PRE-TREATMENT CHANGE IN INTERNET-DELIVERED ALCOHOL USE DISORDER TREATMENT

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by
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Abstract

Alcohol misuse is a common mental disorder that can have devastating effects on an individual’s physical and mental health. Although alcohol misuse is both prevalent and disabling, only 21% of individuals receive treatment. Internet-delivered cognitive behaviour therapy (ICBT) may serve as a promising solution for the treatment gap, as it minimizes concerns about the stigma surrounding seeking treatment. Previous studies in alcohol treatment literature address a phenomenon named Assessment Reactivity (AR) which suggests that assessment interviews are predictive of significant changes in pre-treatment drinking. This may be of clinical importance as early abstinence from alcohol has been significantly associated with longer periods of continuous abstinence. The primary objective of the current study was to explore pre-treatment change by experimentally manipulating assessment in an ICBT program for alcohol misuse. As such, 87 clients were randomly assigned to receive an assessment interview or no assessment interview prior to beginning treatment. It was hypothesized that clients who received an assessment interview would experience greater reductions in alcohol consumption and depression, as well as increased motivation to improve their drinking behaviours. Results indicated that there were no significant differences in drinking behaviours between groups at pre-treatment. However, significant reductions in alcohol consumption were observed amongst both groups, suggesting that factors other than an assessment interview may contribute to client’s willingness to improve their drinking behaviours. No significant differences in motivation to change or depressive symptoms were observed between groups, although, both groups experienced a significant increase in motivation and decrease in depressive symptoms over time. The results have valuable implications for the delivery of ICBT in routine care.

Key Words: Alcohol, assessment reactivity, internet-delivered cognitive behaviour therapy
**Introduction**

Alcohol is a toxic and psychoactive substance with strong dependence producing properties (WHO, 2018). It is an economically embedded product widely used to celebrate, relax, and socialize (“Alcohol: No Ordinary Commodity”, 2010). Alcohol is consumed by the vast majority of the population, and alcohol misuse, defined as alcohol consumption that puts individuals at an increased risk for adverse health and social consequences, affects 8% of those aged 15 years or older (WHO, 2018). Today, alcohol use disorder (AUD) is one of the most prevalent mental disorders in developed countries (WHO, 2018; “Alcohol: No Ordinary Commodity”, 2010).

Alcohol accounts for more than 4% of the global burden of injury and disease (“Alcohol: No Ordinary Commodity”, 2010) and is the cause of nearly 3 million premature deaths annually (WHO, 2018). Alcoholic liver disease, heart disease, strokes, cancers, and gastrointestinal disease are a few of the major causes of premature death linked to alcohol consumption (Connor, Haber, & Hall, 2016), but injuries incurred in motor vehicle accidents, self-harm, and interpersonal violence are responsible for 28% of premature deaths (WHO, 2018).

Along with premature death and illnesses, alcohol misuse can cause serious social consequences for the drinker (“Alcohol: No Ordinary Commodity”, 2010; Klingemann & Gmel, 2001). There is evidence of a causal link between alcohol consumption and violence (“Alcohol: No Ordinary Commodity”, 2010). As well, productivity deficits in the work-place can occur as a consequence of alcohol misuse (Klingemann & Gmel, 2001).

There is a strong link between frequent and heavy alcohol consumption and the development of mental health disorders (“Alcohol: No Ordinary Commodity”, 2010). Major
Depressive Disorder (MDD) and AUD frequently co-occur, with comorbid depression amounting to nearly 50% in alcohol treatment populations (Riper et al., 2014). Those suffering from MDD are also at a greater risk for developing AUD post-diagnosis, with a life-time probability of 40% (Riper et al., 2014). This is problematic as the co-occurrence of these disorders has been associated with multiple negative outcomes, including the development of more severe depressive symptoms, poorer social functioning, and increased suicidal ideation (Baker et al., 2012).

Despite the magnitude of this problem, and the general availability of interventions, alcohol misuse is largely undertreated. Only a mere 21% of those who meet the criteria for AUD receive treatment (Kohn et al., 2004; Probst et al., 2015), leaving a large percentage of individuals vulnerable to lifelong dependence and fatal consequences. Severe stigmatization of AUD is a possible explanation for individuals refraining from accessing help (Schomerus et al., 2010). The stigma of, and lack of understanding for, people with AUD can cause a person to minimize their condition thereby limiting their capacity to access social benefits, such as treatment and recovery support (Williamson, 2012). Additional barriers for treatment include shame, guilt and embarrassment, and the individual’s belief that they can handle their alcohol problems on their own (Probst et al., 2015). Individuals with AUD are often considered to be responsible for their affliction rather than being regarded as mentally ill when compared to those suffering from other mental disorders, thus, they are held more accountable for their condition (Schomerus et al., 2010).

**Cognitive Behavioural Therapy**

Cognitive behavioural therapy (CBT) is the most widely researched and established evidence-based treatment for psychological disorders (Chambless and Ollendick, 2001). The
core premise of CBT is the idea that automatic thoughts influence our behaviour. As such, behaviours are to be interpreted in the context of our thoughts, attitudes, and beliefs, and, consequently, can be altered and improved once they are fully understood (Bond & Dryden, 2002). CBT has shown promising results in the treatment of AUD (Magill et al., 2019). Relapse prevention (RP) is the most common form of CBT used to treat people with alcohol problems. The RP model assumes that immediate determinants, e.g., high-risk situations, coping skills, and outcome expectancies, and covert antecedents, e.g., lifestyle factors and urges and cravings, contribute to relapse (Larimer et al., 1999). RP incorporates specific intervention strategies such as: identifying high-risk situations for each client and enhancing their skills for coping with those situations, increasing client’s self-efficacy, providing alcohol knowledge, managing lapses, and restructuring the client’s perceptions of the relapse process (Larimer et al., 1999). The RP model also aims to prevent the occurrence of initial lapses after a commitment to change has been made, and ultimately aides to prevent any lapse that escalate into a full relapse.

**Internet-Delivered Cognitive Behavioural Therapy**

In the past two decades, internet-delivered therapy rooted in cognitive behavioural theory (ICBT) has emerged as an effective and viable form of treatment for multiple mental disorders (Andersson et al., 2019; Twomey et al., 2014). ICBT is usually carried out completely online. Client’s log-in to a secure website regularly to access, download, and read materials arranged into a series of modules (Andersson & Titov, 2014). Each online module introduces common CBT practices such as behavioural activation, cognitive restructuring, and problem-solving, introducing skills and strategies that enable clients to regulate and manage their symptoms on their own (Andersson, 2016). Further, patients receive homework that they are expected to complete before the next module is available and are also asked to respond-to regular online-
administered questionnaires that allow monitoring of progress and outcomes (Andersson & Titov, 2014). In some cases, ICBT is therapist-guided (G-ICBT), and in other cases it is self-guided (S-ICBT) (Andersson et al., 2013).

ICBT possesses many advantages over traditional face-to-face therapy. One advantage is that it is considerably less time-consuming for the therapist (Andersson & Titov, 2014). It also allows patient flexibility as users can access the program at their convenience. Additionally, ICBT allows for those living in remote areas to receive treatment where it may otherwise be inaccessible (Andersson, 2016). ICBT is more cost-effective than face-to-face therapy (Andersson, 2018), and, importantly, it allows those concerned with stigma to manage their troubles in a more private manner (Andersson, 2018).

**Internet-Delivered Cognitive Behavioural Therapy for Alcohol Misuse**

While there is considerable research demonstrating the efficacy of ICBT for common psychiatric problems, ICBT for alcohol misuse is not as strongly established (Hadjistavropoulos et al., 2019). Emerging research, however, shows promising effects of both S-ICBT and G-ICBT for AUD (Hadjistavropoulos et al., 2019). In a 2019 review, S-ICBT was found to be significantly more effective in reducing alcohol consumption when compared to alcohol information in multiple studies and was also significantly more effective when compared to a waitlist (Hadjistavropoulos et al., 2019). G-ICBT demonstrated even more promising results, with two studies finding it to be superior to a waitlist with medium and large effect sizes. Notably, in one study G-ICBT was found to be superior to S-ICBT with a medium effect size, with participants in guidance groups having significantly lower past-week alcohol consumption compared to the group without guidance (Sundström et al., 2016). In another study, G-ICBT was superior to S-ICBT with a small effect size (Blankers et al., 2011).
Assessment Reactivity and Pre-treatment Change

In most cases, individuals participating in alcohol misuse treatment undergo an assessment before they can begin. Reporting on one’s own behaviour may change the behaviour in question, a psychological phenomenon commonly referred to as assessment reactivity (AR) (Clifford et al., 2007). Research suggests that AR may be especially beneficial in alcohol trials, as assessment appears to be associated with a subsequent change in drinking (Stasiewicz et al., 2013; Morgenstern et al., 2007). For example, one study found that participants, who received a diagnostic interview and were then randomized to one of two separate conditions of an ICBT program for alcohol misuse or to a wait-list, experienced a sharp and significant decrease in alcohol consumption between screening and pre-treatment (Sundström et al., 2019). It is plausible to assume that patients may perceive those conducting assessments as “helping professionals” interested in their well-being (Clifford et al., 2007), which may, in turn, improve mood and facilitate motivation to abstain from consuming alcohol prior to their treatment beginning. Sundström et al. (2019) confirmed this assumption, as participants in their study reported perceiving the diagnostic interview conducted during assessment as therapeutic.

There is some evidence that a more in-depth assessment can increase short-term effects on a client’s progress, specifically when conducted pre-treatment (Epstein et al., 2005; Clifford et al., 2007; Stasiewicz et al., 2013). In an observational study where pre-treatment assessment occurred at multiple occasions in the form of a brief telephone screen, a 90-minute clinical intake, and a 3-4 hour baseline research interview, significant reductions in drinking were observed at all points of the pre-treatment assessment process, resulting in 44% of participants becoming abstinent before the treatment had begun (Epstein et al., 2005). Consequently, it was hypothesized that the more comprehensive assessments were made to be, the more aware clients
would become about the severity of their drinking, and thus, the better they would fair in their efforts to reduce their alcohol consumption (Epstein et al., 2005). This is of great clinical importance as early abstinence from alcohol is significantly associated with longer periods of continuous abstinence and is a robust and reliable predictor of long-term change (Dunn et al., 2016).

In sum, existing research suggests that a) a comprehensive pre-treatment assessment has the propensity to foster early change, and b) early change is associated with significant and clinically meaningful long-term outcomes in alcohol misuse treatment. Currently, however, there is no experimental research investigating the effects of pre-treatment assessments prior to ICBT for alcohol misuse.

**Research Purpose**

This study was conducted as a component of a larger randomized factorial trial evaluating the efficacy of ICBT for alcohol misuse with and without health educator guidance. The primary purpose of the current study was to evaluate the impact of an assessment interview (Structured Clinical Interview for AUD) versus no assessment interview on pre-treatment change prior to beginning ICBT. Pre-treatment change was evaluated by comparing the participant’s alcohol consumption, motivation to change, and depression at screening to the same measures assessed just prior to beginning treatment. It was hypothesized that those randomized to an assessment interview would experience a greater reduction in weekly drinking and depression as well as increased motivation to change compared to those who were randomized to no assessment interview.
Methods

Ethics

This study was approved by the University of Regina Ethics Board (see Appendix).

Trial Registration

This trial was registered (NCT03984786, https://clinicaltrials.gov/ct2/show/NCT03984786).

Participants

Clients were recruited across Canada via online media advertisements on GoogleAds targeting people who were ‘experiencing difficulties in controlling or cutting down on their drinking’ and who were interested in a study on ‘online interventions for alcohol problems.’ Recruitment also took place by way of posters and cards sent to general medicine practitioners and Saskatchewan Liquor and Gaming Authority stores in Saskatchewan.

Procedure

All interested individuals were directed to REDcap, a secure web application used for building and managing data bases. On this website, the individuals began by completing an online screening questionnaire. As part of this questionnaire, clients were presented with a consent form explaining the screening protocol. After consent had been given, clients were assessed for basic eligibility and completed a battery of questionnaires including the Alcohol Use Disorders Identification Test (AUDIT), the Penn Alcohol Craving Scale (PACS), the Generalized Anxiety Disorder 7-item (GAD-7), the Drug Use Disorders Identification Test (DUDIT), and the Sheehan Disability Scale (SDS). Key to this study, they also completed the Patient Health Questionnaire (PHQ9), the Readiness to Change Questionnaire – Treatment
Version (RCQ-TV), and the Time-Line Follow Back (TLFB) measure. Clients were screened for inclusion based on the following criteria: 1) must be over the age of 18; 2) must endorse alcohol misuse (defined as having consumed 14 or more drinks in the past week and having a score of 8 or more on the AUDIT), and 3) must have access to a computer and the internet. Clients were excluded if they reported: 1) severe psychiatric illness (e.g., psychosis, severe depression), 2) high risk of suicide or 3) severe problems with drugs.

Clients who met basic eligibility during the online screening were redirected to the Online Therapy Unit telephone-screen booking platform. There, clients scheduled a telephone screening interview with one of the Online Therapy Unit screeners. In the telephone screening interview, clients were excluded from further participation if they reported: 1) suicidal ideation, 2) severe depression or indications of other severe medical or mental health conditions, 3) severe drug use problems (other than alcohol), 4) low motivation to participate in online treatment, 5) ongoing or impending significant mental health treatment, 6) lack of or inconsistent access to a computer and internet at home or a private place for the duration of treatment, and, 7) plans to reside outside of Canada for the duration of treatment. Clients who still met the eligibility requirements after the telephone screen were then randomized by the interviewer, while still on the phone, to one of four conditions (see Figure 1).

Condition 1: Assessment Interview and Guidance

Condition 2: Assessment Interview and No Guidance

Condition 3: No Assessment Interview and Guidance

Condition 4: No Assessment Interview and No Guidance
Of direct significance to the study at hand, the interviewer then conducted a 30-minute in-depth assessment interview with participants randomized to conditions 1 and 2. Specifically, participants were administered the AUD section of the Structured Clinical Interview DSM-5 (SCID-5; First et al., 2016). The SCID was developed as a standardized measure to increase the reliability of diagnostic assessment as well as to minimize clinical judgement in diagnoses (First et al., 2016). Interview questions were constructed based upon specific DSM-5 criteria which are provided alongside each corresponding question (First et al., 2016). The SCID created for assessment of AUD is comprised of 11 questions based on the 11 diagnostic criteria defined in the DSM-5.

After the assessment interview, these clients were provided with a username and temporary password and were informed that they will have access to the ICBT course on the second Monday following the interview. Clients who were randomized to conditions 3 and 4,
completed the same online screening as well as follow-up brief screening questions to determine eligibility, but did not receive an assessment interview. As such, these clients were immediately provided with their username and temporary password as well as given the same access date to the ICBT course (second Monday following the interview). Of note, to maintain a clear distinction between groups 1 and 2 who received a subsequent assessment interview and groups 3 and 4 that did not, efforts were made to keep conversation throughout the telephone screening as brief as possible.

Before accessing the ICBT course with their username and password, all clients were presented with a new consent form (one consent form for those randomized to having guidance, and another for those randomized to no guidance) explaining the nature of the treatment. At this point, prior to treatment start, clients were administered the TLFB, the PHQ-9 and the RCQ-TV measure once again. It is with this data that the comparisons were made to responses gathered at the initial online screening questionnaire.

While not of direct relevance to the research questions answered in this proposal, clients in all conditions received an ICBT program called Alcohol Change Course, an alcohol intervention targeting alcohol misuse. The Alcohol Change Course is offered on the Online Therapy Unit website (www.onlinetherapyuser.ca), a government and research-funded unit that specializes in delivering ICBT. The course consists of 12 online lessons, based on the foundations of CBT and RP, to be completed over 8 weeks (Sundström et al., 2020). Lessons are made accessible in sequential order – meaning that Lesson 1 must be completed before participants can move on to Lesson 2. Clients are also provided with subsequent learning material, intended to facilitate skill acquisition, after each lesson to be completed as homework. Throughout the 8-week Alcohol Change Course, clients in all conditions receive regular
automatic emails informing them of upcoming lessons. Those in conditions 1 and 3 also received guidance from a health educator through weekly online messages that take place on a secure message system on the Online Therapy Unit website. In the Guidance condition, phone calls were only made if there was a significant clinical issue, e.g., a sudden increase in symptoms, or a client’s misunderstanding of an email. Health educators spend roughly 15 minutes per week/per client with those in conditions 1 and 3. In conditions 2 and 4 where clients did not receive guidance, phone calls were only made in the case of a significant clinical issue requiring immediate attention, such as a sudden increase in symptoms of anxiety or depression. Weekly and in both groups, clients completed a brief questionnaire assessing their alcohol use, depression, and anxiety before beginning each new module. These questionnaires allowed for systematic and frequent monitoring of the client’s symptoms.

**Measures**

**Online Screening Measures**

Clients completed a number of measures during online screening including the AUDIT, PACS, GAD-7, DUDIT, and SDS. The AUDIT is a measure used to identify current unhealthy alcohol use, defined as harmful or hazardous consumption (WHO, 2019). The AUDIT also identifies alcohol dependence and some specific consequences of harmful drinking (WHO, 2019). The PACS is a 5-item self-administered instrument designed to assess craving based on the frequency, intensity, and duration of thoughts about drinking (Flannery et al., 1999). Ability to resist drinking is also assessed with PACS (Flannery et al., 1999). Symptoms of anxiety were assessed with GAD-7, a seven-item self-report questionnaire (Löwe et al., 2008). To screen clients for issues with drug use, the 11-item self-report questionnaire, DUDIT, was administered (Voluse et al., 2012). Lastly, the SDS is a 3-item self-report measure designed to assess
functional impairment, occurring due to symptoms, in three domains: work/school, social life, and family life (Sheehan et al., 1996).

**Primary Outcome Measures**

**Time-Line Follow Back: Preceding Week Alcohol Consumption.**

The repeated 7-day Time-Line Follow Back (TLFB) is a web-based, self-administered version of the original TLFB, an instrument commonly used to measure retrospective alcohol consumption (Hoeppner et al., 2010). The TLFB can be used to collect data on drinking over a period of up to 12 months (Hoeppner et al., 2010). This measure has been recognized as having strong construct validity. There is evidence, however, that discrepancies are positively correlated with the length of time covered in the recall, such that briefer length of time recalled leads to more accurate assessments (Hoeppner et al., 2010). The 7-day TLFB was created to allow for increased frequency of TLFB administration and shortened length of recall intervals. The 7-day TLFB has proven to more accurately capture participants drinking in terms of both frequency and volume when compared to a 30-day version, thereby serving as a more reliable tool when studying the processes of drinking behaviours (Hoeppner et al., 2010).

**Readiness to Change Questionnaire: Revised Treatment Version.**

The Revised Readiness to Change Questionnaire: Treatment Version (RCQ-TV) is a 12-item self-report questionnaire designed to measure motivation to change among hazardous and harmful drinkers seeking alcohol-treatment (Heather & Hönekopp, 2008). The RCQ-TV measures the “stage of change” reached by the excessive drinker (Heather & Hönekopp, 2008). The stages of change exist as three subscales labelled; Precontemplation (P), Contemplation (C), and Action (A). Each subscale is assessed by 4 items referring to motivation to reduce or abstain
PRE-TREATMENT CHANGE IN AUD

from drinking (Heather & Hönekopp, 2008). The questionnaire consists of statements pertaining to the drinkers’ thoughts about their drinking behaviour and their drinking habits in general, for example, “I am actively working on my drinking problem”. Scoring consists of responses on a Likert scale, with responses ranging from: Strongly Disagree = (1) Disagree = (2), Unsure = (3), Agree = (4), and, Strongly Agree = (5). The scale to which each item belongs is indicated by a ‘P’, ‘C’ or an ‘A’ on the right-hand side of the questionnaire, and the subjects score for the item is to be entered in the space provided (Heather & Hönekopp, 1993). The Stage of Change Designation is then made by identifying the highest score among the three scale scores. Notably, the current study analyzed only the “Action” items to measure variation in motivation to change. This measure has demonstrated good internal consistency of all 3 subscales, satisfactory test-retest reliability (Heather & Hönekopp, 2008), as well as good criterion and construct validity (Heather et al., 1999).

Patient Health Questionnaire-9 (PHQ-9).

The PHQ-9 is a self-report questionnaire used to assess depressive symptoms occurring over the past two weeks (Kroenke et al., 2001). The instrument consists of nine items directly based on the DSM-IV diagnostic criteria of depressive disorders. Scoring is conducted by calculating the summation of response items. Response items are rated on a 4-point Likert scale with 0 indicating “not at all,” 1 indicating “several days,” 2 indicating “more than half of the days,” and, 3 indicating “nearly every-day.” Sum scores range from 0-4, 5-9, 10-14, 15-19, and above 20 (Kroenke et al., 2001). PHQ-9 scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe, and severe depression, respectively (Kroenke et al., 2001). The PHQ-9 scale has been found to have similar sensitivity and specificity compared with other common
depression measures, as well as strong internal consistency and construct validity (Kroenke et al., 2001).

**Analyses**

All analyses were completed using Statistical Package for the Social Sciences version 23 (SPSS). Demographic variables, such as age and gender were examined using between-group t-tests to examine continuous variables and chi-square to examine categorical variables. Shapiro-Wilks test was used to assess the distribution of continuous variables. Generalized estimating equations (GEE) were used to measure the effect of the assessment interview on drinks preceding week and number of heavy drinking days (HDD; defined as more than 3 drinks in one day for women, and more than 4 drinks in one day for men). GEE analyses allow for both measurements of changes over time while taking within-subject variance into consideration. A negative binomial distribution was used when conducting the GEE since it is considered optimal when analyzing alcohol consumption data (Horton et al., 2007). Cohen’s d effect sizes for the within-group effects were calculated based on the estimated marginal means taken from the GEE models to help interpret the results. GEE analyses were also used to measure the effect of group on PHQ-9 scores and to measure changes in four items of the Action category of RCQ-TV. To compare the rates of abstinence between groups at pre-treatment, a chi-square test was run.

**Results**

**Distribution of the Data**

Shapiro-Wilks test showed a significant departure from normality on all primary measures and secondary measures (Drinks at Screening, W(76)= 0.842, p= < 0.001, Drinks at Pre-treatment, W(76)= 0.934, p= 0.001, HDD at Screening, W(76) = 0.910, p= < 0.001, HDD at
Pre-treatment, (76)= 0.913, p= < 0.001, PHQ9 at Screening, W(76)= 0.96, p= 0.017, PHQ9 at Pre-treatment, W(76)= 0.967, p= 0.043). To confirm, skewness and kurtosis values were also calculated. TLFB Screening had a skewness of 1.944 and kurtosis of 4.843, while TLFB pre-treatment showed a skewness of 0.751 and a kurtosis of 0.186. HDD screening showed a skewness of -0.120 and a kurtosis of -1.184, while HDD pre-treatment had a skewness of 0.058 and a kurtosis of -1.267. Lastly, PHQ-9 screening scores had a skewness of 0.106 and a kurtosis of -1.090, and PHQ-9 pre-treatment scores had a skewness of 0.340 and a kurtosis of -0.658. Values of less than -1 or greater than +1 are indicative of a skewed distribution, thus suggesting that reported drinks at screening were substantially skewed (Hair et al., 2017). As well, the kurtosis value of 4.843 for drinks at screening suggests a distribution that is non-normally peaked (Hair et al., 2017). A similar pattern of kurtosis was observed for HDD at screening and pre-treatment.

**Demographic Variables**

For the analyses, groups 1 and 2 receiving the assessment interview were combined into one group (“Interview group”) while groups 3 and 4 not receiving the assessment interview were combined into another group (“Non-Interview group”). In total, 87 clients completed the online and telephone screening. Of these clients, 43 were randomized to the interview group and 44 were randomized to the non-interview group. Eleven (12.6%) individuals did not complete pre-treatment measures and did not log in to access treatment. Five of these clients belonged to the interview group, and six belonged to the non-interview group, indicating there was no differential attrition.

The average age of the clients was 46.3 years (SD = 11.4) and 66.7% were female. Four significant group differences were present at baseline when comparing the two groups. The non-
interview group consumed significantly more alcohol at baseline (see Table 2), both in terms of drinks \((p=0.007)\) and in terms of heavy drinking days \((p=0.014)\). Those in the interview group had significantly higher drug use (see Table 2) \((p=0.033)\), and, lastly, participants in the interview group were more likely to report having previously sought help for drinking, and more likely to have participated in Alcoholics Anonymous (see Table 1).

### Table 1

**Sociodemographic Characteristics of Clients at Baseline**

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Interview Group</th>
<th>Non-Interview Group</th>
<th>Full Sample</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>t</th>
<th>p</th>
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<tbody>
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<tr>
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<td>42</td>
<td>95.5</td>
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<td>94.3</td>
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<td>Married/Living with partner</td>
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<td>Divorced/Separated/Widowed</td>
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<td>9</td>
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<tr>
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<td>23.3</td>
<td>10</td>
<td>22.7</td>
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<td>23</td>
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<td>Town/Village/Farm</td>
<td>10</td>
<td>23.2</td>
<td>17</td>
<td>38.6</td>
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<td>35</td>
<td>81.4</td>
<td>37</td>
<td>84.1</td>
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<tr>
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<td>18.6</td>
<td>7</td>
<td>15.9</td>
<td>15</td>
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<td>Years with alcohol problems</td>
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<td></td>
<td></td>
<td></td>
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<td>4</td>
<td>9.1</td>
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<td>1-2 years</td>
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<td>7</td>
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<td>Previously received treatment</td>
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<td>24</td>
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<td>Type of Treatment</td>
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<td>Alcoholics Anonymous</td>
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<td>34.9</td>
<td>4</td>
<td>9.1</td>
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<td>Individual psychotherapy/ counselling</td>
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<td>32.6</td>
<td>6</td>
<td>13.6</td>
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<td>9.1</td>
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<td>9.3</td>
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<td>4.5</td>
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Table 2

*Primary and Secondary Outcome Characteristics of Clients at Baseline*

<table>
<thead>
<tr>
<th>Baseline Characteristics</th>
<th>Interview Group</th>
<th>Non-Interview Group</th>
<th>Full Sample</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinks preceding week</td>
<td>32.60 17.90</td>
<td>46.55  28.31</td>
<td>39.6</td>
<td>24.61</td>
<td>5.04</td>
<td>0.007*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy drinking days</td>
<td>3.67   2.02</td>
<td>4.79    2.16</td>
<td>4.25</td>
<td>2.15</td>
<td>2.50</td>
<td>0.016*</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>AUDIT</td>
<td>24.35  6.03</td>
<td>24.95   4.77</td>
<td>24.66</td>
<td>5.40</td>
<td>0.52</td>
<td>0.604</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACS</td>
<td>17.44  6.75</td>
<td>18.18   5.24</td>
<td>17.82</td>
<td>6.00</td>
<td>0.57</td>
<td>0.569</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHQ-9</td>
<td>11.00  6.37</td>
<td>12.39   6.41</td>
<td>11.70</td>
<td>6.39</td>
<td>1.01</td>
<td>0.315</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>GAD-7</td>
<td>9.30   5.97</td>
<td>9.93    5.96</td>
<td>9.62</td>
<td>5.93</td>
<td>0.49</td>
<td>0.624</td>
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<tr>
<td>DUDIT</td>
<td>3.51   6.75</td>
<td>1.21    3.04</td>
<td>2.35</td>
<td>5.07</td>
<td>-2.17</td>
<td>0.033*</td>
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<tr>
<td>SDS</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol use has disrupted work/school</td>
<td>4.44 3.20</td>
<td>4.68  3.20</td>
<td>4.56</td>
<td>3.18</td>
<td>0.35</td>
<td>0.727</td>
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<tr>
<td>Alcohol use has disrupted social life/leisure</td>
<td>5.63 2.94</td>
<td>5.98  3.17</td>
<td>5.80</td>
<td>3.04</td>
<td>0.53</td>
<td>0.595</td>
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</tr>
<tr>
<td>Alcohol use has disrupted family/home responsibilities</td>
<td>5.56 3.20</td>
<td>6.02  2.98</td>
<td>5.79</td>
<td>3.08</td>
<td>0.70</td>
<td>0.486</td>
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</tbody>
</table>

*Note. AUDIT= Alcohol Use Disorders Identification Test; PACS = Penn Alcohol Craving Scale; PHQ-9= Patient Health Questionnaire-9; GAD-7= Generalized Anxiety Disorder 7-item Scale; DUDIT = Drug Use Identification Test; SDS = Sheehan Disability Scale.*
Primary Outcomes

In terms of primary measures, GEE analysis conducted for drinks revealed significant times effects, Wald’s $\chi^2 = 32.543$, $p<.001$, but did not reveal significant interaction effects, Wald’s $\chi^2 = 0.326$, $p=.568$. Similarly, for HDD, a significant time effect was observed, Wald’s $\chi^2 = 12.607$, $p<.001$, however no significant group interaction was found Wald’s $\chi^2 = .513$, $p=.474$. The pattern of results suggests that both groups reduced their drinks, as well as their HDD from screening to pre-treatment (see Table 3). A Chi square analysis found no significant differences between the groups regarding abstinence from alcohol at pre-treatment, $\chi^2 = .396$, $p = 0.529$.

Figure 2. Drinks at screening and pre-treatment by group
Table 3

*Primary and Secondary Outcomes at screening and pre-treatment*

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Screening</th>
<th>Pre-treatment</th>
<th>Within-group effect size</th>
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</thead>
<tbody>
<tr>
<td>Drinks preceding week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>M: 32.56</td>
<td>M: 23.46</td>
<td>D: 0.50</td>
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<tr>
<td></td>
<td>SD: 17.93</td>
<td>SD: 20.11</td>
<td></td>
</tr>
<tr>
<td>Non-Interview</td>
<td>M: 46.55</td>
<td>M: 31.18</td>
<td>D: 0.59</td>
</tr>
<tr>
<td></td>
<td>SD: 28.31</td>
<td>SD: 22.96</td>
<td></td>
</tr>
<tr>
<td>Heavy Drinking Days</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>M: 3.67</td>
<td>M: 3.06</td>
<td>D: 0.30</td>
</tr>
<tr>
<td></td>
<td>SD: 2.01</td>
<td>SD: 2.42</td>
<td></td>
</tr>
<tr>
<td>Non-Interview</td>
<td>M: 4.79</td>
<td>M: 3.60</td>
<td>D: 0.46</td>
</tr>
<tr>
<td></td>
<td>SD: 2.16</td>
<td>SD: 2.53</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>M: 11.00</td>
<td>M: 9.25</td>
<td>D: 0.27</td>
</tr>
<tr>
<td></td>
<td>SD: 6.37</td>
<td>SD: 6.02</td>
<td></td>
</tr>
<tr>
<td>Non-Interview</td>
<td>M: 12.39</td>
<td>M: 11.31</td>
<td>D: 0.16</td>
</tr>
<tr>
<td></td>
<td>SD: 6.41</td>
<td>SD: 6.59</td>
<td></td>
</tr>
</tbody>
</table>
Sensitivity Analysis

Two outliers in TLFB screening were identified, with one individual reporting a preceding-week alcohol consumption of 149 drinks, and another reporting preceding-week alcohol consumption of 126 drinks. These participants were deemed to be outliers as their z scores were above 3.29 (Tabachnik & Fidell, 2001). A sensitivity analysis was therefore conducted with both outliers removed. The GEE analysis revealed a significant time effect for TLFB $\chi^2=29.026, p<.001$, though no significant group interaction was found $\chi^2=.107, p=.744$. Regarding HDD, a significant time effect was found $\chi^2=23.767, p<.001$ but no significant group interaction was observed $\chi^2=.520, p=.471$.

Secondary Outcomes

Analyses for PHQ-9 (see Table 3) revealed similar results to the primary measures. GEE analysis for PHQ9 scores revealed a statistically significant effect for time ($\chi^2=7.688, p=.006$), however, no statistically significant interaction was found for group ($\chi^2=.446, p=.504$). Results showed a significant reduction in depressive symptoms from screening to pre-treatment in both the interview and non-interview group.

The GEE analysis conducted for Action items within the RCQ-TV revealed significant time effects for all four items (Item #5: $\chi^2=15.667, p<.001$, Item #8: $\chi^2=10.875, p=.001$, Item #9: $\chi^2=24.387, p<.001$, Item #12: $\chi^2=21.189, p<.001$) but no interaction effects (Item #5: $\chi^2=.480, p=.787$, Item #8: $\chi^2=.576, p=.750$, Item #9: $\chi^2=3.533, p=.147$, Item #12: $\chi^2=1.924, p=.382$). Each action item consists of a statement that endorse actively working on improving one’s problems with alcohol misuse (See Table 4).
Table 4

Movement in Action Items in RCQ-TV at screening and pre-treatment

<table>
<thead>
<tr>
<th></th>
<th>Interview Group</th>
<th>Non-Interview Group</th>
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<tr>
<td></td>
<td>Screening</td>
<td>Pre-treatment</td>
</tr>
<tr>
<td></td>
<td>M    SD</td>
<td>M    SD</td>
</tr>
<tr>
<td>Action #5:</td>
<td>3.42 0.82</td>
<td>3.77 0.70</td>
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<td>“Anyone can talk about wanting to do something about their drinking but I’m actually doing something about it.”</td>
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<td>Action #8:</td>
<td>3.40 1.11</td>
<td>3.75 1.04</td>
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<tr>
<td>“I’m actually changing my drinking habits right now (either cutting down or quitting)”</td>
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<tr>
<td>Action #9:</td>
<td>3.51 1.14</td>
<td>4.13 0.65</td>
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<td>“I have started to carry out a plan to cut down or quit drinking.”</td>
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<tr>
<td>Action #12:</td>
<td>3.44 0.96</td>
<td>3.96 0.85</td>
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<tr>
<td>“I’m actively working on my drinking problem.”</td>
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</table>
Discussion

Principle Findings

The purpose of the present study was to evaluate the impact of an in-depth assessment interview on pre-treatment changes prior to beginning ICBT for alcohol misuse. Research has suggested that individuals who seek treatment for alcohol misuse experience significant reductions in their drinking prior to beginning treatment. Factors that are directly responsible for these pre-treatment changes, however, are unclear. The current study hypothesized an assessment interview would increase motivation and enhance the clients’ willingness to positively change their drinking behaviours.

The current study found no significant interaction effects on either of the primary alcohol measures, TLFB and HDD, disconfirming the hypothesis. More specifically, those in the interview group and the non-interview group did not differ from online screening to start of treatment in drinks or having drinking days. These findings do not align with predictions made in previous research which examined the relationship between interviewer-client interaction and AR (Kaminer et al., 2008; Epstein et al., 2005). In Epstein’s study, they found that clients drastically reduced their drinking throughout the assessment process, such that 44% of the participants were abstinent before treatment start (Epstein et al., 2005). Similar findings were observed in Kaminer’s study, in which more than half of their participants reported being abstinent at the first treatment session (Kaminer et al., 2008). The assessment process in Epstein’s study was rigorous, with clients receiving three assessments prior to randomization for treatment, thus, leading to the hypothesis that a more comprehensive assessment may be indicative of greater significant change in pre-treatment behaviours. It is important to note that these studies did not experimentally manipulate assessment as the current study has done. The
current study does not provide evidence that a more comprehensive assessment is responsible for pre-treatment changes, although significant reductions in alcohol assumption were still observed across groups.

Despite the lack of significant group interactions, a time effect was observed for drinks and heavy drinking days. Both the non-interview group and the interview group improved substantially from screening to pre-treatment. At pre-treatment, participants consumed approximately 30% less alcohol than at screening (see Figure 2). This finding is consistent with previous research that observed a sharp decrease in alcohol consumption between screening and pre-treatment (Sundström et al., 2019). In the current study, 12 participants (15.8%) were completely abstinent from alcohol at pre-treatment. These results, like findings obtained by Sundström et al., and Kaminer et al., are consistent with an AR effect, although, it cannot yet be confirmed what aspects of assessment foster these positive changes. It would appear that the online screening followed by the brief telephone screening was efficient for creating AR.

Depression in both the interview and non-interview group improved significantly from screening to pre-treatment, though no group interaction was observed. In previous research in which assessment was manipulated in the treatment of social anxiety, both the interview and the non-interview group experienced reductions in their depressive symptoms at post-treatment (Boettcher, Berger, & Renneberg, 2012). However, Boettcher and colleagues found that participants in the interview group showed significantly greater improvements than participants in the non-interview group, suggesting that the assessment interview was predictive of greater change (Boettcher, Berger, & Renneberg, 2012). This finding is inconsistent with the current study as assessment did not significantly contribute to decreases in symptoms of depression at pre-treatment. Plausibly, the assessment interview in the current study may be predictive of
greater long-term outcomes and may then align with the previous research. Of note, although changes in depression in the current study are significant, improvements in clients were not clinically significant, as the majority of clients remained in the clinical range at pre-treatment.

Time effects, but not group effects, were observed for both the non-interview and interview group for level of motivation. Motivation levels were assessed by observing participants endorsement of Action items in the RCQ-TV. Participants were in higher agreement with statements such as, “I am actively working on my drinking problem,” and “Anyone can talk about wanting to do something about their drinking but I’m actually doing something about it,” at pre-treatment than at screening. This finding provides additional evidence that both screening and assessment processes may have the propensity to increase motivation. Considering that each group experienced an increase in motivation, it is plausible that the length of assessment does not play as prominent of a role as previously hypothesized.

Limitations and Strengths

The study is not without limitations. First, as previously mentioned, the total number of individuals participating in this study was 87, being that this was only an initial sample from a randomized factorial trial projected to include 300 participants. Further, 11 of these participants did not log in to access treatment, and therefore did not complete pre-treatment measures. As such, data was acquired from 76 participants, resulting in a relatively small sample which limits the generalizability of the results. Secondly, all data collection was based on self-report measures which may be subject to biases (Del Boca & Noll, 2000).

Notably, five significant differences existed between the randomized groups at baseline. Those in the interview group were more likely to have previously received treatment, to have
previously visited Alcoholics Anonymous and to have scored higher on measurements of drug use. As well, individuals in the non-interview group had significantly higher preceding-week alcohol consumption, both in terms of drinks and in terms of heavy drinking days. In particular, differences amongst the groups on primary outcome measures causes great limitations to the interpretation of the results.

Although no interaction effect was observed, at face-value, the results suggest that the non-interview group experienced a greater reduction in preceding-week alcohol consumption than did the interview group (See Table 3). Specifically, clients in the non-interview group reduced their preceding-week alcohol consumption by 15 drinks from screening to pre-treatment, while the interview groups reduced theirs by 9 drinks. Of note, it is likely that this greater reduction in the non-interview reflects regression to the mean (RTM), a statistical phenomenon that can make natural variation in repeated data look like real change (Barnett et al., 2004; Twisk et al., 2018). In the current study, the non-interview group consumed significantly higher amounts of alcohol than the interview group at screening, 13.9 additional drinks, precisely, which is consistent with the RTM phenomenon, where extreme values tend to be followed by values closer to the mean (Barnett et al., 2004; Twisk et al., 2018).

Regardless of limitations, the study has many strengths. This study is the first to experimentally manipulate assessment in the pre-treatment stage of ICBT for alcohol misuse, thus, contributing to the understanding of AR and its implications for routine practice. Second, randomized control trials are regarded as one of the most valued research methodologies for evaluating effectiveness of interventions (Houle, 2015). The random assignment of clients prevents both selection and allocation bias, producing comparative groups and outcomes (Suresh, 2011). In addition, the use of standardized measures allows for increased interpretability
of results. Last and most importantly, the study took place in a routine clinic with a clinical sample, thus, providing significant implications for routine practice. The dissemination of factors in pre-treatment that are indicative of significant positive changes has facilitated a greater understanding of how to offer ICBT courses for alcohol misuse.

**Future Research Directions**

Despite finding no significant differences between the conditions, the results are indicative of positive behavioural change occurring between screening and treatment start and valuable inferences can be made about the data. A substantial improvement from screening to pre-treatment was observed across conditions, however, the interview group did not experience greater improvements than the non-interview group. Therefore, it is plausible to suggest that the length and comprehensiveness of assessments may not be the primary determinant of beneficial behavioural changes in pre-treatment. Possibly, increasing the frequency rather than comprehensiveness of assessments may be the superior alternative in promoting these changes (Clifford et al., 2007).

Further, it may be the online and telephone screening that all clients completed that possesses a causal relationship with the positive pre-treatment changes. Clients completed a battery of questionnaires in the online screening process that required them to reflect on their drinking behaviours. Reflecting on one’s drinking behaviour may increase awareness of their misuse of alcohol thus increasing motivation to make a change (Epstein et al., 2005). The reflection encouraged during the online and telephone screening may have been the catalyst of change for clients in the current study. Further investigation of the direct effects of screening processes would be advantageous.
Changes in addictive behaviour occur frequently without professional intervention and it is possible that positive changes observed in the pre-treatment phase occur due to factors that are removed from the clinic (Orford et al., 2006). For example, previous research has found that significant decreases in alcohol consumption are noted several weeks before an initial telephone screening, suggesting that the decision itself to sign up for treatment may lead to the successful behavioural changes (Stasiewicz et al., 2013). In other words, clients may feel motivated by their commitment to seeking out treatment, causing them to decrease their alcohol intake drastically in the following weeks prior to treatment start (Stasiewicz et al., 2013). In the current study, clients began intake processes with intentions of improving their alcohol behaviours and their level of motivation reflected this. Scores on the Readiness to Change questionnaire indicated that the majority of the clients were already contemplating the severity of their alcohol misuse at screening. Thus, it is possible that improvements observed in the current study would not be achieved in a sample of less-motivated individuals. These findings highlight the need for additional studies that isolate motivation and self-efficacy as a predictor of change.

In sum, there are many opportunities for future research endeavours. First, as previously mentioned, it would be valuable to experimentally manipulate the frequency of assessments, rather than comprehensiveness. It would be constructive to compare the effects of online screening and telephone screenings to more clearly understand their value in predicting pre-treatment changes, as well as to expand our understanding of human reaction on AR. Qualitative research investigating individuals’ experiences following the decision to seek out treatment and their experience during the pre-treatment stage would aide in our understanding of motivation and commitment to change. Lastly, a replication of the current study would be highly valuable,
on the assumption that significant baseline imbalances may have diminished the ability to make clear conclusions about the results.

**Conclusion**

This study is to our knowledge, the very first to experimentally manipulative assessment in the treatment of alcohol misuse. AR has been offered as a possible explanation for pre-treatment drinking changes (Epstein et al., 2005) however, the current results suggest that AR cannot provide a full explanation of pre-treatment change. Significant pre-treatment changes were observed in this study regardless of condition, indicating that the assessment interview does not create more prominent behavioural changes than an online and telephone screening. These results have important implications for routine practice as they contribute to our understanding of how to properly allocate resources when offering ICBT for alcohol misuse. It seems that time can be saved by eliminating the assessment interview from the pre-treatment process thus allowing more time to be invested in the screening of clients. However, this study focused solely on the short-term effects of the assessment interview. It may be that clients who received the assessment interview will be more likely to complete treatment or to experience greater outcomes. Further, the larger factorial trial in which this study is embedded may find that there is an interaction between the assessment interview and receiving guidance throughout treatment. Plausibly, clients who received an assessment interview and who receive guidance throughout treatment may be more likely to engage in meaningful interactions with their health educator, which may be predictive of greater outcomes. Thus, no concrete conclusions about the assessment interview can be made as the long-term effects are yet to be determined.

Formal treatments are embedded within a much larger system of change-promoting conditions that occur prior to treatment start (Orford, 2006). In the current study, it seems that
the online and telephone screenings in combination with moderate to high levels of motivation contribute to positive behavioural changes in pre-treatment. Elements such as: reflecting on one’s alcohol misuse, the commitment to seeking out treatment, and screening processes may all play a prominent role in pre-treatment changes (Orford et al., 2006; Stasiewicz et al., 2013). In the current study, the small sample size and presence of significant baselines differences may have hindered the interpretation of the results. As such, it is plausible that an assessment interview may also be predictive of significant pre-treatment change in a replication of the study.

In conclusion, data from the current study adds to a small but growing body of literature that emphasizes the importance of positive pre-treatment change. Results from this study provide some clarification of which pre-treatment procedures should best be applied in the delivery of ICBT for alcohol misuse, such as the online and telephone screenings. Continued exploration of these elements and others that may be predictive of pre-treatment change are warranted. Overall, the results suggest that continued systemic investigation of predictive mechanisms of pre-treatment change is essential to improving the efficacy and efficiency of alcohol misuse treatment in routine practice.
References


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Appendix

The University of Regina Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol, or related documents.

Any significant changes to your proposed method, procedures or related documents should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS
In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for the renewal and closure forms:
https://www.uregina.ca/research/for-faculty-staff/ethics-compliance/human/ethicsforms.html