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## Boredom Prone or Nothing to Do? Distinguishing Between State and Trait Leisure Boredom and its Association with Substance Use in South African Adolescents

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### Abstract

Reducing adolescent substance use is important in South Africa, a developing nation with increasing adolescent substance use, lack of leisure/recreation opportunities, and high rates of adolescent discretionary time. Previous research suggests leisure boredom and adolescent substance use co-occur in this setting. Using longitudinal data from 2,580 SA adolescents as they progressed from the 8<sup>th</sup> to 11<sup>th</sup> grade, the current study disentangles the associations of trait and state leisure boredom with substance use, and examines how ability to restructure boring situations moderates those associations. On average, individuals with higher trait boredom used more substances, and on occasions when state boredom was high, the prototypical adolescent used more substances. Although restructuring did not moderate these associations, greater ability was associated with lower substance use independent of leisure boredom. Findings illustrated the importance of considering how trait and state aspects of leisure may contribute to adolescents' risk behavior and addressed through preventive intervention.

### Keywords

adolescence; leisure boredom; multi-level modeling; South Africa; substance use

## Introduction

Adolescent substance use is a global public health problem associated with a variety of short- and long-term outcomes such as risky sexual behaviors (Flisher, Ziervogel, Chalton, Leger, & Robertson, 1996), academic challenges and school dropout (Sutherland & Shepherd, 2001), and adult abuse and dependence (Grant et al., 2006). A number of predictors and correlates of adolescent substance use have been well-documented and include parental monitoring (Dishion & McMahon, 1998) and time spent with risky peers (Caldwell & Smith, 2006; Osgood, Wilson, Bachman, O'Malley, & Johnston, 1996). Research suggests that substance-using adolescents experience greater levels of leisure boredom than their non-using counterparts (Iso-Ahola & Crowley, 1991; National Center on Addiction and Substance Abuse, 2003).

Within South Africa (SA), adolescents have limited leisure and recreation opportunities (Caldwell et al., 2004) despite experiencing a high incidence of discretionary time (Kingdon & Knight, 2004; Wegner & Magner, 2002). The mismatch of opportunity with need creates fertile ground for experiencing leisure boredom as well as engaging in substance use, both documented problems in SA (Wegner, Flisher, Chikobvu, Lombard, & King, 2008). Furthermore, leisure boredom seems to be a contributing factor to substance use among SA adolescents (Sharp et al., 2011; Wegner, Flisher, Muller, & Lombard, 2006). Although the relation between leisure boredom and substance use seems well supported, little is known about the mechanisms by which leisure boredom may contribute to substance use. Much previous work related to leisure boredom and substance use has used cross-sectional, between-person approaches to generally understand the relation. However, leisure is dynamic, with individuals experiencing more or less boredom at different times or in different situations. Tracking these within-person changes requires collection and analysis of longitudinal data.

Fully understanding how leisure boredom contributes to substance use is complex. One reason for this complexity is the difficulty in understanding how trait and state boredom operate and interact to create a situation where substance use is more likely. That is, one may question whether or how an adolescent's state boredom (i.e., situational boredom) is related to substance use relative to his or her trait boredom (i.e., typical level of boredom no matter what the situation). For example, when individuals recognize they are bored in a leisure activity (state), one would expect they would actively try to restructure the situation to alleviate the experience of boredom, as posited by self as entertainment theory (Mannell, 1984) or from the perspective of Flow Theory (Csikszentmihalyi, 1991). Flow theory suggests that boredom is a context-specific experience dependent upon the activity engaged in and influenced by environmental factors. Those who cannot restructure their time to engage in more interesting things are more likely to experience boredom (Barnett & Klitzing, 2006). Thus, the ability to restructure a boring situation into something less boring may shed light on the mechanisms of boredom and substance use.

Understanding an individual's response to leisure boredom from trait and state perspectives can only be unraveled using longitudinal data. Such data allows for a better understanding of how developmental and conceptual processes unfold and interact over time. Making use of

longitudinal data obtained from a large sample of SA high school students, the current study begins to disentangle the association of both trait and state leisure boredom with substance use, and how those associations are influenced by individuals' ability to restructure states of boredom into something more interesting.

## Substance Use in South Africa

In SA, adolescent drug use is widespread. The most recent SA national Youth Risk Behavior Survey (Reddy et al., 2010) found that 30% of 8<sup>th</sup> to 11<sup>th</sup> graders surveyed had used tobacco in their lifetime and 21% were current smokers. Alcohol use rates were even higher, with 50% having ever consumed alcohol, 35% using alcohol within the past month, and 29% binge drinking within the past month. Rates of other substances were lower, with 13% of students ever using marijuana, 12% ever using inhalants, and 7% ever using methamphetamines (known as tik in SA). Flisher, Parry, Evans, Muller, and Lombard (2003) surveyed students in grades 8 through 11 in Cape Town, SA and found past month substance use rates to be 31% for alcohol, 27% for tobacco, and 7% for marijuana with increasing rates of use between grade 8 and grade 11 (except for Black females). Adolescents contributing data to the current study attended schools within the Western Cape (which includes Cape Town); an area reporting rates of substance use greater than the national average (Reddy et al., 2010).

SA adolescents have demonstrated similar patterns of initiation to those of US adolescents where alcohol and/or tobacco is tried first, followed by marijuana, inhalants, and other illicit substances. However, SA adolescents transition through substances at a faster rate (Grant et al., 2006; Kandel, 2002; Patrick et al., 2009). In addition to the speed of transition through substances, the age of substance use initiation is concerning. In SA, 15% of SA adolescent males report they initiated alcohol use prior to 13 years of age, and 9% used tobacco younger than 10 years old (Reddy et al., 2010).

In general, adolescent substance use has been associated with risk behavior as well as other negative outcomes including a delay in important age-related transitions and interference with normal development (Baumrind & Moselle, 1985; Windle & Windle, 2003), delinquency, and adult addictions (Duncan, Alpert, Duncan, & Hops, 1997). One longitudinal study to assess the effect of adolescent alcohol use on young adult outcomes found chronic alcohol use was associated with higher overall levels of alcohol use in young adulthood as well as delinquent behavior (Duncan et al.). They also found adolescents who had the rapidest increase in substance use demonstrated a higher rate of use in young adulthood suggesting "increases in alcohol use during adolescence... channel individuals into environments that sustain and promote more alcohol use and related problem behaviors" (p. 46).

## Leisure Boredom and Substance Use

Although recent statistics for SA adolescent free time are not available, time diary data from 1989 found that 30% of SA adolescent days were spent in leisure (Møller, 1991). More recent work has found high levels of leisure boredom in SA adolescents, with higher levels among Black adolescents, females, and younger adolescents (Wegner et al., 2006).

Additionally, approximately 10% of mixed race (i.e., Coloured) SA adolescents experience high levels of leisure boredom (Miller et al., 2014). Some have suggested that the lack of available community recreation and leisure resources may result in an under-stimulating environment, which in turn fosters unsupervised and unstructured activities with peers -- a context associated with risk behavior (Wegner, 2011).

Leisure boredom has been associated with adolescent male binge drinking in SA adolescents with nearly 50% of at-risk youth sampled stating they used substances to alleviate the negative experience of boredom (McIntosh, MacDonald, & McKeganey, 2005; Ziervogel, Ahmed, Flisher, & Robertson, 1998). However, Wegner and colleagues (2006) found conflicting results from a survey of adolescents in Cape Town, SA. They found that although adolescents reported experiencing leisure boredom, there was no significant association between it and substance use.

To further understand the meaning of leisure boredom and risk behavior among SA adolescents, Wegner (2011) collected qualitative data through a combination of photo-elicitation and focus groups where she gave adolescents a camera and asked them to photograph peers having fun. She then used those images to structure focus group discussions around boredom and risk behavior. Four themes emerged from the focus groups including (1) a contextually dependent theme of “no entry-no exit” relating to the limited leisure resources and opportunities in the community; (2) “too much free time, but you have time for yourself” where participants value autonomy in leisure, but also use this unsupervised time to engage in risk behavior such as substance use; (3) “boredom is dangerous” where participants reported being understimulated in their free time and engaged in risk behavior because there was nothing to do; and (4) “every person must get bored,” acknowledging that boredom is experienced by everyone and it can facilitate engagement in both positive and negative behaviors (p. 20).

Wegner’s work illustrates Larson and Richards’ (1991) Understimulation Model of leisure boredom. From this perspective, regardless of setting, adolescents may experience leisure boredom “in any situation that is repetitive, habituated, and unchallenging” (p. 420). In addition, the situation must also account for the dynamic and developing cognitive abilities of adolescents. Adolescents report experiencing boredom due to both internal factors (e.g., difficulty identifying free time interests) and external factors (e.g., being forced to do an activity), further demonstrating the need to understand both types of influences (Barnett, 2011). Although there is a general understanding that leisure boredom and substance use co-occur (e.g., Iso-Ahola & Crowley, 1991; Wegner et al., 2006), it is not yet clear whether the relations should be attributed to person characteristics (traits, i.e., the individuals who are bored are the substance users) or situational factors (states, i.e., the boring moments are the moments an individual uses substances).

## Disentangling Trait and State Influences

Although the conceptual distinction between trait and state is not novel to leisure studies, rarely are the longitudinal data (i.e., > 5 occasions) that allow for separation and analysis of trait and state components available. This approach has historically been used within

personality psychology to integrate personality traits with dynamic states and situational factors to predict behavior more effectively (Ram, Morelli, Lindberg, & Carstensen, 2008). Mischel's (1968) seminal text, *Personality & Assessment*, argued that personality traits are poorly associated with behavior prediction because behavior is multi-dimensional and largely determined by contextual factors. Rather than personality traits, Mischel posited individuals have predictable situation-specific tendencies. By removing intraindividual stability (i.e., average), the remaining variability is "...seen as potential signatures of the underlying stable personality processes that generate them..." and result in valuable information "...rather than as measurement errors to be aggregated away." (Shoda, Mischel, & Wright, 1994, p. 682). This situational perspective ultimately led to methods of research design and analysis that facilitate the investigation of behavioral change over time and the dynamic interplay between individual and context. Techniques to decompose measures into trait and state (such as those used within the current study) accommodate both the personality and situation perspectives by providing a trait and situation-specific state representation (Ram et al., 2013).

Similar to personality, boredom is a multi-faceted and complex phenomenon that can manifest as a stable trait and a context-specific state (Perkins & Hill, 1985; Vodanovich, 2003). Even as early as the 1970's, a distinction was made between these two types of boredom with Bernstein's (1975) separation into response (i.e., state) and chronic (i.e., trait) boredom. Prior research has tended to study boredom as a response to situational or individualistic factors (e.g., lack of stimulating context, Caldwell, Darling, Payne, & Dowdy, 1999) or as a personality characteristic (Farmer & Sundberg, 1986), but not both. Additionally, measures of leisure boredom have typically been collected at one time point, therefore being used to make between-person comparisons of trait boredom. Unfortunately, such aggregate results may not be valid at the within-person or state level and furthermore, moderators may differentially influence trait and state constructs (Molenaar, 2004). This potential for individual heterogeneity further illustrates the need to examine both trait and state influences to tease out any discrepant effects (Borsboom, Mellenbergh, & Van Heerden, 2003; Hamaker, Nesselroade, & Molenaar, 2007).

To adequately examine the interplay of trait and state leisure boredom on an outcome, intensive longitudinal studies are needed (e.g., Larson & Richards, 1991; Scott, Vasilenko, Skiyko, & Caldwell, 2012). These types of studies are uncommon within the leisure boredom literature despite the expressed need that such a distinction should be made and analyzed (Larson & Richards, 1991). Only one identified previous study has attempted to understand between- and within-person influences of adolescent leisure boredom and its association with substance use using longitudinal data. Sharp and colleagues (2011) used baseline levels of leisure boredom (between measure) and the difference from baseline and each of seven measurement occasions (within measure) to predict past month use of three substances in adolescents. Results identified positive associations at both a between- and within-person level. At both levels, higher levels of leisure boredom were associated with a higher likelihood of past month alcohol, tobacco, and marijuana use. Sharp and colleagues' study provided an initial view into this association but focused on how change in leisure

experience was associated with change in substance use over time rather than understanding leisure experience from a trait and state perspective.

This paper extends the work of Sharp et al. by using longitudinal data to tease apart the influence of being bored in leisure in general (trait) in relation to being bored during a particular time frame (state), and their relations with substance use outcomes. In addition, we also try to understand these relations by using a measure of an adolescent's ability to restructure perceptions and participation in a boring situation.

### Trait boredom

The Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986) measures an individual's likelihood of experiencing boredom from a trait perspective. Boredom proneness has been associated with mood disorders (Watt & Vodanovich, 1992), anger and aggression (Dahlen, Martin, Ragan, & Kuhlman, 2004), pathological gambling (Blaszczynski, McConaghy, & Frankova, 1990), lower job satisfaction (Kass, Vodanovich, & Callander, 2001), decreased life satisfaction (Farmer & Sundberg, 1986), higher levels of sensation seeking attributes (Zuckerman, 1979), and lower levels of autonomy (Farmer & Sundberg, 1986).

Larson and Richards (1991) used experience sampling methodology to collect boredom measures in middle school students. These youths reported high levels of boredom across school and non-school settings, suggesting an individual characteristic may at least partially be driving the experience of boredom. Caldwell and Faulk (2013) suggested this trait type of boredom is unlikely to produce the same developmental benefits as meaningful leisure engagement.

### State boredom

Mikulas and Vodanovich's widely used definition of leisure boredom refers to "a *state* [emphasis added] of relatively low arousal and dissatisfaction which is attributed to an inadequately stimulating environment" (1993, p. 1). This definition is supported by the Understimulation Model and other research that suggests boredom may be a response to a mismatch of challenge and skill within an activity (e.g., Csikszentmihalyi, 1991; Larson & Richards, 1991). Similarly, leisure boredom has also been defined as a negative state reflecting the "subjective perception that available leisure experiences are not sufficient to instrumentally satisfy needs for optimal arousal." (Iso-Ahola & Wessinger, 1990, pp. 4-5). Empirically, although results previously presented from Larson and Richards' (1991) study illustrated trait differences, state differences were also evident. When students were asked why they were bored, explanations centered around environmental factors, usually an uninteresting classroom topic.

Specific to leisure, Caldwell and colleagues (1999) analyzed causes of leisure boredom in U.S. 8<sup>th</sup> graders and found both psychological and social control perspectives predicted boredom, but situational factors explained more of the variance in boredom "suggesting that adolescents are more prone to be influenced by "the moment" rather than those presumably stable individual difference characteristics they possess" (p. 116). For example, adolescents who reported engaging in an activity because there was nothing else to do also reported

higher levels of leisure boredom. Likewise, Palen and colleagues (2010) collected qualitative data from focus groups of SA adolescents who mentioned boredom or disinterest as an interpersonal constraint in over half of the 15 focus groups conducted.

## Restructuring to Alleviate Boredom

Definitions of leisure boredom previously presented included characteristics of low arousal (Mikulas and Vodanovich, 1993) and the absence of optimal arousal (Iso-Ahola & Weissinger, 1990). When adolescents experience low or sub-optimal arousal, they may attempt to regulate the situation to become more satisfying (i.e., more optimally arousing). Iso-Ahola (1980) also refers to optimal arousal as level of interest, which has been linked to experiences of boredom. Hunter and Csikszentmihalyi (2003) argued that boredom is the absence of interest and refer to interest as “the drive an individual uses to learn, discover, and grow...” (p. 29). They found interested adolescents reported higher levels of self-esteem, felt more optimism and less pessimism, and perceived more of an internal locus of control than their bored peers. Hunter and Csikszentmihalyi also suggested that “attraction to ‘cheap thrills’ may originate from a general inability to structure experience in pleasurable ways” (p. 29). Thus this concept of ability to structure an experience to get pleasure suggests, by extension, that if an adolescent is involved in a boredom situation, he or she should be motivated to *restructure* the situation to become more pleasurable but not risky.

Similarly, Hamilton, Haier, and Buchsbaum (1984) developed the Boredom Coping Scale to represent the ability to “restructure one’s perceptions and participation in potentially boring activities so as to decrease boredom” (p. 183). The ability to cope with boredom, or restructure an understimulating activity to become more interesting, means that an individual needs to possess the ability to plan or organize activity participation and to overcome barriers that may hinder participation. By taking activities and turning them into engaging, active experiences, adolescents are taking initiative, viewed as a central aspect of positive youth development. An adolescent’s ability to turn a boring situation into an interesting one, an important developmental skill for participating in healthy leisure activities (Caldwell, Baldwin, Walls, & Smith, 2004; Larson, 2000), may help explain the association between leisure boredom and substance use.

Christopherson, Jones, and Sales (1988) suggested that individuals who engage in substance use to alleviate boredom would benefit from “prevention approaches that encourage healthier structuring of free time” (p. 151). This view is supported by recent findings suggesting that engaging in healthy leisure activity is protective against substance use behaviors (Weybright, Caldwell, Ram, Smith, & Jacobs, 2014). Thus, individuals who possess the ability to restructure their boring experiences may be more easily able to identify experiences of leisure boredom and react by engaging in meaningful activities rather than substance use behaviors.

## The Current Study

Wegner and Flisher (2009) stated “the phenomenon of leisure boredom has received relatively little attention throughout the world” and emphasized the need for additional

studies analyzing leisure boredom and substance use with longitudinal data (p. 10). Given the lack of longitudinal studies addressing leisure boredom using a trait and state approach, the current study examined the association between trait and state leisure boredom and substance use, the effect of the interplay between trait and state boredom, and how restructuring moderated these associations. We hypothesized that in a sample of SA adolescents (1) high levels of trait leisure boredom would be associated with a greater tendency to use substances, (2) on occasions when adolescents experienced higher than their normal levels of leisure boredom (state), they would tend to use more substances, and (3) restructuring skills would moderate these relations at both the trait and state level, such that the correspondence between leisure boredom and substance use would be attenuated among individuals with better restructuring skill. Gender, school, and cohort were included in the model as covariates.

## Methods

### Study Setting, Participants, and Procedures

Participants consisted of 2,580 students from schools in Mitchell's Plain, a low-income township approximately 15 miles outside of Cape Town, South Africa who participated in an effectiveness trial of HealthWise South Africa, a leisure-based life skills curriculum intervention addressing adolescent health risk behavior in a school setting (see Caldwell, Smith et al., 2004). At the outset of the study, 25 schools in the local area were considered for inclusion. Of these, six schools were excluded due to implementation concerns (e.g., frequent principal and teacher turnover, school violence and crime; Coffman, Smith, Flisher, & Caldwell, 2011), four schools were randomly assigned from the remaining 19 schools to receive the HealthWise curriculum, and five schools were chosen as matched no-treatment controls. The present analysis makes use of data from all students in the control schools who reported lifetime substance use at any wave of data collection. These 2,580 students (51% female, 49% male) ranged in age from 12-19 years old at baseline (Wave 1,  $M=14.5$ ,  $SD=0.89$ ), mostly reported their race as Coloured (92%; mixed ancestry), with some identifying as Black (5%), and White (3%). The sample was relatively homogeneous with respect to available socio-economic indicators, with 93% of the sample living in a home with running water, 97% with electricity in their home, and 79% residing in a brick home.

The Mitchell's Plain geographical area was targeted for study due to its provision of a homogeneous context (see sample descriptives in previous paragraph) with relatively high levels of school organization and cooperation -- factors that facilitated data collection. From a statistical perspective, the homogeneity naturally lessened potential impact of a variety of "nuisance" factors, including differences in socio-economic status, environmental context and relevance of three-way interactions, and facilitated more focused examination of between-person and within-person differences specifically related to trait and state boredom.

Students were followed longitudinally in three cohorts starting in 8<sup>th</sup> grade. Cohort 1 was followed from 8<sup>th</sup> through 11<sup>th</sup> grade with data collected at eight bi-annual measurement occasions between March 2004 and October 2007. Cohort 2 was followed from 8<sup>th</sup> to 10<sup>th</sup> grade with data collected at six bi-annual measurement occasions between March 2005 and October 2007. Cohort 3 was followed from 8<sup>th</sup> to 10<sup>th</sup> grade with data collected at five bi-



annual measurement occasions between March 2006 and March 2008. Cohort 1 students represented 35% of the sample ( $n=900$ ), cohort 2 represented 33% ( $n=845$ ), and cohort 3 represented 32% ( $n=835$ ). Students completed bi-annual surveys using personal digital assistants at the beginning and end of each year/grade during school hours for approximately 30 minutes. The survey was administered in the student's home language (English or Afrikaans) and research staff were available at each administration to answer questions or assist with difficulties. The study and its passive parental consent and adolescent assent procedures were approved by the Institutional Review Boards at study-affiliated universities and by school administrators.

## Measures

**Leisure boredom**—Leisure boredom was measured at each survey administration using three items from the Leisure Experience Battery for Adolescents (LEBA; Caldwell, Smith, & Weissinger, 1992; adapted from the Leisure Boredom Scale; Iso-Ahola & Weissinger, 1990) and supplemented with an item reflecting leisure boredom as also inclusive of “absence of interest” (see Hunter & Csikzentmihalyi, 2003; an approach used in Caldwell, Baldwin et al., 2004). Participants answered these four items (“For me, free time just drags on and on;” “Free time is boring;” “I usually don't like what I'm doing in my free time, but I don't know what else to do;” and “I do a lot of activities even though I'm not interested in them.”) using a 5-point Likert response scale (“*strongly disagree*” to “*strongly agree*”) at each occasion. Responses were averaged to obtain a summary *leisure boredom* index with higher scores indicating higher levels of boredom. Balancing the need for a brief scale with few items in administration and the increases provided by use of more items, the four item scale demonstrated adequate reliability (Cronbach's  $\alpha=0.68$ ) equivalent to that found in other leisure boredom measurements (e.g., Caldwell et al., 1992). Item contributions to reliability are shown in Table 1.

**Substance use**—Substance use variables were collected at each measurement occasion. Following prior work (Weybright et al., 2014), a composite substance use index was created to account for both recency and frequency of use for five substances (alcoholic drinks, tobacco, tik/methamphetamines, dagga/marijuana, and inhalants). The summed index was created by assigning a higher value to higher levels of substance use. For example, alcoholic drinks was indexed as 1=Lifetime (i.e., alcoholic drinks consumed in the lifetime) use but no past month use, 2=Lifetime use and one or fewer drinks in the past month, 3=Lifetime use and two to three drinks in the past month, and 4=Lifetime use and four or more drinks in the past month. All five substances were indexed in this manner and summed together to obtain a *substance use* composite. Note that, given their lack of variability in behavior, students indicating no lifetime use of any substance across all measurement occasions were not included in this analysis of associations between leisure boredom and substance use.

**Restructuring**—Four items within the larger survey that asked about individuals' ability to restructure were used to measure a general restructuring construct. These four items were previously used to represent the ability to restructure within Caldwell, Baldwin et al.'s (2004) *TimeWise: Lifelong Leisure Skills* evaluation and additional theoretical justification can be found there. Adolescents responded to the four items “If nothing exists, I can

organize leisure activities to do in my community;” “In my free time, I know how to turn a boring situation into something that is more interesting to me;” “I am confident I can overcome things that get in the way of doing what I want to do in my free time;” and “I am confident I can plan activities for myself without help from my parents;” using a 5-point Likert response scale (“strongly disagree” to “strongly agree”). At each occasion, responses were averaged to obtain a *restructuring* index (Cronbach’s  $\alpha=0.74$ ; see Table 1) where higher scores represent greater restructuring ability.

**Covariates**—Gender, school, and cohort were included in analyses as covariates. Gender was dummy coded (0=male; 1=female) and then centered to facilitate interpretation.

### Analytic Strategy

Generalized linear multilevel models were used to examine between- and within-person associations between leisure boredom and substance use and the moderating effects of restructuring while accommodating the nested nature of the data (measurement occasions nested within students). Models were estimated using PROC GLIMMIX in SAS 9.3, with incomplete data across the three cohorts treated as missing as random (Little & Rubin, 1987) through use of full information maximum likelihood estimation (i.e., all complete and incomplete cases contributed to parameter estimation; Black, Harel, & Matthews, 2012).

Upon examining the intra-class correlation coefficients (proportion of within- and between-person variance) it was clear that the extensive within-person variability in leisure boredom (65% of total observed variance) would facilitate examination of both trait and state associations. Restructuring demonstrated similar levels of within-person variability (62%), further justifying the understanding of moderating influences at both the between- and within-person level. Bi-annual reports of leisure boredom were person-centered and separated into occasion-specific and person-specific components (Bolger, Davis, & Rafaeli, 2003; Schwartz & Stone, 1998). For example, *TraitBrdm<sub>i</sub>*, a between-person variable, was calculated as the within-person mean across all measurement occasions of an adolescent’s leisure boredom scores. *StateBrdm<sub>ti</sub>* was then calculated for each measurement occasion as the deviation of occasion-specific scores from the individual mean. Across all persons and occasions, trait and state leisure boredom were weakly correlated ( $r = 0.26$ ; results not reported elsewhere). These scores were then used in a multi-level Poisson regression (due to the composite score for substance use being non-normally distributed count data) to examine if and how adolescent substance use was associated with leisure boredom and if restructuring (*StateRestruct<sub>ti</sub>* and *TraitRestruct<sub>i</sub>* calculated in the same manner described above) moderated those associations at a between- and/or within-person level. The model was specified as:

$$\log(\text{SubUse}_{ti}) = \beta_{0i} + \beta_{1i}(\text{Wave}_{ti}) + \beta_{2i}(\text{Wave}_{ti}^2) + \beta_{3i}(\text{StateBrdm}_{ti}) + \beta_{4i}(\text{StateRestruct}_{ti}) \quad (1)$$

where adolescent  $i$ ’s composite score for substance use at time  $t$  (*SubUse<sub>ti</sub>*) was modeled as a function of person-specific composite for substance use ( $\beta_{0i}$ ), person-specific association with leisure boredom state ( $\beta_{3i}$ ), and within-person centered restructuring ( $\beta_{4i}$ ) while

controlling for the developmental changes (across waves) of substance use in the sample ( $\beta_{1i}, \beta_{2i}$ ). Person-specific parameters were modeled as:

$$\beta_{ki} = \gamma_{k0} + \gamma_{k1} (\text{TraitBrdm}_i) + \gamma_{k2} (\text{GrpRestruct}_i) + \gamma_{k3} (\text{Gender}_i) + \gamma_{k4} (\text{School}_i) + \gamma_{k5} (\text{Cohort}_i) + u_{ki} \quad (2)$$

where the parameters indicate expectations for the person-level coefficients ( $\gamma_{k0}$ ) and how they differ with respect to adolescents' trait leisure boredom ( $\gamma_{k1}$ ) and restructuring ( $\gamma_{k2}$ ) while controlling for gender ( $\gamma_{k3}$ ), school ( $\gamma_{k4}$ ), and cohort ( $\gamma_{k5}$ ). To facilitate estimation and interpretation, predictors were centered at sample means. Effect size estimates were articulated using an adaptation of McFadden's pseudo- $R^2$  (McFadden, 1979), an analogue of proportion of variance explained (see Snijders & Bosker, 1999) that is suitable for the multilevel Poisson regression analysis framework. Specifically, the relative fit of the model with predictors to an intercept only model was calculated as

$$\text{McFadden}R^2 = 1 - (\log L_f / \log L_i) \quad (3)$$

where  $\log L_f$  represents the log likelihood of the full model and  $\log L_i$  represents the intercept-only model. Typically lower than the  $R^2$ -type indices obtained in more traditional regression settings, McFadden's pseudo- $R^2$  of between 0.2 and 0.4 indicate excellent fitting models (see Louviere, Hensher, & Swait, 2000).

## Results

### Developmental Trends

To examine the developmental course of substance use and leisure boredom, no-growth, linear, and quadratic growth were modeled. Table 2 provides descriptive statistics for measures of leisure boredom, substance use, and restructuring skills. In preliminary analyses, ANOVAs (with Bonferroni adjusted follow-ups) indicated that sample-level means of both leisure boredom ( $F(7, 10336) = 6.14, p < .0001, \eta^2 = 0.01$ ; see Table 2) and substance use ( $F(7, 10371) = 141.72, p < .0001, \eta^2 = 0.09$ ; see Table 2) changed across time. Formal growth models suggested that curvature in the pattern of change in substance use was captured relatively well by linear and quadratic components of change. Thus, those components were carried into the subsequent models (e.g., Eq. 1; linear,  $\gamma_{10} = 0.58, p < .0001$ ; quadratic,  $\gamma_{20} = -0.04, p < .0001$ ) where they carry substantial between-person variance in both the intercept ( $\sigma^2_{u0} = 1.729$ ) and linear rate of change ( $\sigma^2_{u0} = 0.040$ ). A negative covariance between intercept and linear rate of change ( $\sigma_{u0,u1} = -.0204$ ) indicates that individuals with higher initial use tended to increase use more slowly. Quadratic growth in substance use was not modeled as a random effect. Of note, restructuring remained moderately high across all waves, on average (see bottom portion of Table 2), and did not exhibit any systematic time-related trends.

### Association between Leisure Boredom and Substance Use

**Trait leisure boredom**—Our first hypothesis centered on the between-person association: that high levels of trait leisure boredom would be associated with a greater tendency to use substances. Results from the multi-level model shown in Table 3 support the hypothesized

association ( $\gamma_{01}=0.42, p <.001$ ). That is, adolescents with higher trait leisure boredom also tended to use more substances.

**State leisure boredom**—Our second hypothesis centered on the within-person association: that on occasions when an adolescent experienced higher than usual leisure boredom (state) he/she would also tend to use more substances. As shown in Table 3, this hypothesis was also supported. For the average adolescent, there was a positive within-person association between state leisure boredom and substance use ( $\gamma_{30}=0.06, p <.001$ ). On occasions when state leisure boredom was higher or lower than usual, he/she also tended to use more or less substances than usual. Notably, the extent of the within-person association between state leisure boredom was moderated by adolescents level of trait boredom ( $\gamma_{31}=0.06, p <.05$ ), such that adolescents with higher levels of trait leisure boredom also tended to be more affected by state leisure boredom. That is, the occasion-to-occasion changes in the substance use of adolescents with higher levels of trait leisure boredom fluctuated in greater synchrony with the occasion-to-occasion changes in state leisure boredom than those of their generally less bored peers. A negative covariance between the intercept and state leisure boredom ( $\sigma_{u0,u3} = -.0062$ ) indicates that individuals who began with a high level of substance use also had lower state leisure boredom.

### Moderating Influence of Restructuring

Our third hypothesis was that the associations between trait/state leisure boredom and substance use would be moderated by trait/state ability to restructure. As seen in Table 3, neither trait nor state components of restructuring ability moderated the leisure boredom-substance use associations ( $\gamma_{32}=0.01$  and  $\gamma_{41}=-0.02$  respectively,  $p >.05$ ). However, restructuring ability was related to substance use in other ways. Within-person, on measurement occasions when adolescents reported lower levels of restructuring than usual, they tended to use more substances ( $\gamma_{40}=-0.03, p <.05$ ). Similar to trait leisure boredom, trait levels of restructuring also moderated the association between state restructuring ability and substance use ( $\gamma_{42}=-0.05, p <.05$ ). That is, the occasion-to-occasion changes in the substance use of adolescents with lower levels of trait restructuring fluctuated in greater synchrony with the occasion-to-occasion changes in state restructuring than those of their peers with higher trait levels of restructuring. Adolescents with lower levels of trait restructuring exhibited greater association between substance use and state restructuring.

### Covariates

Also seen in Table 3, there were some gender effects. Males had higher overall levels of substance use ( $\gamma_{03}=-0.23, p <.01$ ) and ‘shallower’ rates of change developmentally ( $\gamma_{13}=-0.08, p <.05$ ;  $\gamma_{23}=-0.01, p <.01$ ) than their female peers. There was no evidence of systematic differences related to cohort or school. Altogether, comparing the full model to an intercept only model (see log likelihoods in Table 3) indicates the utility of the predictors (McFadden’s pseudo- $R^2 = 0.14$ ) to collectively produce a substantial explanation of the data (see Louviere et al., 2000).

## Discussion

Leisure boredom has been associated previously with substance use and other risky behavior within U.S. samples (Caldwell & Smith, 1995; Iso-Ahola & Crowley, 1991; Piko, Wills, & Walker, 2007), but studies have found mixed results from samples of South African adolescents (e.g., McIntosh et al., 2005; Wegner et al., 2006). Impoverished community environments that lack recreational opportunities may increase the risk of experiencing leisure boredom for SA adolescents. In turn, adolescents may be relying on substance use to turn an under-stimulating environment into a stimulating one; a process worsened by the early age of initiation and speed of progression through substances by SA adolescents (Patrick et al., 2009; Reddy et al., 2010).

The current study aimed to better understand the association between substance use and trait and state boredom, the interplay between the two, and a potential moderator of these relations. More specifically, the current study hypothesized positive associations between both trait and state leisure boredom and substance use. Essentially these hypotheses addressed the long-standing question of whether trait or state boredom matters, whether the relation between trait and state leisure boredom has an influence on substance use, and if this relation is moderated by the ability to restructure a boring situation.

The first two hypotheses were supported with results indicating a significant positive association between both trait leisure boredom and substance use and state leisure boredom and substance use. Furthermore, there was a significant interaction between state and trait leisure boredom such that the association between state leisure boredom and substance use was even stronger for adolescents with high levels of trait boredom.

The third hypothesis was not supported. Findings indicated that restructuring skills did not moderate, or dampen, the relation between trait or state leisure boredom and substance use. Rather than moderate the relation, the ability to restructure had an effect on substance use independent of leisure boredom; those with higher ability to restructure were less likely to use substances.

Although limitations to this study are addressed at the end of the paper, one limitation must be considered as we continue this discussion. The current study provided between five to eight measurement occasions across time spaced at six-month intervals; this was therefore not a “momentary” measure. So at best we are measuring the “situational” nature of leisure boredom during a six-month interval. Still, given that the students were responding at between five to eight points across time, and there were fluctuations in levels of leisure boredom across these time points, we assume that they were representative of their recent lives. Thus, we believe that this first study of its kind presents some insight into the nature of trait and state leisure boredom and the dynamic interplay between the two in relation to substance use.

### The Study in Context

Mitchell's Plain is an area created under Apartheid where individuals designated as Coloured (i.e., mixed ancestry) were required to relocate by the Group Areas Act. Apartheid

was abolished in the early 1990s, however, Mitchell's Plain remains predominately inhabited by individuals characterized as Coloured as reflected in the current study's sample characteristics. Although conditions have improved over the last two decades for individuals disenfranchised by the social and political climate of Apartheid, these areas continue to lack developmentally appropriate recreational opportunities.

All adolescents were equally exposed to environments that lacked suitable and accessible recreation opportunities and facilities; an issue so pervasive it emerged as a main theme of Wegner's (2011) qualitative work, represented by the "no entry-no exit" theme. In Wegner's study, although participants desired engagement in positive, meaningful leisure pursuits, they felt deprived of these experiences due to the lack of opportunities in their environment such as usable, accessible recreation facilities. For example, physical education is not required within the SA school curriculum and consequently many schools lack sports facilities and equipment and few offer extracurricular activities. Additionally, sports fields within the community are often gated and locked to prevent vandalism and illegal activities occurring on the grounds (Wegner). This leaves areas such as streets, parking lots, and open dirt areas for engaging in recreational pursuits. Although community centers are often present, they provide little, if any, structured programming for adolescents and consequently are not frequented by local adolescents.

### **Trait and State Leisure Boredom and the Ability to Restructure**

As previously noted, a unique contribution of this study is to address the issue of both trait and state leisure boredom and their interplay. We learned that although both high trait and state leisure boredom are associated with higher levels of substance use, results suggested that when youth experience higher levels of situational leisure boredom than they are used to, they are more likely to use substances than usual.

The development-as-action-in-context perspective first proffered by Silbereisen, Eyferth, and Rudinger (1986) is one way to make sense of the findings. The development-as-action-in-context perspective has since been extended to understand how development differentially occurs in different cultural contexts. Essentially, this perspective views adolescents as the drivers of their own development. Hence, as we have suggested, if someone is bored in their leisure, he or she would presumably do something about it and restructure the situation. For example, if one was bored, he or she might make changes in elements such as peer involvement, challenge level, and motivation. This may equate to varying experiences for one individual within the same activity.

An example of the development-as-action-in-context perspective and the lack of restructuring comes from Wegner's (2011) previously described photo-elicitation study. One 17 year-old male participant was discussing engaging in leisure at a local game shop (a room with video arcade games and pool tables) and stated "... it can get monotonous, yea the game... nothing's gonna change, the same stuff all the time so it's gonna get boring" (p. 21). Another 17 year-old male who had dropped out of school was discussing the results of being in an under-stimulating context stating "Boredom can lead to doing stupid things, it makes you steal, do drugs" (p. 22). If these two males were able to restructure their boring

situations into something more interesting, that is, taking action-in-context, we hypothesized that that ability would lessen the chances of using substances.

Our lack of findings for this possibility may have been because on average, students reported levels of restructuring were very stable across time. Such minimal variability may have made it impossible to disentangle the relation between state boredom and restructuring. Students' reported levels of ability to restructure were moderately low. From the development-as-action-in-context perspective, it could be that due to cultural, environmental, and economic reasons, it is not common for youth of this age to engage in action-in-context and take charge of their situations.

Another possible explanation is that maybe those who possessed the ability to restructure never really found themselves bored because they were able to turn a potential boring situation into something interesting before it even happened. Or perhaps these individuals did not place themselves in situations they knew would be boring. These conjectures are supported through the finding that those with high levels of ability to restructure reporting using fewer substances.

A final explanation for the fact that ability to restructure did not moderate the relation between state boredom and substance use may be that, at some level, boredom is developmentally driven. Schulenberg, Martz, Maslowsky, Patrick, and Staff (2012) analyzed data from U.S. adolescents and found boredom to generally decrease between ages 14 and 24 years old with the highest levels at ages 14 through 16 years old. These higher levels may be driven by developmental factors such as less mature initial cognitive functioning, the rapid nature of adolescent brain development which may require increased stimulation to prevent feelings of boredom, and the function of boredom to drive exploration and further identity development (Caldwell et al., 1999; Schulenberg et al.). Consequently, if boredom is affected by adolescent development, then restructuring may not immediately influence its relation with substance use; rather it may inform more long-term developmental processes.

## Implications

Prevention initiatives have demonstrated promise in influencing leisure experience such as leisure motivation and may help address the risky association between leisure boredom and substance use. One such program is HealthWise South Africa (HW; see Caldwell, Smith et al., 2004), the effectiveness trial that provided control group data for the current study. HW is a school-based curriculum that focuses on reducing substance use and risky sexual behavior by targeting positive use of free time and includes specific lessons devoted to addressing leisure boredom. HW has previously shown positive effects for intervention participants such as reducing levels of amotivation and increasing levels of intrinsic motivation (Caldwell et al., 2008).

The current study provided a longitudinal look into the relation between leisure boredom and substance use. Although previous research has shown a positive association between these two concepts, less is known about the differential trait and state influences, their interplay, and contextual moderators. Results from the current study suggest state leisure boredom may be a more salient issue to address within this sample. This is a challenge given

the context-dependent nature of the leisure experience and the dynamic developmental changes occurring in adolescence. Some research suggests adolescents may “age out” of boredom (e.g., Schulenberg et al., 2012), but there remained a subgroup of risky adolescents that demonstrated high levels of state leisure boredom and concurrently engaged in substance use behaviors that needs to be addressed. This emphasizes the need to either (a) provide all adolescents with a basic foundation of skills used to identify and engage in healthy leisure activities, or (b) target a selected group of adolescents most at risk for experiencing leisure boredom and engaging in risky behaviors within the context of leisure and implementing a more in-depth intervention.

### Limitations and Future Directions

The current study provided a much-needed view into the association between substance use and leisure boredom at a trait and state level; however, several limitations should be kept in mind when interpreting results. The current study used measures collected twice a year from adolescents, presenting two issues. First, measures were self-reported by adolescents and may be inaccurate due to self-reporter bias, potentially under- or over-estimating analytical results. Future studies may benefit from including some measure of social desirability (e.g., Marlowe-Crowne Desirability Scale; Crowne & Marlowe, 1960). Furthermore, measures of boredom and restructuring were necessarily limited to a small number of items due to response burden placed on students by the length of the questionnaire. Despite the small number of items, these measures have demonstrated acceptable reliability and have behaved as expected in this study, indicating some evidence for criterion validity.

Second, the timing of the bi-annual measurement occasions during each school semester should be considered. These measurement occasions may be spaced too far apart to accurately capture state measures. However, even with this limitation, a significant association was found between state leisure boredom and substance use, suggesting measurement occasions were sufficient enough to capture fluctuations. Measuring state changes in leisure experience would necessitate the collection of more intensive longitudinal data where frequency and spacing of measurement occasions matched anticipated change (Collins, 2006). Future studies attempting to capture both trait and state leisure experience would benefit from collection of daily diary or experience sampling methodology where individuals are repeatedly requested (e.g., daily or randomly during free time use) to report on how they are spending their free time, how they subjectively feel about free time use, and contextual factors surrounding their experience. In addition, multiple timescale designs wherein “bursts” of experience sampling data are collected at periodic intervals (e.g., 14 consecutive days of data obtained every six months) would allow for examination of how individuals’ leisure experiences are structured and negotiated over the short-term, and how those structures and processes themselves change across adolescence (see Ram & Gerstorf, 2009).

Although the substance use composite measure makes use of all five substances measured and the intensity of their use, results cannot differentiate between consistent low or moderate poly-substance use and infrequent, intense use of one substance. Future analyses should address this limitation by measuring poly-substance use as well as the intensity of individual



substances used. In addition, the current analyses did not serve to identify whether substance use was driven by leisure boredom or vice versa. Future work should address these relations to identify causal processes.

In conclusion, results support an association between substance use and trait and state leisure boredom. Information gained from the current study aids in further understanding the separate influence of experiencing situational leisure boredom and the general tendency to experience leisure boredom. Future studies should further this understanding through more intensive longitudinal data collection (e.g., experience sampling methodology) to accurately track the moment-to-moment progression of adolescents' experiences of leisure boredom (and engagement). A more robust understanding of how individuals' contexts and leisure experiences contribute to potential substance use in real time would both inform and provide new platforms for prevention or reduction of risk behavior.

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**Table 1**

## Leisure Boredom and Restructuring scale Reliability and Descriptives

<b>Factor</b>	<b>Variable</b>	<b><i>M</i></b>	<b><i>SD</i></b>	<b>Alpha if Item Deleted</b>	<b>Correlation with Total</b>
Leisure Boredom ( $\alpha=0.68$ )	For me, free time just drags on and on.	1.68	1.27	0.62	0.45
	Free time is boring.	1.28	1.21	0.60	0.49
	I usually don't like what I'm doing in my free time, but I don't know what else to do.	1.64	1.26	0.55	0.63
	I do a lot of activities even though I'm not interested in them.	1.93	1.23	0.67	0.52
Restructuring ( $\alpha=0.74$ )	If nothing exists, I can organize leisure activities to do in my community.	2.43	0.77	0.72	0.47
	In my free time, I know how to turn a boring situation into something that is more interesting to me.	2.72	0.78	0.65	0.59
	I am confident I can overcome things that get in the way of doing what I want to do in my free time.	2.64	0.74	0.66	0.58
	I am confident I can plan activities for myself without help from my parents.	2.64	0.78	0.70	0.50

Note:  $N=2580$  students,  $M$ =Mean,  $SD$ =Standard Deviation. Item response ranged from 0 (strongly disagree) to 4 (strongly agree).

**Table 2**

Means, Standard Deviations, and ANOVA Results for Substance Use, Leisure Boredom, and Restructuring Variables

Variable	Wave 1	Wave2	Wave3	Wave4	Wave5	Wave6	Wave7	Wave8
Substance Use Composite	1.85 <sub>a</sub> (2.61)	2.50 <sub>b</sub> (3.09)	3.19 <sub>c</sub> (3.42)	3.87 <sub>d</sub> (3.82)	4.31 <sub>e</sub> (3.90)	4.44 <sub>e</sub> (3.87)	4.82 <sub>e</sub> (3.90)	4.46 <sub>e</sub> (3.79)
$F(7, 10371) = 141.72, p < .0001, \eta^2 = 0.09$								
Leisure Boredom	1.71 <sub>a</sub> (0.85)	1.62 <sub>ab</sub> (0.87)	1.69 <sub>ac</sub> (0.90)	1.63 <sub>ab</sub> (0.90)	1.61 <sub>bc</sub> (0.90)	1.57 <sub>bc</sub> (0.90)	1.52 <sub>b</sub> (0.92)	1.52 <sub>bc</sub> (0.87)
$F(7, 10336) = 6.14, p < .0001, \eta^2 = 0.01$								
Restructuring	2.63 (0.77)	2.63 (0.75)	2.63 (0.75)	2.64 (0.73)	2.61 (0.72)	2.57 (0.71)	2.65 (0.70)	2.63 (0.68)

Note:  $N_{\text{wave1}} = 2580$ . Substance use composite range 0-20, leisure boredom and restructuring range 0-4. Waves represent measurement occasions at the beginning and end of each semester from the beginning of 8<sup>th</sup> grade through the beginning of 11<sup>th</sup> grade. Differing subscripts identify significant mean differences using Bonferroni adjusted post-hoc tests. Like subscripts indicate nonsignificant mean differences.

**Table 3**

## Multi-Level Model Testing Association between Leisure Boredom and Substance Use

Parameters	Estimate (Standard Error)
<b>Fixed Effects</b>	
Intercept, $\gamma_{00}$	-0.587*** (0.102)
Trait Leisure Boredom, $\gamma_{01}$	0.424*** (0.072)
Trait Restructuring, $\gamma_{02}$	-0.246** ((0.066)
Gender, $\gamma_{03}$	-0.225** ((0.076)
School, $\gamma_{04}$	-0.007 (0.012)
Cohort, $\gamma_{05}$	0.033 (0.024)
Wave, $\gamma_{10}$	0.589*** (0.016)
Wave*Trait Leisure Boredom, $\gamma_{11}$	-0.001 (0.027)
Wave*Trait Restructuring, $\gamma_{12}$	0.072* (0.028)
Wave*Gender, $\gamma_{13}$	0.079* (0.029)
Wave <sup>2</sup> , $\gamma_{20}$	-0.045*** (0.001)
Wave <sup>2</sup> *Trait Leisure Boredom, $\gamma_{21}$	-0.005 (0.003)
Wave <sup>2</sup> * Trait Restructuring, $\gamma_{22}$	-0.003 (0.003)
Wave <sup>2</sup> * Gender, $\gamma_{23}$	-0.009** ((0.003)
State Leisure Boredom, $\gamma_{30}$	0.062*** (0.015)
State Leisure Boredom*Trait Leisure Boredom, $\gamma_{31}$	0.057s* (0.023)
State Leisure Boredom*Trait Restructuring, $\gamma_{32}$	0.013 (0.023)
State Leisure Boredom*Gender, $\gamma_{33}$	-0.038 (0.025)
State Restructuring, $\gamma_{40}$	-0.030* (0.018)
State Restructuring*Trait Leisure Boredom, $\gamma_{41}$	-0.021 (0.028)
State Restructuring*Trait Restructuring, $\gamma_{42}$	-0.053* (0.030)
State Restructuring*Gender, $\gamma_{43}$	-0.028 (0.032)
<b>Random Effects</b>	
Intercept Variance $\sigma^2_{u0}$	1.729*** (0.082)
Wave Variance $\sigma^2_{u1}$	0.040*** (0.003)
State Leisure Boredom Variance $\sigma^2_{u3}$	0.041*** (0.009)
State Restructuring Variance $\sigma^2_{u4}$	0.066*** (0.013)
Covariance Intercept, Wave $\sigma_{u0,u1}$	-0.204*** (0.014)
Covariance Intercept, State Leisure Boredom $\sigma_{u0,u3}$	-0.062** ((0.021)
Covariance Intercept, State Restructuring $\sigma_{u0,u4}$	0.002 (0.027)
Covariance Wave, State Leisure Boredom $\sigma_{u1,u3}$	0.006 (0.004)
Covariance Wave, State Restructuring $\sigma_{u1,u4}$	0.002 (0.004)

Parameters	Estimate (Standard Error)
Covariance State Leisure Boredom, State Restructuring $\sigma_{u3,u4}$	-0.002 (0.008)
Log Likelihood (Full Model)	43828.54
Log Likelihood (Intercept Only Model)	50920.43

*Note:* Table includes unstandardized estimates and standard errors (in parentheses). Model based on up to 8 occasions nested within 2,580 students for a total of 10,251 observations.

\*\*\*  
 $p < .001$ ,

\*\*  
 $p < .01$ ,

\*  
 $p < .05$ .