Coping and emotion regulation profiles as predictors of nonmedical prescription drug and illicit drug use among high-risk young adults

Carolyn F. Wong[a,b,*], **Karol Silva**[c], **Aleksandar Kecojevic**[d], **Sheree M. Schrager**[e], **Jennifer Jackson Bloom**[e], **Ellen Iverson**[e], and **Stephen E. Lankenau**[d]

[a] Children's Hospital Los Angeles, The Saban Research Institute Community, Health Outcomes and Intervention Research Program, 4650 Sunset Boulevard, Mailstop #30, Los Angeles, CA 90027, United States

[b] University of Southern California, Keck School of Medicine, Department of Pediatrics, United States

[c] Temple University, Department of Psychology, Weiss Hall, 1701 N. 13th Street, Philadelphia, PA 19122, United States

[d] Drexel University, School of Public Health, Department of Community Health and Prevention, 1505 Race Street, 11th Floor, Philadelphia, PA 19102, United States

[e] Children's Hospital Los Angeles, Division of Adolescent Medicine, 5000 Sunset Boulevard, 7th Floor, Los Angeles, CA 90027, United States

Abstract

Background—Deficits in the ability to organize, integrate, and modulate emotions, thoughts, and behaviors when dealing with stress have been found to be related to the onset and escalation of substance use among adolescents and young adults. However, limited research has focused on understanding how coping and emotion regulation tendencies might be associated with different patterns of prescription and illicit drug use, particularly among high-risk young adults who may already face additional challenges relative to lower-risk populations.

Methods—Young adults aged 16–25 years who had misused prescription drugs within the past 90 days were interviewed in Los Angeles and New York. The current study utilized latent profile analysis to empirically derive coping and emotion regulation typologies/profiles that are then used to predict different patterns of substance use ($N = 560$).

*Corresponding author at: Children's Hospital Los Angeles, 4650 Sunset Boulevard Mailstop #30, Los Angeles, CA 90027, United States. Tel.: +1 323 361 8427; fax: +1 323 361 8043. cawong@chla.usc.edu (C.F. Wong)..

Results—Four latent classes/groups were identified: (1) suppressors, (2) others-reliant copers, (3) self-reliant copers and (4) active copers. Distinct patterns of prescription and illicit drug misuse were found among different coping/emotion regulation profiles, including differences in age of initiation of opiates, tranquilizers, and illicit drugs, recent injection drug use, substance use-related problems, and past 90-day use of tranquilizers, heroin, and cocaine. Specifically, suppressors and others-reliant copers evidenced more problematic patterns of substance use compared to active copers.

Conclusion—This is among the first studies to show how coping and emotion regulation profiles predict distinct patterns of substance use. Results provide the groundwork for additional investigations that could have significant prevention and clinical implications for substance-using high-risk young adults.

Keywords

1. Introduction

Nonmedical use or "misuse" of prescription drugs has been linked to a range of negative health outcomes among adolescents and young adults, including drug dependence in adulthood (McCabe et al., 2007), drug overdose (Paulozzi et al., 2012), and psychiatric dysfunctions (Schepis and Hakes, 2011). Since most research on prescription drug misuse patterns tend to focus on typically-developing adolescents and young adults, there may be a reduced understanding of current patterns of prescription drug misuse among high-risk young adults, including homeless persons, injection drug users, or polydrug users (Daniulaityte et al., 2009; Kurtz et al., 2005; Lankenau et al., 2007). These young active drug users are considered "high-risk" because they may be at greater risk for drug overdose and other negative health consequences such as hepatitis, HIV, and long-term drug dependence compared to lower-risk populations (Benotsh et al., 2011; SAMSHA, 2010). Studies that do not include high-risk groups may underestimate more serious or complex patterns of prescription drug misuse and illicit drug use, as research has revealed higher rates of prescription drug and illicit drug misuse among high-risk youth compared to general young adult populations (Lord et al., 2009; McCauley et al., 2010).

Furthermore, research to date among prescription drug misusers has sparsely addressed the impact of psychological factors related to the management of emotions and stress on misuse (Ford, 2008; Ford and Arrastia, 2008; Sung et al., 2005), despite the fact that the management of stress and the management of both positive and negative emotions are fundamental features of motivations to misuse drugs (Arnett, 1995; Conrad et al., 1992). It has been postulated that substance misuse is a symptom, not a cause, of psychological and social maladjustment among adolescents and young adults, suggesting that individuals' ability to handle stress and distress would be important determinants/drivers of substance misuse (Shedler and Block, 1990). Hence, greater empirical attention is needed to understand how individuals' coping responses and emotion regulation tendencies in the face of stress and distress might be associated with their initiation and persistence in misusing

prescription and illicit drugs. This is also a particular concern among high-risk youth who may contend with more diffi-cult life circumstances than youth from general youth populations (McCauley et al., 2010; Sinha, 2008). A better understanding of individual differences in both coping and emotion regulation could inform programs and facilitate the development of interventions that build on specific strengths and characteristics of high-risk young adults.

Even though both coping and emotion regulation (ER) can be conceptualized as traits (i.e., predispositions/tendencies) or states (Lazarus, 1993), the current study focused on individuals' predisposition to cope and manage their emotions. Coping is defined as behavioral and cognitive responses to manage external and internal demands that exceed a person's resources and encompasses strategies that may or may not be directed at emotions (Lazarus and Folkman, 1984). ER strategies, though related to coping, refer to strategies used to influence, experience, and modulate emotions (e.g., suppression and cognitive reappraisal). ER includes processes that may not be typically considered as coping, such as managing expressions of emotions or enhancing positive emotions (Gross, 1999). Adaptive ER can be characterized by individuals' ability to use effective coping strategies during stressful situations. Effective coping, in turn, can buffer substance use behaviors and emotional distress (Stein and Nyamathi, 1999).

1.1. Coping, emotion regulation, and substance misuse

Deficits in individuals' ability to organize, integrate, and modulate emotions, thoughts, and behaviors when dealing with stress (i.e., impairment in coping) have been found to be related to the onset and escalation of substance use among adolescents and young adults (Compas et al., 1992; Wills et al., 2001). For example, strategies that have been found to perpetuate substance use include disengagement coping, such as venting. On the other hand, proactive behavior or task-oriented coping (e.g., use of problem-solving strategies) have been found to deter substance use and initiation among general adolescents and young adults. Wills et al. (2001) found behavioral coping (i.e., doing something to solve a problem) to have a protective effect on drug use initiation and diminished growth in drug use over time among adolescents, while avoidant or anger coping (e.g., using distraction or social diversion) was associated with initiation and escalation of substance use. Similarly, low emotional restraint has been found to be associated with increases in gateway-drug use among a sample of middle-school aged boys (Farrell and Danish, 1993). In contrast, a study of homeless youth revealed avoidant coping to be significantly associated with lower HIV-risk taking behaviors, fewer depressive or anxiety-related symptoms, and less frequent alcohol use (Dashora et al., 2011). In the same study, task-oriented coping and emotion-oriented coping (e.g., self-blame, rumination) were not significantly associated with HIV risk-taking and substance use. Another study of homeless youth indicated that the use of nondisclosure coping (i.e., not telling others how you feel), self-destructive escape coping (i.e., engaging in dangerous activities to reduce tension), and withdrawal coping were related to increased illicit drug use. However, problem-solving coping did not reduce drug use (Nyamathi et al., 2010).

These results showed that individuals' coping and ER responses are important factors that impact drug-use and other risk-taking behaviors among general and high-risk young adults. Results also revealed interesting differences on which types of strategies are considered "adaptive" or "mal-adaptive" for different youth populations. While these studies are informative, no studies to date have considered how coping and ER tendencies constitute meaningful profiles or typologies that account for intra-individual differences in the different types of strategies one might use. This approach can provide a more complex and complete characterization of individuals' underlying coping and ER response to stress and distress because individuals are categorized based on the multitude of coping and ER strategies they prefer/tend to use or not use.

1.2. Current study

In the present study, we employed latent profile analysis (LPA) to develop distinct coping and ER profiles that are then used to predict patterns of prescription and illicit drug misuse among a sample of high-risk young adults. Specifically, we examined how coping and ER typologies are able to differentiate age of initiation of specific prescription and illicit drugs, and magnitude of recent drug use and other high-risk behaviors, such as injection drug use (IDU). LPA enables us to link these typologies/profiles to different patterns of prescription and illicit drug use behaviors while accounting for socio-demographic and significant early life experiences (e.g., having experienced abuse) that could influence the formation of coping and ER tendencies.

2. Methods

2.1. Participants and procedures

Data for this study come from a previously reported study of youth who misuse prescription drugs (Lankenau et al., 2012a), recruited in Los Angeles (LA) and New York (NY) between October 2009 and March 2011. Eligible participants were between 16 and 25 years old and had engaged in misuse of a prescription drug (i.e., opioid, tranquilizer, stimulant, or any combination, at least three times in the last 90 days). "Misuse" was defined as taking prescription drugs "when they were not prescribed for you or that you took only for the experience or feeling it caused" (Hernandez and Nelson, 2010; SAMSHA, 2010). The original sample of 596 was reduced to 560 due to missing values on observed independent variables in the final model.

Sampling was stratified to enroll three groups of high-risk young adults – injection drug users, homeless persons, and polydrug users – with different access to prescription drugs and risks for negative health outcomes, such as overdose, drug dependence, hepatitis, and HIV. Participants were located using a combination of sampling strategies (targeted and chain-referral sampling) in variety of settings, such as parks, streets, and neighborhoods and organizations serving youth (Biernacki and Waldorf, 1981; Watters and Biernacki, 1998). To enhance the diversity of the sample, only one referral or network member per enrolled participant was allowed into the sample as part of the chain-referral sampling process. A brief screening tool was used to determine eligibility, and participants who qualified and were interviewed received a $25 cash incentive. Emancipated minors, i.e., homeless 16 or

17 year olds, received a follow-up set of questions during the consent process to ensure that rights as a research participant were understood. Non-emancipated minors were not enrolled in the study. Referral information, such as resources for counseling, housing, or drug treatment, was offered to all participants following the interview. Additional descriptions of recruitment strategy and sampling methods are reported elsewhere (Lankenau et al., 2012a).

A cross-sectional survey was developed using Entryware Software (Techneos Systems, Inc., Vancouver, Canada) and loaded onto laptop computers. The instrument was administered during face-to-face interviews with enrolled participants by one of two interviewers at each recruitment site. Interviews, which lasted approximately 60 min, were conducted in private offices or natural settings, such as fast food restaurants and parks. Interview data were recorded on both laptop computers and digital recorders. The study protocol was approved by institutional review boards at Drexel University, Children's Hospital Los Angeles, and the National Development and Research Institutes, Inc.

2.2. Measures

This study focused on the misuse of three classes of prescription drugs: opioids, tranquilizers, and stimulants – which are the most frequently misused types of prescription drugs by young adults (SAMSHA, 2010). The instrument was comprised of a range of demographic and behavioral indicators intended to elicit data on health and patterns of drug use. The instrument incorporated questions from previous studies (Lankenau et al., 2007), from topics that emerged during the formative qualitative phase (Lankenau et al., 2012b), and from standardized measures, e.g., Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994).

2.2.1. Latent class indicators—Coping strategies were assessed with the Brief COPE (Carver, 1997), a well-established measure that has been adapted for different populations and for different applications. We chose the following subscales that are most conceptually relevant for our drug-using populations: self-distraction, active coping (i.e., doing something about the problem), emotional support seeking, instrumental support seeking, venting, positive reframing, and planning. Responses were scored on a Likert-type scale that ranged from 1 = "I rarely use this" to 5 = "I do this a lot." Cronbach's alpha for the overall scale was 0.70.

Questions used to define ER were adopted from the Emotional Regulation Questionnaire (Gross and John, 2003). This scale contains 10 items assessing two domains: suppression and cognitive reappraisal. Responses were scored on a Likert-type scale that ranged from 1 = "Strongly disagree" to 7 = "Strongly agree." Cronbach's alpha for the overall scale was 0.96.

2.2.2. Predictors of coping/emotion regulation profiles

Socio-demographics: Participants self-reported a variety of demographic information and background indicators which were used both to describe the sample and to serve as explanatory variables in the LPA. These included age, race/ethnicity (0 = "White" or 1 = "non-White minority"), and gender at birth (0 = "male" or 1 = "female"). History of

homelessness was assessed by, "Was your family ever homeless when you were young, before age 16?" and "Are you currently homeless?" (0 = "no" if answered "no" to both questions, or 1 = "yes" if answered "yes" to either question). History of foster care was assessed by, "Have you ever spent one or more nights in foster care?" (0 = "no" or 1 = "yes"). Socio-economic status when growing up was assessed by, "How would you describe your socio-economic status or social class growing up?" (0 = "middle class" or "upper class," and 1 = "poor" or "working class"). Sexual orientation was assessed with, "Do you think of yourself as straight, bisexual, gay or something else?" (0 = straight and 1 = LGB(T)). To account for the two-city recruitment strategy and sampling methodology specific to the study design, we also investigated site differences in coping/ER profiles (0 = NY; 1 = LA).

Childhood abuse history: Questions used to define emotional, physical, and sexual abuse were adopted from the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994). This scale contains 15 items, with 5 questions assessing each dimension of emotional, physical, and sexual abuse during childhood. Responses were scored on a Likert-type scale that ranged from 1 = "never" to 5 = "very often." Cronbach's alpha for the overall scale was 0.93; alphas were 0.90 for the emotional subscale, 0.90 for the physical subscale, and 0.96 for the sexual subscale.

2.2.3. Outcomes. Prescription drug misuse—Participants indicated the age at which they first misused a prescription drug by, "How old were you the first time you used pain pills/tranquilizers/stimulants only for the experience or feeling they caused?" To assess the severity of current prescription drug use practices, participants were asked, "On how many days in the past 3 months (90 days) did you use (opioids/tranquilizers/stimulants) that were not prescribed to you or that you took only for the experience or feeling it caused?"

Illicit drug use: Participants indicated the age at which they first used any illicit substance, excluding alcohol, cigarettes, and marijuana. Because of the wide variety of illicit drugs measured, we elected to measure illicit drug use by assessing current level of illicit drug use problems and the recent use of heroin and cocaine, which are among the most popular and similar to opioids and stimulants of the illicit drugs. Participants were asked, "On how many days in the past 3 months (90 days) did you use heroin and/or cocaine?" Due to the particular risks associated with IDU behavior, recent IDU (having injected a drug in the past 90 days) was examined as a measure of problematic use. In addition, the modified DAST-10 questionnaire was used to describe the severity of participants' substance use problems (Skinner, 1982; Yudko et al., 2007). The item, "Are you always able to stop using drugs when you want to?" was excluded from questionnaire due to an error in survey programming. Nevertheless, the Cronbach's alpha for the shortened scale was 0.71.

2.3. Statistical analysis

Descriptive statistics and bivariate analyses were conducted using SPSS version 19. Latent profile analysis (LPA) and related analyses were conducted using Mplus version 6 (Muthén and Muthén, 1998-2011). LPA is a technique that probabilistically assigns individuals to groups, or "classes," on the basis of their scores on a set of continuous and/or categorical

indicators, which in this case were seven coping and two ER strategies. Because these measures were obtained with different response scales, we standardized their values for ease of comparison and interpretation. After determining the most appropriate latent class (i.e., profile) structure, we regressed latent class membership on a series of socio-demographic (e.g., age, gender), and childhood upbringing variables (e.g., child abuse history) to determine their effects on likelihood of class membership. Auxiliary analysis was used to investigate how coping/ER typologies were associated with a range of prescription and illicit drug use outcomes, while effects of significant covariates were considered.

3. Results

3.1. Coping and emotion regulation profiles

We identified latent classes or profiles based on the following coping and ER strategies: self-distraction, active coping, emotional support seeking, instrumental support seeking, venting, positive reframing, planning, emotional suppression, and cognitive reappraisal. The best-fitting solution (Nylund et al., 2007) resulted in four latent classes (adjusted BIC = 13597.6; entropy = 0.79), and the smallest class represented 15% of the participants. The standardized conditional response means for each coping and ER strategy within each class are presented in Table 1. Class 1, which contains 15% of the sample, is referred to as "suppressors." This group is characterized by their overall highest endorsement of suppression among all the coping or ER strategies. Class 2, with 27% of the sample, is described as "others-reliant copers." A distinguishing characteristic of Class 2 is its high class mean on emotional and instrumental support seeking. Class 3, which comprised 27% of the sample, is characterized by low endorsement of emotional and instrumental support seeking, and moderate to high endorsement of other coping and ER strategies. We referred to this class as "self-reliant copers." Class 4, called "active copers," consists of 30% of the sample. Class 4 has high class means on virtually all of the coping dimensions, including active coping, emotional and instrumental support seeking, positive reframing, and planning. This class also scored the highest in the use of cognitive reappraisal to regulate their emotions.

3.2. Socio-demographic and childhood history factors

To examine factors that predict membership in the coping/ER latent classes, we investigated a range of socio-demographic and childhood history factors (see Table 2 for the sample and site-specific distribution) using a series of latent class regression analyses. We specifically examined: age, gender, race/ethnicity, sexual identity, social class during childhood, ever experience of homelessness, experience of foster care, experiences of emotional, sexual, and physical abuse, and study site (i.e., NY vs. LA). Significant covariates were entered into a multivariate model. Among the tested variables, only gender, ever homelessness, and site differences showed significant class differences. Specifically, female participants were more likely to be suppressors than self-reliant copers or others-reliant copers (OR_{adj} = 2.99, $p < .01$; OR_{adj} = 4.70, $p < .001$, respectively). Females were also more likely to be others-reliant copers than active copers in the current sample (OR_{adj} = 2.92, $p < .05$). Participants who had ever been homeless in their lifetime were more likely to be suppressors than active copers (OR_{adj} = 3.06, $p < .05$). Finally, LA participants were more likely to be self-reliant copers

(OR$_{adj}$ = 3.07, $p < .01$) and active copers (OR$_{adj}$ = 2.12, $p < .05$) than suppressors. LA participants were also more likely to be self-reliant copers than others-reliant copers (OR$_{adj}$ = 3.38, $p < .01$).

3.3. Coping and emotion regulation profiles and substance misuse

We examined how class membership predicts different patterns of prescription drug and illicit drug use, while simultaneously controlling for factors that predict coping/ER class membership. As summarized in Table 3, coping/ER profiles significantly predicted a range of prescription and illicit drug misuse outcomes: age of initiation of opioids ($\chi^2(3) = 15.63$, $p < .001$), age of initiation of tranquilizers ($\chi^2(3) = 15.01$, $p < .01$), and past 90-day tranquilizer use ($\chi^2(3) = 9.12$, $p < .05$). Age of stimulant initiation was marginally significant ($\chi^2(3) = 6.43$, $p < .10$).

Post hoc group comparisons revealed specific group differences in prescription drug misuse. Suppressors were significantly more likely to have initiated opioids, tranquilizers, and stimulants at an earlier age compared to active copers ($\chi^2(3) = 14.06$, $p < .01$, $\chi^2(3) = 8.69$, $p < .01$, $\chi^2(3) = 7.98$, $p < .01$, respectively). Others-reliant copers also initiated opioids and tranquilizers at a significantly earlier age ($\chi^2(3) = 11.11$, $p < .01$, $\chi^2(3) = 12.45$, $p < .01$, respectively) compared to active copers. Self-reliant copers also initiated opioids and tranquilizers earlier than active copers ($\chi^2(3) = 4.87$, $p < .05$, $\chi^2(3) = 3.93$, $p < .05$, respectively). Self-reliant copers used tranquilizers on a greater number of days within the last 90 days than active copers ($\chi^2(3) = 6.21$, $p < .05$).

Coping/ER latent class membership also predicted the following illicit drug use behaviors: age of initiation of illicit drugs ($\chi^2(3) = 9.68$, $p < .05$), probability of recent IDU ($\chi^2(3) = 17.52$, $p < .001$), past 90-day heroin use ($\chi^2(3) = 11.89$, $p < .01$), and DAST scores ($\chi^2(3) = 12.06$, $p < .01$). The typologies also nearly significantly predicted recent cocaine use ($\chi^2(3) = 7.51$, $p < .10$). Post hoc group comparisons revealed that suppressors initiated illicit drugs significantly earlier ($\chi^2(3) = 10.32$, $p < .01$), had a higher probability of a being a current IDU ($\chi^2(3) = 11.93$, $p < .01$), used heroin more number of days ($\chi^2(3) = 6.13$, $p < .05$), and scored higher on the DAST ($\chi^2(3) = 8.34$, $p < .01$) compared to active copers. Suppressors also had a higher probability of injecting a drug recently compared to self-reliant copers ($\chi^2(3) = 4.31$, $p < .05$). Others-reliant copers were also more likely to have initiated illicit drugs at a significantly earlier age ($\chi^2(3) = 4.48$, $p < .05$), used cocaine greater number of days ($\chi^2(3) = 6.30$, $p < .05$), and scored higher on the DAST ($\chi^2(3) = 8.19$, $p < .01$) compared to active copers. Moreover, others-reliant copers had a higher probability of being a current IDU ($\chi^2(3) = 15.70$, $p < .001$, $\chi^2(3) = 6.03$, $p < .05$) and using heroin more number of days ($\chi^2(3) = 11.77$, $p < .001$, $\chi^2(3) = 7.11$, $p < .01$), compared to both active copers and self-reliant copers. Finally, self-reliant copers were very similar to active copers in terms of their probability of being a current IDU (low) and recent heroin or cocaine use (fewer days). However, self-reliant copers initiated illicit drug earlier than active copers ($\chi^2(3) = 3.79$, p = .05) and reported more substance-related problems as indicated by their DAST score ($\chi^2(3) = 5.44$, $p < .05$).

4. Discussion

This is among the first studies to examine how typologies formed by coping and ER tendencies predict prescription and illicit drug use among a sample of high-risk young adults. Given that individuals' ability to handle stress and distress are important drivers of substance misuse (Carrico et al., 2012; Dashora et al., 2011; Wills et al., 2001), it was expected that profiles based on their coping and ER would be useful for distinguishing different patterns of substance misuse. Consistent with previous findings, we empirically derived four distinctive coping/ER profiles: suppressors, others-reliant copers, self-reliant copers, and active copers; that in turn predicted distinct patterns of prescription drug misuse and illicit drug use.

Specifically, we found suppressors initiated prescription and illicit drugs at the earliest ages and reported the most severe problems in drug use. These results align with recent findings showing that a desire to escape or avoid negative emotions explain, in part, the association between depressive symptoms and stimulant use (Carrico et al., 2012). Perhaps due to an inability to deal with or express emotions effectively, suppressors were less likely to use other coping strategies when dealing with stress, which may have led to more problematic patterns of substance use.

On the other hand, individuals who tended to adopt proactive coping behaviors exhibited less problematic substance use behaviors. Specifically, active copers initiated the use of prescription and illicit drugs at significantly later ages, reported less frequent use of prescription and illicit drugs, had the lowest probability of being a current IDU, and had the lowest level of substance use-related problems, compared to other coping/ER groups. This is consistent with previous studies that examined coping and substance use among youth from a general youth population (Wills et al., 2001). Notably, active copers in our study also reported the use of other strategies (e.g., emotional and instrumental support-seeking and positive reframing) in addition to proactive coping. The ability to use multiple strategies may help explain why active copers exhibited less problematic patterns of drug use relative to other groups. For instance, a study that examined heroin abstinence and relapse after treatment found abstainers' used a greater number of coping strategies at post-treatment compared to those who relapsed (Gossop et al., 2002).

While suppressors and active copers may represent the opposite ends of the mal-adaptive and adaptive continuum, we also identified two other distinctive groups of copers with significantly different patterns of substance misuse behaviors: others-reliant and self-reliant copers. Others-reliant copers (i.e., those who seek emotional and instrumental support from others as their primary coping method) initiated both prescription and illicit drug use nearly as early as suppressors and reported high levels of problematic drug use. Unlike suppressors, they appeared to prefer illicit drugs, like heroin and cocaine, over prescription drugs. Similar to active copers, self-reliant copers (i.e., those who used moderate to high amounts of coping/ER strategies but the least in seeking support from others), exhibited less problematic patterns of illicit drug use. However, they initiated prescription and illicit drugs significantly younger than active copers. Moreover, self-reliant copers reported the greatest number of

days in both recent tranquilizer and stimulant use, and second highest in opioid use among the four groups.

While it seems remarkable that these coping/ER profiles are able to significantly differentiate distinct patterns of drug use, additional research is needed to decipher some of the mechanisms behind the associations. For example, others-reliant copers' preference for illicit drugs may be partially explained by their gregarious style of coping or by their reliance on social networks that may consist of other illicit drug users. The study of participants' social networks and the types of support they receive may inform this. Future studies should also consider how mental health, perceived stress, and other psychosocial factors are related to these coping/ER profiles as this may provide additional insight to their associations to substance misuse behaviors. In addition, while we have chosen a reasonable set of predictors/covariates that could influence coping and ER tendencies, it may be worthwhile to study in greater depth, other social-developmental and environmental factors (e.g., parental–child relationships, stability of household) that could affect individuals' coping and ER styles. For example, study site (LA vs. NY) was a significant factor in coping/ER profiles. Study site could be a proxy for some inherent difference between the two cities, e.g., economic, social, cultural, that are not adequately captured when merely examining socio-demographics measures (Lankenau et al., 2012a). Additional investigations can probe further about why this is the case. Since we have examined a limited set of indicators of substance misuse, future studies that investigate the progression and severity of illicit drug use should evaluate a wider array of drugs used (e.g., methamphetamines, ecstasy) and other drug-risk behaviors.

The study of coping and emotion regulation is a promising area of research and results from the present study provide the groundwork for additional investigations that could have signifi-cant prevention implications for high-risk youth. The issue of how high-risk young adults regulate emotions or cope with stress is particularly relevant and important since many use substances to cope with street life, connect with peers, and/or manage physical and mental health symptoms (Thompson et al., 2010). Though preliminary, current findings may also have potential clinical implications. Results showed that both suppressors and others-reliant copers had the greatest probability of being IDUs. Given that IDU is typically a more severe form of substance use that also carries a high risk for HIV and HCV infection (Vickerman et al., 2012), its high prevalence among suppressors and others-reliant copers merits consideration by clinicians/service providers on how to circumvent or curtail injection drug use among individuals with these coping/ER profiles.

Furthermore, our findings point to great heterogeneity in the way coping and ER are related to substance misuse within this high-risk youth population. For instance, it is somewhat surprising that "active copers," higher functioning individuals with a greater ability to deal with stress and distress, constitute the largest group in this high-risk youth sample. Active copers may use drugs for very different reasons compared to individuals' who cope and regulate emotions in other ways. It is possible that active copers largely use drugs for recreational and/or experimental reasons rather than as a primary way to cope with stress or to regulate negative emotions (Boys and Marsden, 2003; Dow and Kelly, 2012). While additional research is needed to verify these speculations, results suggest that identifying

coping and emotion regulation tendencies among high-risk young adults can shed light on the complex relationship between drug use and risk-taking behaviors.

The current study has several limitations. First, while high-risk young adults are an important group to study, current results are not generalizable to populations of young adults who do not engage in high-risk behaviors. Second, this sample comes from two large metropolitan areas (LA and NY). Findings may not generalize to populations from other areas. Third, the cross-sectional nature of this data prevents us from examining the stability of the associations between coping/emotion regulation profiles and substance use behaviors over time. Finally, self-reports are often subject to problems of recall bias and social desirability bias, especially among young adults concerned with describing the extent of their drug use.

The diversity in coping/ER profiles identified in this study suggest that programs and interventions developed for high-risk populations should consider the different motivations for drug use and the specific strengths and weaknesses of individuals with different coping/ER profiles. Given that coping and emotion regulation can also be conceptualized as a process, whereby coping efforts can vary depending on characteristics of the environment, researchers could apply this knowledge to learning more about how individuals deal with stressors under different circumstances (Lazarus, 1993). Ultimately, this knowledge could provide insights into the reasons/motivations underlying youths' risk-taking behaviors and be applied towards equipping youth with beneficial coping and emotion regulation skills/tools.

Acknowledgments

References

Arnett J. The young and the reckless: adolescent reckless behavior. Curr. Direct. Psychol. Sci. 1995; 4:67–71.

Benotsh EG, Koester S, Luckman D, Martin AM, Cejka A. Non-medical use of prescription drugs and sexual risk behavior in young adults. Addict Behav. 2011; 36:152–155. [PubMed: 20863626]

Bernstein D, Fink L, Handelsman L, Foote J, Lovejoy M, Wenzel K, Sapareto E, Ruggiero J. Initial reliability and validity of a new retrospective measure of child abuse and neglect. Am. J. Psychiat. 1994; 151:1132–1136. [PubMed: 8037246]

Biernacki P, Waldorf D. Snowball sampling: problems and techniques of chain referral sampling. Sociol. Methods Res. 1981; 10

Boys A, Marsden J. Perceived functions predict intensity of use and problems in young polysubstance users. Addiction. 2003; 98:951–963. [PubMed: 12814501]

Carrico AW, Pollack LM, Stall RD, Shade SB, Neilands TB, Rice TM, Woods WJ, Moskowitz JT. Psychological processes and stimulant use among men who have sex with men. Drug Alcohol Depend. 2012; 123:79–83. [PubMed: 22088656]

Carver CS. You want to measure coping but your protocol's too long: consider the brief COPE. Int. J. Behav. Med. 1997; 4:92–100. [PubMed: 16250744]

Compas, BE.; Malcarne, VL.; Banez, GA. Coping with psychosocial stress: a developmental perspective.. In: Compas, BE.; Malcarne, VL.; Banez, GA., editors. Personal Coping: Theory, Research, and Application. Praeger Publishers/Greenwood Publishing Group; Westport, CT, US: 1992. p. 47-63.

Conrad KM, Flay BR, Hill D. Why children start smoking cigarettes: predictors of onset. Br. J. Addict. 1992; 87:1711–1724. [PubMed: 1490085]

Daniulaityte R, Falck RS, Wang J, Carlson RG. Illicit use of pharmaceutical opioids among young polydrug users in Ohio. Addict. Behav. 2009; 34:649–653. [PubMed: 19398164]

Dashora P, Erdem G, Slesnick N. Better to bend than to break: coping strategies utilized by substance-abusing homeless youth. J. Health Psychol. 2011; 16:158–168. [PubMed: 20929945]

Dow SF, Kelly JF. Listening to youth: adolescents' reasons for substance use as a unique predictor of treatment response and outcome. Psych. Addict. Behav. 2012 [Epub ahead of print].

Farrell AD, Danish SJ. Peer drug associations and emotional restraint: causes or consequences of adolescents' drug use? J. Consult. Clin. Psychol. 1993; 61:327–334. [PubMed: 8473586]

Ford JA. Nonmedical prescription drug use among college students: a comparison between athletes and nonathletes. J. Am. Coll. Health. 2008; 57:211–219. [PubMed: 18809538]

Ford JA, Arrastia MC. Pill-poppers and dopers: a comparison of non-medical prescription drug use and illicit/street drug use among college students. Addict. Behav. 2008; 33:934–941. [PubMed: 18403131]

Gossop M, Stewart D, Browne N, Marsden J. Factors associated with abstinence, lapse or relapse to heroin use after residential treatment: protective effect of coping responses. Addiction. 2002; 97:1259–1267. [PubMed: 12359030]

Gross, JJ. Emotion and emotion regulation.. In: Gross, JJ., editor. Handbook of Personality: Theory and Research. Guilford Press; New York, NY, US: 1999.

Gross JJ, John OP. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. J. Pers. Soc. Psychol. 2003; 85:348–362. [PubMed: 12916575]

Hernandez SH, Nelson LS. Prescription drug abuse: insight into the epidemic. Clin. Pharmacol. Ther. 2010; 88:307–317. [PubMed: 20686478]

Kurtz SP, Inciardi JA, Surratt HL, Cottler L. Prescription drug abuse among ecstasy users in Miami. J. Addict. Dis. 2005; 24:1–16. [PubMed: 16368653]

Lankenau S, Schrager S, Silva K, Kecojevic A, Wong CF, Iverson E. Misuse of prescription and illicit drugs among high-risk young adults in Los Angeles and New York. J. Public Health Res. 2012a; 1:22–30. [PubMed: 22798990]

Lankenau SE, Sanders B, Bloom JJ, Hathazi DS, Alarcon E, Tortu S, Clatts M. Prevalence and patterns of prescription drug misuse among young ketamine injectors. J. Drug Issues. 2007; 37:717–736. [PubMed: 18612374]

Lankenau SE, Teti M, Silva K, Bloom JJ, Harocopos A, Treese M. Initiation into prescription opioid misuse amongst young injection drug users. Int. J. Drug Policy. 2012b; 23:37–44. [PubMed: 21689917]

Lazarus RS. Coping theory and research: past, present, and future. Psycho-som. Med. 1993; 55:234–247.

Lazarus, RS.; Folkman, S. Stress, Appraisal and Coping. Springer; New York: 1984.

Lord S, Downs G, Furtaw P, Chaudhuri A, Silverstein A, Gammaitoni A, Budman S. Nonmedical use of prescription opioids and stimulants among student pharmacists. J. Am. Pharm. Assoc. 2009; 49:519–528.

McCabe SE, West BT, Morales M, Cranford JA, Boyd CJ. Does early onset of non-medical use of prescription drugs predict subsequent prescription drug abuse and dependence? Results from a national study. Addiction. 2007; 102:1920–1930. [PubMed: 17916222]

McCauley JL, Danielson CK, Amstadter AB, Ruggiero KJ, Resnick HS, Hanson RF, Smith DW, Saunders BE, Kilpatrick DG. The role of traumatic event history in non-medical use of prescription drugs among a nationally representative sample of US adolescents. J. Child Psychol. Psychiatry. 2010; 51:84–93. [PubMed: 19674194]

Muthén, LK.; Muthén, BO. Mplus User's Guide. Muthén & Muthén; Los Angeles, CA: 1998-2011.

Nyamathi A, Hudson A, Greengold B, Slagel A, Marfisee M, Khalilifard F, Leake B. Correlates of substance use severity among homeless youth. J. Child Abnorm. Psychiat. Nurs. 2010; 23:214–222.

Nylund KL, Asparouhov T, Muthen BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: a Monte Carlo Simulation Study. Struct. Equat. Model. 2007; 14:535–569.

Paulozzi LJ, Kilbourne EM, Shah NG, Nolte KB, Desai HA, Landen MG, Harvey W, Loring LD. A history of being prescribed controlled substances and risk of drug overdose death. Pain Med. 2012; 13:87–95. [PubMed: 22026451]

SAMSHA. Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings. Substance Abuse and Mental Health Services Administration, Office of Applied Studies. NSDUH Series H-38A, HHS Publication No. SMA 10-4856. Rockville, MD, USA: 2010.

Schepis TS, Hakes JK. Non-medical prescription use increases the risk for the onset and recurrence of psychopathology: results from the National Epidemiological Survey on Alcohol and Related Conditions. Addiction. 2011; 106:2146–2155. [PubMed: 21631624]

Shedler J, Block J. Adolescent drug use and psychological health. A longitudinal inquiry. Am. Psychol. 1990; 45:612–630. [PubMed: 2350080]

Sinha R. Chronic stress, drug use, and vulnerability to addiction. Ann. N. Y. Acad. Sci. 2008; 1141:105–130. [PubMed: 18991954]

Skinner HA. The drug abuse screening test. Addict. Behav. 1982; 7:363–371. [PubMed: 7183189]

Stein JA, Nyamathi A. Gender differences in relationships among stress, coping, and health risk behaviors in impoverished, minority populations. Person. Individ. Diff. 1999; 26:141–157.

Sung HE, Richter L, Vaughan R, Johnson PB, Thom B. Nonmedical use of prescription opioids among teenagers in the United States: trends and correlates. J. Adolesc. Health. 2005; 37:44–51. [PubMed: 15963906]

Thompson S, Barczynk A, Gomez R, Dreyer L, Popham A. Homeless, street-involved emerging adults: attitudes toward substance use. J. Adolesc. Res. 2010; 25:231–257.

Vickerman P, Martin NK, Hickman M. Understanding the trends in HIV and hepatitis C prevalence amongst injecting drug users in different settings: implications for intervention impact. Drug Alcohol Depend. 2012; 123:122–131. [PubMed: 22138540]

Watters J, Biernacki P. Targeted sampling: options for the study of hidden populations. Soc. Probl. 1998; 36:416–430.

Wills TA, Sandy JM, Yaeger AM, Cleary SD, Shinar O. Coping dimensions, life stress, and adolescent substance use: a latent growth analysis. J. Abnorm. Psychol. 2001; 110:309–323. [PubMed: 11358025]

Yudko E, Lozhkina O, Fouts A. A comprehensive review of the psychometric properties of the Drug Abuse Screening Test. J. Sub. Abuse Treat. 2007; 32:189–198.

Table 1

Standardized conditional response means of coping and emotion regulation profiles ($N = 560$).

	Class 1 suppressors	Class 2 others-reliant copers	Class 3 self-reliant copers	Class 4 active copers
	($n = 86$)	($n = 153$)	($n = 151$)	($n = 170$)
Coping subscales				
Distraction	–0.31	–0.33	0.26	0.23
Active coping	–0.90	–0.45	0.21	0.65
Emotional support seeking	–0.89	0.40	–0.76	0.83
Instrumental support seeking	–1.21	0.40	–0.70	0.87
Venting	–0.29	0.17	–0.29	0.20
Positive reframing	–1.18	–0.55	0.39	0.75
Planning	–1.00	–0.33	0.17	0.68
Emotion regulation subscales				
Suppression	0.42	–0.23	0.42	–0.41
Cognitive reappraisal	–0.96	–0.44	0.38	0.56

Note: Given the standardization of the measures, the sample mean of all subscales are equal to 0.

Table 2

Descriptive table of demographics and variables of interest by site.

Variable	Categories	Los Angeles (*n* = 281) (%)	New York City (*n* = 279) (%)	Total (*n* = 560)
Age (mean ± SD)	Range: 16–25	20.9 (2.1)	20.8 (2.0)	20.85 (2.0)
Gender at birth	Male	206 (73)	174 (62)	380 (68)
	Female	75 (27)	105 (38)	180 (32)
Race	Non-Hispanic White	143 (51)	178 (64)	321 (58)
	Nonwhite	137 (49)	100 (36)	237 (43)
Sexual identity	Heterosexual	207 (74)	179 (64)	386 (69)
	LGBT	74 (26)	99 (36)	173 (31)
Socioeconomic status (SES) growing up	Poor or lower class	128 (46)	117 (42)	245 (44)
	Middle or upper class	151 (54)	161 (58)	312 (56)
Homelessness	Ever	211 (75)	195 (70)	406 (73)
Ever lived in foster or group home		93 (33)	65 (23)	158 (28)
Childhood trauma	Emotional	13.4 (6.1)	13.6 (6.2)	13.5 (6.1)
	Physical	11.0 (5.7)	10.1 (5.6)	10.6 (5.7)
	Sexual	7.3 (4.5)	7.9 (5.3)	7.6 (4.9)
Age of 1st misuse of prescription drugs	Opioids	15.6 (3.1)	15.6 (2.5)	15.6 (2.8)
	Tranquilizers	16.2 (3.1)	16.3 (2.7)	16.3 (2.9)
	Stimulants	15.3 (3.5)	16.2 (2.6)	15.8 (3.0)
Recent, 90 days use (number of days)	Opioids	17.3 (22.3)	15.1 (20.1)	16.2 (21.2)
	Tranquilizers	12.9 (19.4)	15.3 (22.3)	14.1 (21.2)
	Stimulants	9.2 (18.0)	9.9 (19.4)	9.6 (18.7)
Age of 1st use	Heroin	17.5 (2.6)	17.5 (2.3)	17.5 (2.5)
	Cocaine	16.7 (2.6)	16.6 (2.3)	16.7 (2.5)
Recent, 90 days Use (number of days)	Heroin	21.3 (30.9)	31.3 (31.2)	26.5 (31.4)
	Cocaine	3.5 (8.1)	9.7 (17.6)	6.7 (14.2)
Recent IDU (last 90 days)		84 (30)	96 (34)	180 (32)
DAST[a]		5.59 (2.15)	5.70 (2.20)	5.64 (2.17)

Note: Among the variables examined, site (LA vs. NY), gender, and ever homelessness were significant predictors of coping/ER class membership. For some variables, the total N may not equal to 560 due to response refusal.

[a]The DAST is based on 9 items, with possible scores ranging from 0 to 9 (See text for explanation).

Table 3

Coping and emotion regulation profiles and differences in prescription drug and illicit drug use ($N = 560$).

	Class 1 suppressors	Class 2 others-reliant copers	Class 3 self-reliant copers	Class 4 active copers
	($n = 86$)	($n = 153$)	($n = 151$)	($n = 170$)
Prescription drug use behaviors				
Age of initiation of opioids [***]	14.91[a]	15.18[a]	15.50[a]	16.31[b]
Age of initiation of tranquilizers [**]	15.86[a]	15.75[a]	16.27[a]	17.04[b]
Age of initiation of stimulants [+]	15.05[a]	15.74	15.78	16.30[b]
Recent (90 days) opioid misuse	19.13	14.51	17.38	13.14
Recent (90 days) tranquilizer misuse [*]	14.70	12.39	15.49[b]	9.34[a]
Recent (90 days) stimulant misuse	7.31	7.15	8.16	7.10
Illicit drug use behaviors				
Age of initiation of illicit drugs [*]	15.15[a]	15.58[a]	15.55[a]	16.25[b]
Probability of recent (90 days) injection drug use (IDU) [***]	0.43[a]	0.43[a]	0.29[b]	0.20[b]
Recent (90 days) heroin use [**]	17.13[a]	19.24[a,b]	10.15[a,c]	7.98[c]
Recent (90 days) cocaine use [+]	7.64	7.79[a]	4.72	3.55[b]
DAST [**]	6.02[a]	5.97[a]	5.8[a]	5.19[b]

Note: Within a row (i.e., within each individual outcome), latent class probabilities with different superscripts are significantly different from each other. In addition, the DAST is based on a range from 0 to 9.

[+] $p < .10$.

[*] $p < .05$.

[**] $p < .01$.

[***] $p < .001$.