.01.003 [PubMed: 25665917]
- Lindgren KP, Neighbors C, Teachman BA, Wiers RW, Westgate E, Greenwald AG. I drink therefore I am: validating alcohol-related implicit association tests. *Psychology of Addictive Behaviors*. 2013b; 27(1):1–13. DOI: 10.1037/a0027640 [PubMed: 22428863]
- Lindgren KP, Neighbors C, Westgate E, Salemink E. Self-control and implicit drinking identity as predictors of alcohol consumption, problems, and cravings. *Journal for the Study of Alcohol and Drugs*. 2014; 75(2):290–298.
- Margolin A, Beitel M, Schuman-Olivier Z, Avants SK. A controlled study of a spirituality-focused intervention for increasing motivation for HIV prevention among drug users. *AIDS Education and Prevention*. 2006; 18(4):311–322. DOI: 10.1521/aeap.2006.18.4.311 [PubMed: 16961448]
- Margolin A, Schuman-Olivier Z, Beitel M, Arnold RM, Fulwiler CE, Avants SK. A preliminary study of spiritual self-schema (3-S[^{sup}]+[^{sup}]) therapy for reducing impulsivity in HIV-positive drug users. *Journal of Clinical Psychology*. 2007; 63(10):979–999. DOI: 10.1002/jclp.20407 [PubMed: 17828761]
- Markus H, Kunda Z. Stability and malleability of the self-concept. *Journal of Personality and Social Psychology*. 1986; 51(4):858–866. DOI: 10.1037/0022-3514.51.4.858 [PubMed: 3783430]
- Markus H, Wurf E. The dynamic self-concept: A social psychological perspective. *Annual Review of Psychology*. 1987; 38:299–337. DOI: 10.1146/annurev.ps.38.020187.001503
- Markus HR. Self-schemata and processing information about the self. *Journal of Personality and Social Psychology*. 1977; 35(2):63–78.
- Markus HR, Kitayama S. Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*. 1991; 98(2):224–253.
- McCartney J, O'Donnell PJ. The perception of drinking roles by recovering problem drinkers. *Psychological Medicine*. 1981; 11:747–754. [PubMed: 7323231]
- McConnell AR. The multiple self-aspects framework: Self-concept representation and its implications. *Journal of Personality and Social Psychology*. 2010; 20(2):1–21. DOI: 10.1177/1088868310371101
- McConnell AR, Rydell RJ, Brown CM. On the experience of self-relevant feedback: How self-concept organization influences affective responses and self-evaluations. *Journal of Experimental Social Psychology*. 2009; 45(4):695–707. DOI: 10.1016/j.jesp.2009.03.011
- McConnell, AR., Strain, LM. Content and structure of the self-concept. In: Sedikides, C., Spencer, SJ., editors. *The Self*. New York, NY US: Psychology Press; 2007. p. 51-73.
- Mitchell, P. *Concepts basic to nursing*. New York, NY: McGraw Hill; 1973.
- Neubauer AC, Malle BF. Questionnaire response latencies: Implications for personality assessment and self-schema theory. *European Journal of Psychological Assessment*. 1997; 13(2):109–117.

- Oyserman, D. Social identity and self-regulation. In: Kruglanski, A., Higgins, T., editors. *Handbook of Social Psychology*. 2. NY: Guilford Press; 2007. p. 432-453.
- Oyserman D, Bybee D, Terry K. Possible selves and academic outcomes: How and when possible selves impel action. *Journal of Personality and Social Psychology*. 2006; 91(1):188–204. DOI: 10.1037/0022-3514.91.1.188 [PubMed: 16834488]
- Oyserman D, Destin M. Identity-based motivation: Implications for intervention. *The Counseling Psychologist*. 2010; 38:1001–1043. [PubMed: 21516204]
- Oyserman D, Fryberg SA, Yoder N. Identity-based motivation and health. *Journal of Personality and Social Psychology*. 2007; 93(6):1011–1027. DOI: 10.1037/0022-3514.93.6.1011 [PubMed: 18072851]
- Oyserman, D., James, L. Possible selves: From content to process. In: Markman, K.Klein, WMP., Suhr, JA., editors. *The Handbook of Imagination and Mental Stimulation*. NY: Psychology Press; 2009. p. 373-394.
- Polit DFB, Cheryl T. System for grading the strength of a body of evidence. 2004 Retrieved from National Clinical Content Network Review Board.
- Rafaeli-Mor E, Steinberg J. Self-complexity and well-being: A review and research synthesis. *Personality and Social Psychology Review*. 2002; 6(1):31–58.
- Renaud JM, McConnell AR. Organization of the self-concept and the suppression of self-relevant thoughts. *Journal of Experimental Social Psychology*. 2002; 38(1):79–86. DOI: 10.1006/jesp.2001.1485
- Russell CL. An overview of the integrative research review. *Progress in Transplantation*. 2005; 15(1): 8–13. [PubMed: 15839365]
- Schleicher DJ, McConnell AR. The complexity of self-complexity: An associated systems theory approach. *Social Cognition*. 2005; 23(5):387–416. DOI: 10.1521/soco.2005.23.5.387
- Scott WA. Structure of natural cognitions. *Journal of Personality and Social Psychology*. 1969; (12): 261–278.
- Shadel WG, Mermelstein R, Borrelli B. Self-concept changes over time in cognitive-behavioral treatment for smoking cessation. *Addictive Behavior*. 1996; 21(5):659–663. DOI: 10.1016/0306-4603(95)00088-7
- Shadel WG, Niaura R, Abrams DB. An idiographic approach to understanding personality structure and individual differences among smokers. *Cognitive Therapy and Research*. 2000; 24(3):345–359. DOI: 10.1023/A:1005567405173
- Stein KF. Schema model of the self-concept. *IMAGE: Journal of Nursing Scholarship*. 1995; 27(3): 187–193. DOI: 10.1111/j.1547-5069.1995.tb00857.x
- Stein KF, Corte C. Identity impairment and the eating disorders: Content and organization of the self-concept in women with anorexia nervosa and bulimia nervosa. *European Eating Disorder Review*. 2007; 15:58–69.
- Stein KF, Corte C. The identity impairment model: A longitudinal study of self-schemas as predictors of disordered eating behaviors. *Nursing Research*. 2008; 57(3):182–190. DOI: 10.1097/01.NNR.0000319494.21628.08 [PubMed: 18496104]
- Stein KF, Corte C, Chen DG, Nuliyalu U, Wing J. A randomized clinical trial of an identity intervention programme for women with eating disorders¹. *European Eating Disorders Review*. 2013; 21(2):130–142. DOI: 10.1002/erv.2195 [PubMed: 23015537]

Figure 1. Depiction of the self-concept for a hypothetical person named Fred, illustrating the structural and functional properties of the self-concept

Ovals represent the highest level of the self-schema hierarchy, the generalized notion of one's self within a domain of experience. The rectangles represent the mid-level comprised of personal traits and attributes drawn out of one's experiences within the domain. The circles represent the lowest level of the hierarchy, episodic memories of personal experiences within a domain. The figure depicts the *availability* of four self-schemas (Fred's father schema, husband schema, professor schema, and his drinking-related schema). The dashed rectangle encompasses the *content* of one domain-specific *self-schema* (his drinking-related self-schema). *Elaboration* is depicted by the number of traits and attributes within each schema and the dotted lines linking self-schemas based upon redundant traits and attributes. Model is adapted from McConnell & Strain (2007) and Stein (1995).

Figure 2.
Flow chart of literature search and exclusion process

Table 1

Peer-reviewed publications and models pertaining to drinking-related self-schemas in addictions, retrieved by search strategy

Data-based studies examining the drinking-related self-schema (n=12)	Schema based models of addiction (n=4)
1. Casey & Dollinger (2007)	1. Avants & Margolin (2004)
2. Corte & Stein (2007)	2. Brown (1996)
3. Dollinger et al. (1993)	3. Denzin (1993)
4. Foster et al. (2014a)	4. Galanter (2014)
5. Foster et al. (2014b)	
6. Gray et al. (2011)	
7. Daepfen et al. (1999)	
8. Doebrick & Todman (2003)	
9. Lindgren et al. (2013a)	
10. Lindgren et al. (2013b)	
11. Lindgren et al. (2014)	
12. McCartney & O'Donnell (1981)	

Table 2

Summary of methodological properties of data-based studies examining the structure, function and/or effects of a drinking-related self-schema

Study	Purpose	Design	Sample	Operationalization of drinking-related schemas
College students' alcohol-related problems: An autophotographic approach Casey & Dollinger (2007)	To replicate findings of previous research by the authors, that "alcohol identity" relates to alcohol use among college students; to assess whether age group/legality and gender moderate the relationship between alcohol identity and alcohol use; and to test whether alcohol identity predicts problematic alcohol use including driving intoxicated, binge drinking, drinking to induce intoxication, and drinking games	Cross-sectional	n=135 Undergraduate college psychology students Age= 22 years (SD=5.5, range=18–50) 45 men, 90 women	Autophotographic essay technique: Participants were instructed to compile 20 photographs answering the question "Who are you?" and provide a written commentary. It was required that at least 10 new photos be taken for the project. Photos were coded for consumption of alcohol, display of alcohol and alcohol advertisements. The number of alcohol-related photographs were used to determine the availability and degree of elaboration of a drinking-related schema
Self-cognitions in antisocial alcohol dependence and recovery Corte & Stein (2007)	To examine the valence, content, and organization of self-schemas in persons with antisocial alcohol dependence, persons in recovery and control participants; and to test a model in which these self-concept properties predict level of alcohol use	Cross-sectional between groups	n=65 total n=24 persons with a diagnosis of antisocial alcohol dependence n=18 persons in recovery from alcohol dependence n=23 community control participants 21–31 years of age 57% men	Zajonc card-sort task was employed to determine the number of valenced self-schemas and interrelatedness of self-schemas within the total self-concept. A closed-ended Likert scale task patterned after Shadel, Mermelstein & Borrelli (1996), was employed to determine the availability of drinker and recovering alcoholic self-schemas
How would you label your own drinking pattern overall? An evaluation of answers provided by 121 high functioning middle-aged men Daepfen et al. (1999)	To evaluate how high-functioning men in their 30's rate their alcohol consumption	Secondary analysis of alcohol genetics study data	n=181 total n=150 participants who did not meet DSM-III criteria for alcohol abuse or dependence n=15 participants who met criteria for alcohol abuse n=16 participants who met criteria for alcohol dependence Average age 38.7 years (SD=1.91) 100% men	Participants were asked to rate their drinking pattern: "over the last 5 years, how would you label your own drinking pattern overall?" 1- non-drinker, abstainer (non-drinker) 2- infrequent, occasional light social drinker (infrequent drinker) 3- moderate social drinker (moderate drinker) 4- frequent, heavy social drinker (heavy drinker) 5- problem drinker, alcoholic (problem drinker) 6- recovering alcoholic Drinking patterns were then compared to self-reported alcohol-related problems endorsed during alcohol SCID
Schematic processing of cigarette smoking and drinking information: Separate or shared? Doebrick & Todman (2003)	To test the hypothesis that the correlation between cigarette smoking and alcohol use may be partly attributable to a cross-substance facilitation/inhibition effect in which schematic processes derived from	Cross-sectional between groups	n=123 total n=17 heavy drinkers-nonsmokers, n= 31 light drinkers-smokers, n=25 heavy drinkers-smokers,	<i>Validation study:</i> Participants were presented with a list of 200 attributes from Anderson's (1968) list of personality trait words and asked to rate applicability of each attribute describing 3 types of activities, alcohol drinking, cigarette smoking and newspaper reading, using a 5pt Likert scale, as well

Study	Purpose	Design	Sample	Operationalization of drinking-related schemas
	personal experience with one substance facilitates or inhibits the processing of information associated with the other		n=40 light drinkers nonsmokers Recruited from university students, local restaurants, retail establishments and healthcare facilities 49 men, 74 women	as valence (+ or –) The 30 attributes with highest mean applicability for each of the three activities selected for use in study (15 positive and 15 negative) Each of the attribute words were added to one of three sentence stems (e.g. alcohol drinking is...) resulting in 3 separate lists of 30 descriptive statements <i>Study:</i> Participants were then presented with 3 envelopes, each containing one of the 3 activity-related statement lists and asked to indicate if they agreed or disagreed with each of the 30 sentences Participants were asked to write down as many attributes as they could remember from the statements to test memory encoding and facilitated information processing (indicators of schematic processing)
Photographically portrayed identities, alcohol expectancies, and excessive drinking Dollinger et al. (1993)	To assess whether the alcohol-relevant identity presented in autophotographic essays related to self-reported drinking and whether such an identity contributes to the prediction of drinking when a well-established predictor of such behavior, alcohol expectancies, is accounted for	Cross-sectional	n=46 Undergraduate psychology college students Age 18–39 years 29 men, 52 women	Autophotographic essay technique, as described above
Drink refusal self-efficacy and implicit drinking identity: An evaluation of moderators of the relationship between self-awareness and drinking behavior Foster et al. (2014a)	To evaluate the relationship between self-awareness and drinking by considering two potential moderators, implicit drinking identity and drink refusal self-efficacy	Cross-sectional	n=218 Undergraduate college students Average age 22.9 years (SD=6.3) 18% men	IAT task: Participants were shown a stimulus image on a computer screen and asked to assign it either to the joint category alcohol/me or the joint category water/not me. Stimulus images included alcohol-related pictures, drinking water related pictures, self-relevant words (e.g. self, me, mine, my), other relevant words (e.g. they, them, theirs, others). Response latency times for critical combination blocks were recorded using an IAT scoring algorithm The strength of the association between alcohol-relevant pictures and self-relevant words for each participant were calculated by means of standardized D score, and utilized to determine availability and elaboration of a drinking-related schema within participants
I think I can't: Drink refusal self-efficacy as a mediator of the relationship between self-reported	To examine the relationship between self-reported drinking identity and alcohol use by considering drink-	Cross-sectional	n=1067 College students Average age 22.9 years (SD=6.3) 24% men	A closed-ended Likert scale task patterned after Shadel, Mermelstein & Borrelli (1996), was employed to determine the availability of drinker and

Study	Purpose	Design	Sample	Operationalization of drinking-related schemas
drinking identity and alcohol use Foster et al. (2014b)	refusal self-efficacy as a potential mediator			recovering alcoholic self-schemas
Development and validation of the alcohol identity implicit associations test (AI-IAT) Gray et al. (2011)	To develop the Alcohol-Identity Implicit Associations Test and examine the measures psychometric properties	Longitudinal with baseline, 3 month, and 6 month points	n=141 Undergraduate college students Age 18–22 years, mean 19.22 years 42 men, 97 women	Autophotographic essay technique, as described above IAT task, as described above
Implicit drinking identity: Drinker + me associations predict college student drinking consistently Lindgren et al. (2013a)	To examine the predictive validity of three alcohol-related associations (drinking identity, alcohol approach, and alcohol cope) using adaptations of the Implicit Association Test (IAT)	Cross-sectional	n=243 Undergraduate college students Average age 22.9 years (SD=6.3) 18% men	Three IAT tasks (Drinking Identity, as described above; Alcohol Approach; and Alcohol Cope) were used Alcohol Approach IAT-using similar methodology to Drinking Identity (IAT), participants were instructed to pair pictures of alcohol and pictures of water with approach and avoid words Alcohol Cope IAT-using similar methodology to Drinking Identity (IAT), participants were instructed to pair pictures of alcohol and pictures of water with cope and ignore words
I drink Therefore I am: Validating alcohol-related implicit association tests Lindgren et al. (2013b)	To examine five alcohol-related variants of the Implicit Association Test (IAT) (Alcohol Approach, Drinking Identity, Alcohol Excitement, Alcohol Coping, and Stress Drinking), to establish their predictive validity and investigate whether the IAT's account for distinct variance in drinking outcomes	Cross-sectional with a subset (n=41) participating in longitudinal portion (re-test at one week)	n=300 Undergraduate college students Age 18–25 years, mean 20.5 years 136 men, 164 women	Alcohol Approach, Drinking Identity, and Alcohol Excitement were assessed using the IAT task, as described above Alcohol Cope and Stress Drinking were assessed using a Brief IAT (BIAT). The BIAT has fewer than 50% of the trials used in the standard IAT A closed-ended Likert scale task patterned after Shadel, Mermelstein & Borrelli (1996), was employed to determine the availability of drinker and recovering alcoholic self-schemas
Self-control and implicit drinking identity as a predictors of alcohol consumption, problems, and cravings Lindgren et al. (2014)	To investigate whether trait self-control, alcohol-specific self-control, and implicit drinking identity associations are unique predictors of drinking when evaluated simultaneously; and whether both indices of self-control and implicit drinking identity associations are positively associated with drinking	Cross-sectional	n=300 Undergraduate college students Age 18–25 years, mean 20.5 years 136 men, 164 women	IAT task, as described above
The perception of drinking roles by recovering problem drinkers McCartney & O'Donnell (1981)	To measure how problem drinkers evaluate semantically, the roles of "heavy controlled drinker," "light controlled drinker," "total abstainer," and "alcoholic," to measure the psychological distance between each of the aforementioned roles	Cross-sectional	n=29 Inpatients admitted as "alcoholics" to short-stay wards of a public hospital Age 20–55 years, mean 35 years 19 men, 10 women	Participants rated how they generally perceived their own disposition as well as how they perceived the disposition of drinking roles, including total abstainer, heavy controlled drinker, light controlled drinker, on a set of bipolar adjective pairs describing personality traits (from Osgood et al., 1957; Hoy, 1973; Hoy, 1977) on 7pt scale

Study	Purpose	Design	Sample	Operationalization of drinking-related schemas
	and the dependent drinker's conception of himself; to test the suggestion that the recovering problem drinker tends to delineate their self-concept as being significantly different from the way in which they picture "the alcoholic"			(e.g., honest-dishonest, escapist-realist) Ratings were used to determine the personality traits associated with drinking-related schemas

Table 3

Results, interpretation of findings and relevance to research questions of data-based studies examining the structure, function and/or effects of a drinking-related self-schema

Study	Results	Interpretation of results and relevance to research questions
College students' alcohol-related problems: An autophotographic approach Casey & Dollinger (2007)	Results indicated that an "alcohol identity" uniquely contributed to the prediction of alcohol consumption, frequency and participation in risky alcohol-related behaviors with the highest identity scores predicting increasing problematic drinking and behavior scores	Findings suggest that an alcohol-related self-schema is available within light-to-moderate drinking college student samples, and that the elaboration of a drinking-related schema influences alcohol use and frequency and degree of alcohol-related problem behaviors. However the exact nature and content of the drinking-related self-schema within this sample is undetermined
Self-cognitions in antisocial alcohol dependence and recovery Corte & Stein (2007)	Persons with Antisocial Alcohol Disorder trended toward fewer positive self-schemas than did control participants, had more negative self-schemas, and trended toward higher interrelatedness than did those in recovery and control participants. They also showed evidence of a drinking-related self-schema, whereas those in recovery showed evidence of a recovery-related self-schema The three self-structure variables (number of schemas, valence, and interrelatedness) predicted negative affect, which predicted drinker self-schema score, which predicted the number of alcoholic drinks consumed	Findings suggest the simultaneous existence of multiple drinking-related self-schemas which vary in elaboration (i.e., both a drinking-related schema and a recovery related schema), and not a single drinking-related schema that is revised and refined over time as one transitions across the stages of change However the study focused on valence and elaboration of the overall self-concept and not the specific drinking-related schema, thus the nature and content of the drinking-related schema remains unexplored
How would you label your own drinking pattern overall? An evaluation of answers provided by 181 high functioning middle-aged men Daepfen et al. (1999)	Among persons with a DSM-III diagnosis of alcohol abuse, none rated their drinking pattern as "problem drinker." Among persons with a diagnosis of alcohol dependence 12.5% rated themselves as a "problem drinker," while the remainder of that group did not consider their drinking patterns as problematic. Despite being in inpatient treatment for alcohol dependence or abuse, and having experienced multiple negative drinking-related incidents, no participants identified with the label of "alcoholic" Of non-AUD and AUD groups who rated themselves as moderate drinkers, those in non-group endorsed, on average, less than one alcohol-related problem while those in AUD group reported 4.2 problems Of non-AUD and AUD groups who rated themselves as heavy drinkers, those in non-AUD group reported fewer than 1 alcohol-related problem while those in AUD group reported 9.0 alcohol-related problems	Findings suggest that persons with drinking experience do have some self-conceptualization within the domain of drinking and this self-conceptualization varies in nature, from non-drinker to problem drinker. Persons with a diagnosis of alcohol abuse and/or dependence, and self-identifying as moderate drinkers, averaged 4.2 negative drinking-related incidents, while persons self-identifying as heavy drinkers averaged 9.0 alcohol-related problems. These findings suggest that there is a strong, positive correlation between the nature of the drinking-related self-schema and drinking-related problems
Schematic processing of cigarette smoking and drinking information: Separate or shared? Doebrick & Todman (2003)	Results indicate that the correlation between cigarette smoking and alcohol use may be partly attributable to a cross substance facilitation/inhabitation effect in which schematic processes derived from personal experience with one substance facilitates or inhibits the processing of information associated with the other Smokers were significantly more likely than nonsmokers to have had problems associated with drinking ($p < 0.008$) Heavy drinkers endorsed significantly more positive drinking words than light drinkers $F(1,120)=24.01$, $p=0.0001$. Heavy drinkers endorsed significantly more positive drinking-related attributes than negative drinking-related attributes ($HD/S=p<0.007$; $HD/NS=p<0.0001$) The researchers concluded that two distinct schematic organizations exist for smoking and drinking with very minimal overlap in schematic content	Heavy and light drinkers could be distinguished from one another on the basis of schematic processing of alcohol-related information, suggesting that heavy and light drinking-related self-schemas are supported by different attributes, and guide differing drinking patterns
Photographically portrayed identities, alcohol expectancies, and excessive drinking Dollinger et al. (1993)	Results reveal a moderately strong correlation between number of alcohol-related pictures and drinking measures ($r=.45$) for frequency and ($r=.61$) for quantity Regression analysis revealed, 61% of variance in quantity was explained by alcohol expectancy, gender and alcohol identity. The largest weight in equation was for alcohol identity, $B=.494$, $t(42)=3.29$ $p<.01$, followed by gender $B=.38$, $t(42)=3.89$, $p<.001$	Findings suggest that moderate experience within the domain of drinking, can result in availability of a drinking-related self-schema; and availability of a drinking-related self-schema is correlated with increased alcohol consumption However the nature and content of the drinking-related self-schema was not determined

Study	Results	Interpretation of results and relevance to research questions
Drink refusal self-efficacy and implicit drinking identity: An evaluation of moderators of the relationship between self-awareness and drinking behavior Foster et al. (2014a)	Results revealed that having a drinking-related self-schema is positively associated with drinking behavior (peak drinking, drinking frequency, drinks per week and alcohol-related problems), however not associated with self-awareness. Of the drinking variables under study only alcohol-related problems were positively associated with self-awareness. Three-way interactions were found between self-awareness, implicit drinking identity and drink refusal self-efficacy in predicting drinking. For participants low in drinking related self-efficacy, high implicit drinking identity was associated with greater drinking frequency when private self-consciousness was low. High implicit drinking identity was associated with greater drinks per week and peak drinks when public self-consciousness was low	Findings suggest that drinking-related information is processed implicitly (without self-awareness). The degree of implicit processing (high implicit drinking identity) is positively related to quantity and frequency of drinking. Therefore availability and elaboration of the drinking-related self-schema are key structural properties influencing drinking patterns.
I think I can't: Drink refusal self-efficacy as a mediator of the relationship between self-reported drinking identity and alcohol use Foster et al. (2014b)	Results revealed that self-reported drinking identity was negatively associated with drink-refusal self-efficacy and positively associated with drinking behavior. Drinking-related self-efficacy subscales were negatively associated with drinking behavior. Males also reported greater self-reported drinking identity, lower drinking-related self-efficacy, and increased alcohol consumption.	Findings suggest availability of a drinking-related self-schema within low to moderately drinking college samples. Availability of a drinking-related self-schema is associated with increased drinking-related behavior as well as decreased confidence in one's ability to control drinking.
Development and validation of the alcohol identity implicit associations test (AI-IAT) Gray et al. (2011)	Results revealed that AI-IAT scores were stable over time, internally consistent and positively correlated with autophotographic essay scores (a previously validated measure of alcohol identity) Baseline AI-IAT scores predicted future engagement in risky college drinking practices after controlling for standard alcohol consumption	Findings suggest a drinking-related self-schema enhances information processing among persons with stronger self/alcohol associations, therefore providing evidence of enhanced schematic processing with greater elaboration of the drinking-related self-schema In addition, findings suggest that the more elaborate the drinking-related schema is, the more likely one is to regularly participate in drinking-related behavior
Implicit drinking identity: Drinker + me associations predict college student drinking consistently Lindgren et al. (2013a)	Results revealed that drinking identity is the most consistent predictor of alcohol consumption and alcohol problems (compared to alcohol cope and alcohol approach associations).	Findings suggest that availability of a drinking-related self-schema is related to both drinking patterns and alcohol-related problems.
I drink Therefore I am: Validating alcohol-related implicit association tests Lindgren et al. (2013b)	Results revealed that the Drinking Identity IAT was the most consistent predictor of alcohol consumption, alcohol problems, and alcohol cravings (compared to Alcohol Approach, Alcohol Excitement, Alcohol Coping, and Stress Drinking IAT's). The Drinking Identity IAT also showed the highest internal consistency and test-retest reliability of the measures.	Findings suggest that drinking-related information as it relates specifically to oneself, is processed separately from other drinking-related information (coping, approach, excitement, and stress drinking), as availability of a drinking-related self-schema has the strongest and most reliable influence on alcohol consumption, problems and cravings.
Self-control and implicit drinking identity as a predictors of alcohol consumption, problems, and cravings Lindgren et al. (2014)	Results revealed that both trait self-control and alcohol self-control as well as drinking identity associations predicted unique variance in drinking patterns. Both types of self-control, but not drinking identity scores, accounted for unique variance in alcohol-related problems.	Findings suggest that availability and elaboration of the drinking-related self-schema are related to drinking-related behavior.
The perception of drinking roles by recovering problem drinkers McCartney & O'Donnell (1981)	Results revealed the roles of heavy controlled drinker, light controlled drinker and total abstainer were positively evaluated by "problem drinking" participants. The role of alcoholic was negatively evaluated by participants The greatest psychological distances were between a problem drinkers conception of himself and "alcoholic" and himself and "total abstainer" The distance between "myself" and "heavy controlled drinker" was significantly smaller than between self and all other roles	Findings suggest that persons with AUD do have an elaborate conceptualization of themselves within the domain of drinking which consists of valenced supporting attributes

Table 4

Self-schema based models of alcohol use and addiction

Model	Model purpose	Key postulate(s)
Development of spiritual self-schema (3-s) therapy for the treatment of addictive and HIV risk behavior Avants & Margolin (2004)	Proposes a self-schema based addiction treatment program	Based on the premise that habitual activation of an “addict” self-schema leads to high-risk behavior. Goal of the proposed therapy is to elaborate a self-schema for abstainer and harm-prevention (the spiritual self-schema) The therapy employs cognitive-behavioral techniques to facilitate shift in self-schemas from addict schema to spiritual schema
Treating the alcoholic: A developmental model of recovery Brown (1996)	Proposes a self-schema based alcohol treatment program	Based on the premise that alcohol assumes a central organizing role in the alcohol-dependent person’s daily routines, including interactions with friends, family at work and leisure routines
The alcoholic society: Addiction and recovery of the self Denzin (1993)	Proposes a self-schema based model to understand cognitive factors underlying problem drinking	Based on the premise that an alcohol-related self becomes a “master identity that overrides all other [self] conceptions the alcoholic has” It is proposed that an alcohol identity is taken on to cope with the lack of a clear and focused self Thoughts about the self in relation to alcohol, become the primary source of self-definition and serve to drive alcohol-related behaviors while other self-conceptions simultaneously recede in importance
Alcoholics anonymous and twelve step recovery: A model based on social and cognitive neuroscience Galanter (2014)	Proposes a neurocognitive model to understand factors underlying recovery in Alcoholics Anonymous	It is proposed that the activities encouraged in AA (mirroring and mutuality and storytelling), encourage inward reflection and integration of memories into the self-concept, which are relied upon later for self-regulation and future oriented understanding and behavior

Table 5

Grading results for retrieved data-based publications, utilizing criteria for the evaluation of the quality of evidence provided by Polit & Beck (2003) and Grimes & Schulz (2002)

Publication and Author	Methods consistent with existing schema literature	Systematic approach to data collection, analysis, description of findings	Adequate Sampling	Control or comparison group	Multiple levels of abstraction for data analysis	Risk of bias identified	No major methodological concerns	Polit & Beck (2004) Quality Grade
College students' alcohol-related problems: An autophotographic approach Casey & Dollinger (2007)	No	Yes	Yes	No	Yes	Yes	Yes	Fair
Self-cognitions in antisocial alcohol dependence and recovery Corte & Stein (2007)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Good
How would you label your own drinking pattern overall? An evaluation of answers provided by 121 high functioning middle-aged men Daeppen et al. (1999)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Good
Schematic processing of cigarette smoking and drinking information: Separate or shared? Doebbrick & Todman (2003)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Good
Photographically portrayed identities, alcohol expectancies, and excessive drinking Dollinger et al. (1993)	No	Yes	Yes	No	Yes	Yes	Yes	Fair
Drink refusal self-efficacy and implicit drinking identity: An evaluation of moderators of the relationship between self-awareness and drinking behavior Foster et al. (2014a)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good
I think I can't: Drink refusal self-efficacy as a mediator of the relationship between self-reported drinking identity and alcohol use Foster et al. (2014b)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good
Development and validation of the alcohol identity implicit associations test (AI-IAT) Gray et al. (2011)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good
Implicit drinking identity: Drinker + me associations predict college student drinking consistently Lindgren et al. (2013a)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good
I drink Therefore I am: Validating alcohol-related implicit association tests Lindgren et al. (2013b)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good

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Publication and Author	Methods consistent with existing schema literature	Systematic approach to data collection, analysis, description of findings	Adequate Sampling	Control or comparison group	Multiple levels of abstraction for data analysis	Risk of bias identified	No major methodological concerns	Polit & Beck (2004) Quality Grade
Self-control and implicit drinking identity as a predictors of alcohol consumption, problems, and cravings Lindgren et al. (2014)	Yes	Yes	Yes	No	Yes	Yes	Yes	Good
The perception of drinking roles by recovering problem drinkers McCarney & O'Donnell (1981)	No	Yes	No	No	Yes	No	Yes	Fair
Overall Strength of Body of Literature (Grimes & Schulz, 2002)	B							

Table 6
Grading results for retrieved models, utilizing criteria for the analysis and evaluation of theory provided by Fitzpatrick & Whall (2004)

Model and Author	Are the major concepts clearly defined?	Are the concepts operationalized in a way that is congruent with empirical data?	Are gaps or inconsistencies in the theory circumvented?	Are the concepts clearly related via statements?	Is there congruency of all components of the theory?	Are the tenants of the theory supported by existing research?	Has the theory been supported in practice or research?	Grade
Development of spiritual self-schema (3-S) therapy for the treatment of addictive and HIV risk behavior Avants & Margolin (2004)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7
Treating the alcoholic: A developmental model of recovery Brown (1996)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	7
The alcoholic society: Addiction and recovery of the self Denzin (1993)	Yes	Yes	Yes	Yes	Yes	Yes	No	6
Alcoholics anonymous and twelve step recovery: A model based on social and cognitive neuroscience Galanter (2014)	Yes	Yes	No	No	Yes	Yes	No	4