Early Maladaptive Schemas in a Sample of Airline Pilots seeking Residential Substance Use Treatment: An Initial Investigation

Ryan C. Shorey[1], **Hope Brasfield**[1], **Scott Anderson**[2], and **Gregory L. Stuart**[1]
[1]University of Tennessee – Knoxville

[2]Cornerstone of Recovery, Louisville, TN

Abstract

Background—Recent research has begun to examine the early maladaptive schemas of substance abusers, as it is believed that targeting these core beliefs in treatment may result in improved substance use outcomes. One special population that has received scant attention in the research literature, despite high levels of substance use, is airline pilots.

Aims—The current study examined the early maladaptive schemas of a sample of airline pilots (*n* = 64) who were seeking residential treatment for alcohol dependence and whether they differed in early maladaptive schemas from non-pilot substance abusers who were also seeking residential treatment for alcohol dependence (*n* = 45).

Method—Pre-existing medical records from patients of a residential substance abuse treatment facility were reviewed for the current study.

Results—Of the 18 early maladaptive schemas, results demonstrated that pilots scored higher than non-pilots on the early maladaptive schema of unrelenting standards (high internalized standards of behavior), whereas non-pilots scored higher on insufficient self-control (low frustration tolerance and self-control).

Conclusions—Early maladaptive schemas may be a relevant treatment target for substance abuse treatment seeking pilots and non-pilots.

Keywords

Substance use; early maladaptive schemas; pilots; airline

Substance use, particularly alcohol use, is a serious concern among airline pilots (Butcher, 2002; Ross & Ross, 1992). In recent years, there has been a call for an increased understanding of the personality factors that may contribute to negative health functioning among airline pilots (Butcher, 2002) and on factors that may perpetuate substance use among this population (Butcher, 2002; Coombs, 1997). For substance use problems in general, researchers have begun to examine early maladaptive schemas (Young, Klosko, & Weishaar, 2003), which are enduring cognitive and behavioral patterns that may underlie the development, maintenance, or perpetuation of substance use disorders (Ball, 2007; Brotchie, Meyer, Copello, Kidney, & Waller, 2004; Shorey, Stuart, & Anderson, 2012). Early maladaptive schemas are similar to "core beliefs" (Riso et al., 2006) and guide how individuals interpret and code information in their environments. There is preliminary research demonstrating that targeting early maladaptive schemas during substance use

Corresponding Author: Ryan C. Shorey, M.A. University of Tennessee Department of Psychology 1404 Circle Dr. Austin Peay Building, 311 Knoxville, TN 37996 Phone: (865) 974-3288 Fax: (865) 974-3330 rshorey@utk.edu.

treatment may improve adaptive outcomes, including reduced substance use (Ball, 2007). Thus, it may be helpful to understand the early maladaptive schemas of airline pilots seeking treatment for substance use. In the current study, we examined this using the pre-existing patient records of a sample of male airline pilots in residential treatment for alcohol dependence. Additionally, we examined whether there were differences between pilot reports of early maladaptive schemas and a sample of non-airline pilot males also in residential treatment for substance use.

Substance Use among Airline Pilots

As discussed by Butcher (2002), substance use and abuse is one of the most frequently cited mental health problems among airline pilots. Indeed, when airline pilots are surveyed, they indicate that substance use is a problem among both general aviation (private pilots) and corporate, charter, and regional airline pilots (Ross & Ross, 1992). In an early study on alcohol use among airline pilots (Sloan & Cooper, 1986), 98.7% reported that they consume alcohol; 50% reported that they drink at least two drinks per day; 23.2% stated that they have felt the need to cut down on their drinking; and 12.7% noted that they had been told by another person that they consume too much alcohol (Sloan & Cooper, 1986). Further, estimates suggest that in 30% of fatal aviation accidents, general aviation pilots were under the influence of alcohol at the time of the accident (Holdener, 1993). Additionally, research utilizing flight simulators have indicated that any level of alcohol in the bloodstream impairs pilot performance (Ross & Mundt, 1996). Alcohol and other forms of substance use have also been shown to impair executive functioning and to have detrimental effects on sleep (Roehrs & Roth, 2001; Zinn, Scott, & Swartzwelder, 2004), both of which are important factors in the consideration of safety among airline pilots.

Unfortunately, the full extent of substance use problems among airline pilots is not known, with very little research on potential personality and emotional characteristics that may contribute to airline pilots' substance use (Butcher, 2002). Thus, there is a need for research on substance use among airline pilots as well as the potential correlates of their substance use, which in turn could help to inform treatment programs for pilots. In fact, given that many airline companies now have specific rehabilitation programs for alcohol problems among pilots (Butcher, 2002; Harper, 1983), research on pilot substance use is even more important so that empirical evidence can be used to guide treatment programs and improve outcomes. Recent research in the broader substance use literature has investigated early maladaptive schemas as an important underlying correlate of substance use. Thus, early maladaptive schemas may also be important among airline pilots with a substance use problem.

Early Maladaptive Schemas

Whereas the majority of schemas that individuals develop throughout their lives are adaptive (Beck, 1967), early maladaptive schemas are highly dysfunctional. Early maladaptive schemas, which fit closely with the concept of core beliefs (Riso et al., 2006), are defined as "extremely stable and enduring themes, comprised of memories, emotions, cognitions, and bodily sensations regarding oneself and one's relationship with others, that develop during childhood and are elaborated on throughout the individual's lifetime, and that are dysfunctional to a significant degree" (Young et al., 2003, p. 7). Young and colleagues (2003) describe 18 common, core schemas that individuals can possess and use as a guide in interpreting and responding to stimuli in their environment. Early maladaptive schemas are believed to develop through childhood experiences that are traumatic and/or toxic, especially those that involve one's family of origin and primary caretakers (Young et al., 2003).

In addition, early maladaptive schemas are believed to produce high levels of negative affect, lead to consequences that are self-defeating, and interfere with individuals' basic needs for connection, autonomy, and self-expression (Young et al., 2003). Individuals often attempt to cope with their early maladaptive schemas through a variety of maladaptive behaviors, including avoidance behaviors such as substance use. Moreover, Young and colleagues (2003) hypothesized that early maladaptive schemas underlie a number of Axis I and II problems, particularly chronic and enduring disorders, such as depression, eating disorders, personality disorders, and substance use disorders. Indeed, research has demonstrated strong relations between early maladaptive schemas and these forms of psychopathology (Ball & Cecero, 2001; Brotchie et al., 2004; Riso et al., 2006; Waller, Meyer, & Ohanian, 2001).

Early Maladaptive Schemas and Substance Use

Over the past several years there has been a growing body of research examining the early maladaptive schemas of substance use treatment seeking adults. Utilizing an older conceptualization of Young's schema model which contained only 15 schemas, Brotchie and colleagues (2004) demonstrated that male and female alcohol and opiate users who were seeking substance use treatment scored higher than a non-clinical comparison group on 11 of 15 early maladaptive schemas. Similarly, Roper, Dickson, Tinwell, Booth, and McGuire (2010) found that a sample of male and female alcohol dependent adults seeking residential treatment scored significantly higher on 14 of 15 early maladaptive schemas than a non-clinical comparison group. Finally, using Young's current model, which contains all 18 schemas, Shorey, Stuart, and Anderson (2012) found that young adult female substance users seeking residential treatment scored higher on 16 of 18 early maladaptive schemas when compared to a non-clinical comparison group.

Researchers have also begun to investigate the most prevalent early maladaptive schemas among male and female substance users. For instance, Shorey and colleagues (2011; 2012) found that the schemas of self-sacrifice, unrelenting standards, punitiveness, and insufficient self-control were the schemas most often endorsed among male and female adult alcohol dependent patients and male and female young adult opioid dependent patients. Self-sacrifice refers to an excessive focus on meeting the needs of other people at the expense of focusing on one's own needs and desires; unrelenting standards refers to the belief that one must continually strive to meet high internalized standards of behavior; punitiveness refers to a belief that the individual or other people should be harshly punished for their mistakes; and insufficient self-control refers to a lack of ability to exert self-discipline over a broad range of life domains, not just substance use, and appropriately restrain one's emotions and impulses (Young et al., 2003).

Thus, it is clear that early maladaptive schemas play an important role in men and women seeking residential substance use treatment. Knowing whether airline pilots who seek residential substance use treatment also report early maladaptive schemas could provide useful information for both the treatment of airline pilots with substance use problems and on risk assessment screening for substance use among airline pilots. If airline pilots are found to have high levels of specific early maladaptive schemas, similar to previous research with substance users, this information could be useful in screening pilots for potential substance use risk. Moreover, knowledge on the specific schemas most prevalent among this population could help to inform treatment programs on the specific cognitive and behavioral patterns that are present in substance using pilots.

Current Study

Because substance use is a serious concern among airline pilots and there is a dearth of research on factors that may contribute to their substance use, the current study investigated the early maladaptive schemas of a sample of male airline pilots who sought residential substance use treatment. Using pre-existing patient medical records, we investigated the schemas that were rated as most prevalent among airline pilots. We also examined potential differences in early maladaptive schemas between airline pilots and a sample of men who also sought residential substance use treatment. Consistent with the broader literature, we hypothesized that the schemas of self-sacrifice, unrelenting standards, and punitiveness would be the most often endorsed schemas among airline pilots. We had no a priori expectations regarding differences in schemas between pilots and the comparison group of substance users.

Method

Participants and Procedures

Patient records from a residential substance use center in the Southeastern United States were reviewed for the current study. This 30-day inpatient treatment program is guided in large part by the 12-stop model and also places emphasis on the identification and modification of patients' early maladaptive schemas. Adults of approximately 25 years of age or older and presenting with a primary substance use disorder diagnosis are admitted into the program. All patients complete a number of self-report measures and assessments upon their admission to the treatment facility. Additionally, diagnoses based on the DSM-IV criteria for mental health disorders (American Psychiatric Association, 2000), are made by a treatment team consisting of a psychiatrist, a licensed psychologist, and several additional substance use counselors.

For airline pilots, patient records were searched from 2008 to 2012 to identify male airline pilots with a primary diagnosis of alcohol dependence. For the non-pilot comparison group, patient records were searched from May 1, 2012, to August 1, 2012 to identify male patients with a primary alcohol dependence diagnosis. This resulted in a total of 109 patients. Of those patients, 64 were pilots and 45 were non-pilots. The majority of participants identified themselves as Caucasian ($n = 101$, 92.7%), followed by African American ($n = 3$, 2.8%), Hispanic ($n = 2$, 1.8%), Indian ($n = 2$, 1.8%), and Palauan ($n = 1$, 0.9%). Most reported that they were currently married ($n = 52$, 47.7%) and employed ($n = 84$, 77.1%).

Materials

Demographics—Patient medical records were searched to identify participants' age, gender, race, relationship status, employment status prior to entering treatment, and years of education.

Early Maladaptive Schemas—Patients completed the Young Schema Questionnaire - Long Form, Third Edition (YSQ-L3; Young & Brown, 2003) to assess their early maladaptive schemas. The YSQ-L3 consists of 232 self-report items that examine all 18 early maladaptive schemas proposed by Young and colleagues (2003). Each question is rated on a six point scale (1 = completely untrue of me; 6 = describes me perfectly) to indicate how much each item describes respondents. A response of 4 or greater is indicative that that particular schema may be relevant to the individual and thus only items endorsed as a 4, 5, or 6 are counted toward each schema total score (all other items are recoded to "0"). The score ranges for each early maladaptive schema are: emotional deprivation (0–54), abandonment (0–102), mistrust/abuse (0–102), social isolation (0–60), defectiveness (0–90),

failure (0–54), dependence (0–90), vulnerability (0–72), enmeshment (0–66), subjugation (0–60), self-sacrifice (0–102), emotional inhibition (0–54), unrelenting standards (0–96), entitlement (0–66), insufficient self-control (0–90), approval-seeking (0–84), negativity/pessimism (0–66), and punitiveness (0–90) (Young & Brown, 2003).

We also categorized each early maladaptive schema into low, medium, high, and very high endorsement using established cutoff scores developed by Young and Brown (2003). For scores that fall into the *high* and *very high* range, it indicates that an individual likely identifies with that schema and it is causing significant problems for them; scores of *medium* indicate that an individual may identify with certain aspects of a schema and further assessment around that schema is warranted; and scores of *low* indicate that an individual does not identify with that particular schema (Young & Brown, 2003). The YSQ has demonstrated good validity and reliability (Cockram, Drummond, & Lee, 2010) and factor structure (Saariaho, Saariaho, Karila, & Joukamaa, 2009).

Results

All statistical analyses were conducted using SPSS version 20.0. First, we examined demographic differences between pilots and non-pilots. Results demonstrated that the groups differed on age and education. Pilots were significantly younger than non-pilots (Pilots $M = 39.25$, $SD = 9.70$; and Non-Pilots $M = 44.67$, $SD = 10.58$, respectively), and reported significantly more years of education than did non-pilots (Pilots $M = 15.45$, $SD = 9.70$; and Non-Pilots $M = 13.90$, $SD = 2.29$, respectively). Thus, we controlled for differences in age and education when examining differences between groups on early maladaptive schemas.

To examine whether the pilots and non-pilots differed on early maladaptive schemas, we employed a Multivariate Analysis of Covariance (MANCOVA), with age and education included as covariates. Results of the MANCOVA demonstrated that pilots and non-pilots differed on early maladaptive schemas, $F (18, 88) = 2.05$, $p < .05$, with no significant effect for age or education. Follow-up analyses with Analysis of Covariance (ANCOVA) demonstrated that, when compared to their non-pilot counterparts, pilots scored significantly lower on insufficient self-control and significantly higher on unrelenting standards. These findings are displayed in Table 1. We also calculated effect size differences (*d*; Cohen, 1988) between pilots and non-pilots on all schemas. The effect size differences between pilots and non-pilots on insufficient self-control and unrelenting standards fell within the small to medium effect size range (Cohen, 1988).

Next, we examined interpretive scores for early maladaptive schemas for pilots and non-pilots and differences between these interpretations among groups using chi-square analyses. Early maladaptive schemas rated as very high or high were combined, as were those rated as low or medium. The results of the chi-square analyses are presented in Table 2. Findings demonstrated that pilots rated the negativity/pessimism schema as high/very high significantly less often than their non-pilot counterparts. The most commonly endorsed early maladaptive schemas for pilots and non-pilots were self-sacrifice, punitiveness, and unrelenting standards.

Discussion

To date, there has been a dearth of research on airline pilots with substance abuse problems. Learning about the characteristics of pilots who are seeking residential substance abuse treatment may have important implications for the treatment of this high risk population. Thus, the current study investigated the early maladaptive schemas of a sample of male

airline pilots with alcohol dependence seeking substance abuse treatment. We also compared alcohol dependent pilots to non-pilots on early maladaptive schemas. Results demonstrated that airline pilots and non-pilots were largely similar across the 18 early maladaptive schemas, with the exception of the early maladaptive schemas of unrelenting standards and insufficient self-control.

Airline pilots scored significantly higher than their non-pilot counterparts on the early maladaptive schema of unrelenting standards. The early maladaptive schema of unrelenting standards is characterized by a pervasive belief that one must constantly strive to meet very high, and rigid, internalized standards of behavior. Individuals with this early maladaptive schema may experience intense pressure to perform well, and this feeling of intense pressure may lead to increased anxiety about the possibility of not living up to the high standards of behavior that characterize this schema (Young et al., 2003). It is possible that individuals with this early maladaptive schema turn to alcohol or other drugs in an attempt to cope with the feeling of constantly needing to meet these unrealistic expectations for behavior (Shorey et al., 2012). It is also possible that the airline pilots scored higher on this early maladaptive schema than non-pilots due to the nature of their job, which requires high levels of performance and likely intense pressure to keep themselves and passengers safe. In this sense, unrelenting standards may be an adaptive quality to some degree. Alternatively, and as expected by schema theory (i.e., Young et al., 2003), airline pilots likely already had developed the unrelenting standards prior to the becoming a pilot, and it is possible that individuals with this early maladaptive schema may be more attracted to jobs that require high standards of performance. Clearly, additional research is needed to determine whether airline pilots are using alcohol as a way to cope with unrelenting standards and whether this schema was present prior to becoming a pilot.

Results also demonstrated that non-pilots scored higher on the early maladaptive schema of insufficient self-control relative to pilots. This schema is characterized by low frustration tolerance, impulsivity, and an inability to delay gratification (Young et al., 2003). The characteristics of this schema are frequently cited in the literature as related to substance use, such as high impulsivity (Dawe & Loxton, 2004) and low distress tolerance (Leyro, Zvolensky, & Bernstein, 2010). In essence, the insufficient self-control schema may represent a pervasive pattern of beliefs and behaviors that underlie impulsiveness and distress tolerance, increasing the risk for immediately reinforcing behaviors, such as substance use. Previous research has identified this schema as one of the most frequently endorsed schemas among substance abusers (e.g., Shorey et al., 2012). Thus, it is interesting that airline pilots scored relatively low on this schema, which may indicate differences in the etiology of substance use among this population. That is, impulsivity is related to the initiation of substance use (Moeller & Dougherty, 2002), and it is possible that for many pilots substance use is initiated for various reasons, such as job stress. Still, underreporting of negative personality traits has been evidenced among airline pilots (Butcher, 1994), and it is possible that this also influenced results. Thus, additional research is needed to replicate theses results while also controlling for social desirability.

Although pilots and non-pilots evidenced a few differences in early maladaptive schemas, the three highest rated schemas across these groups were similar. Specifically, the most frequently endorsed schemas were self-sacrifice, unrelenting standards, and punitiveness, consistent with our hypothesis. This is one of a number of studies that has demonstrated these three early maladaptive schemas are the highest rated schemas among individuals seeking residential substance abuse treatment. We have previously discussed at length these early maladaptive schemas as related to substance abuse (i.e., Shorey et al., 2011; 2012), thus we will not discuss them further here.

Implications for Future Research and Interventions

The current study provides preliminary information concerning the early maladaptive schemas of airline pilots who were seeking residential substance abuse treatment, a population that has received scant attention in the substance abuse literature. Because airline pilots with substance abuse problems may have impaired job performance, which may place the public at risk, there is a need for continued research into the substance use of airline pilots. Research should seek to replicate and extend findings from the current study. For instance, early maladaptive schemas are closely linked with personality disorders/disorders (Jovev & Jackson, 2004; Nordahl, Holthe, & Haugum, 2005) and are theoretically believed to underlie personality traits/disorders (Young et al., 2003). It is also well-established that substance abusers have high rates of personality disorders (Grant et al., 2004). Thus, future research should explore how early maladaptive schemas and personality traits/disorders interact to increase or decrease the risk for substance abuse among airline pilots. Similarly, early maladaptive schemas are related to Axis I conditions (Bosmans, Braet, & Van Vlierberghe, 2010; Shorey, Stuart, & Anderson, in press), which are also highly prevalent among substance abusers (Grant et al., 2006), and research should examine the intersection of early maladaptive schemas and Axis I conditions among airline pilots. With each of these suggested directions for future research, having a comparison group of non-airline pilot substance abusers and/or non-substance abusing airline pilots will be of critical importance. Future research should also examine whether early maladaptive schemas influence non-psychological factors that likely contribute to alcohol use among airline pilots. For instance, airline pilots may have easy access to alcohol, unstable family lives due to constant traveling, and changes in sleep patterns due to traveling, all of which may only be exacerbated by the presence of early maladaptive schemas.

The findings from the current study may have implications for the treatment of substance abuse among airline pilots, as well as male alcohol dependent adults in general. Consistent with our previous research (Shorey et al., 2012), early maladaptive schemas were highly prevalent among alcohol dependent men, including airline pilots. Because previous research has demonstrated that substance abusers score higher on early maladaptive schemas than non-substance abusers (e.g., Brotchie et al., 2004; Roper et al., 2010), targeting the reduction of early maladaptive schemas in substance abuse treatment may be important. Ball (2007) demonstrated that substance abuse treatment that concurrently focuses on reducing early maladaptive schemas resulted in decreased substance abuse relative to individuals who received substance abuse treatment (i.e., 12-step facilitation therapy) without a focus on early maladaptive schemas. Thus, early maladaptive schemas may represent a promising approach for substance abuse interventions, and research is needed to determine whether this approach is beneficial for airline pilots with a substance abuse disorder.

Limitations

The current study has a number of limitations that should be considered when interpreting its findings. The cross-sectional design of the current study limits our ability to determine whether early maladaptive schemas were present prior to the initiation of problematic substance use. Although it is theoretically believed the early maladaptive schemas develop early in life (Young et al., 2003), and thus would be present prior to substance use initiation, it is possible that substance use influenced early maladaptive schemas, and longitudinal research is needed to examine this question. The current study also did not have a comparison group of non-substance abusing airline pilots to compare to the substance abusing pilots. Future research should determine whether substance abusing pilots score higher on early maladaptive schemas relative to non-substance abusing pilots. The generalizability of these findings is limited to primarily non-Hispanic Caucasian substance abusing populations, and future research should employ more diverse samples. Finally, the

substance abuse treatment facility does not employ structured diagnostic interviews to confirm substance use disorder diagnoses, and future research should use structured interviews to increase confidence in the accuracy of patient diagnoses.

Conclusion

In summary, the current study demonstrated that male alcohol dependent airline pilots who were seeking residential treatment were largely similar in their early maladaptive schemas to non-airline pilot, alcohol dependent substance use treatment seeking patients. Findings demonstrated that airline pilots scored higher on the early maladaptive schema of unrelenting standards, but lower on the schema of insufficient self-control, relative to their non-pilot counterparts. To our knowledge, this is one of only a few studies to examine characteristics of substance dependent airline pilots; such information could be used to inform intervention programs for this important population of substance abusers. A focus on early maladaptive schemas within this population may prove fruitful for improving both mental health and substance use outcomes. Additional research is needed to determine whether reductions in early maladaptive schemas results in long-term improved substance use outcomes among airline pilots.

Acknowledgments

References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed., text rev.. Author; Washington, DC: 2000.

Ball SA. Comparing individual therapies for personality disordered opioid dependent patients. Journal of Personality Disorders. 2007; 21:305–321. [PubMed: 17536942]

Ball SA, Cecero JJ. Addicted patients with personality disorders: Traits, schemas, and presenting problems. Journal of Personality Disorders. 2001; 15:72–83. [PubMed: 11236816]

Beck, AT. Depression: Clinical, experimental, and theoretical aspects. Staples Press; London: 1967.

Bosmans G, Braet C, Van Vlierberghe L. Attachment symptoms of psychopathology: Early maladaptive schemas as a cognitive link? Clinical Psychology and Psychotherapy. 2010; 17:374–385. [PubMed: 20013761]

Brotchie J, Meyer C, Copello A, Kidney R, Waller G. Cognitive representations in alcohol and opiate abuse: The role of core beliefs. British Journal of Clinical Psychology. 2004; 43:337–342. [PubMed: 15333236]

Butcher JN. Psychological assessment of airline pilot applicants with the MMPI-2. Journal of Personality Assessment. 1994; 62:31–44. [PubMed: 8138885]

Butcher JN. Assessing pilots with `the wrong stuff': A call for research on emotional health factors in commercial aviation. International Journal of Selection and Assessment. 2002; 10:168–184.

Cockram DM, Drummond PD, Lee CW. Role and treatment of early maladaptive schemas in Vietnam veterans with PTSD. Clinical Psychology and Psychotherapy. 2010; 17:165–182. [PubMed: 20486158]

Cohen, J. Statistical power analysis for the behavioral sciences. 2nd ed.. Erlbaum; Hillsdale, NJ: 1988.

Coombs, RH. Drug Impaired Professionals. Harvard University Press; Cambridge, MA: 1997.

Dawe S, Loxton NJ. The role of impulsivity in the development of substance use and eating disorders. Neuroscience & Biobehavioral Reviews. 2004; 28:343–351. [PubMed: 15225976]

Grant BF, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Pickering RP. Co-occurrence of 12-month alcohol and drug use disorders and personality disorders in the united states. Archives of General Psychiatry. 2004; 61:361–368. [PubMed: 15066894]

Grant BF, Stinson FS, Dawson DA, Chou SP, Dufour MC, Compton W, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders. Alcohol Research & Health. 2006; 29:107–120.

Harper CR. Airline pilot alcoholism: One airline's experience. Aviation, Space, and Environmental Medicine. Jul.1983 :590–591.

Holdener F. Alcohol and civil aviation. Addiction. 1993; 88:953–958. [PubMed: 8358267]

Jovev M, Jackson HJ. Early maladaptive schemas in personality disordered individuals. Journal of Personality Disorders. 2004; 18:467–478. [PubMed: 15519957]

Leyro TM, Zvolensky MJ, Bernstein A. Distress tolerance and psychopathological symptoms and disorders: A review of the empirical literature among adults. Psychological Bulletin. 2010; 136:576–600. [PubMed: 20565169]

Moeller FG, Dougherty D. Impulsivity and substance abuse: What is the connection? *Addictive Disorders & Their Treatment*. 2002; 1:3–10.

Nordahl HM, Holthe H, Haugum JA. Early maladaptive schemas in patients with or without personality disorders: Does schema modification predict symptomatic relief? Clinical Psychology and Psychotherapy. 2005; 12:142–149.

Riso LP, Froman SE, Raouf M, Gable P, Maddux RE, Turini-Santorelli N, Penna S, Blandino JA, Jacobs CH, Cherry M. The long-term stability of early maladaptive schemas. Cognitive Therapy and Research. 2006; 30:515–529.

Roehrs T, Roth T. Sleep, sleepiness, sleep disorders and alcohol use and abuse. Sleep Medicine Review. 2001; 5:287–297.

Roper L, Dickson JM, Tinwell C, Booth PG, McGuire J. Maladaptive cognitive schemas in alcohol dependence: Changes associated with a brief residential abstinence program. Cognitive Therapy and Research. 2010; 34:207–215.

Ross LE, Mundt JC. Methodological issues in research on the effects of alcohol on pilot performance. The international Journal of Aviation Psychology. 1996; 6:95–106.

Ross LE, Ross SM. Professional pilots' evaluation of the extent, causes, and reduction of alcohol use in aviation. Aviation, Space, and Environmental Medicine. Sep.1992 :805–808.

Saariaho T, Saariaho A, Karila I, Joukamaa M. The psychometric properties of the Finnish young schema questionnaire in chronic pain patients and a non-clinical sample. Journal of Behavior Therapy and Experimental Psychiatry. 2009; 40:158–168. [PubMed: 18804198]

Shorey RC, Anderson S, Stuart GL. Early maladaptive schemas in substance use patients and their intimate partners: A preliminary investigation. *Addictive Disorders & Their Treatment*. 2011; 10:169–179. [PubMed: 22745593]

Shorey RC, Anderson S, Stuart GL. Gender differences in early maladaptive schemas in a treatment seeking sample of alcohol dependent adults. Substance Use and Misuse. 2012; 47:108–116. [PubMed: 22060801]

Shorey RC, Stuart GL, Anderson S. The early maladaptive schemas of an opioid-dependent sample of treatment seeking young adults: A descriptive investigation. Journal of Substance Abuse Treatment. 2012; 42:271–278. [PubMed: 22014405]

Shorey RC, Stuart GL, Anderson S. Differences in early maladaptive schemas among a sample of young adult female substance abusers and a non-clinical comparison group. *Clinical Psychology & Psychotherapy*. In press.

Sloan, S.; Cooper, C. Pilots Under Stress. Routledge & Kegan Paul; London and New York: 1986.

Waller G, Meyer C, Ohanian V. Psychometric properties of the long and short versions of the Young Schema Questionnaire: Core beliefs among bulimic and comparison women. Cognitive Therapy and Research. 2001; 19:137–147.

Young, JE.; Brown, G. Young schema questionnaire. Professional Resource Exchange; Sarasota, FL: 2003.

Young, JE.; Klosko, J.; Weishaar, ME. Schema therapy: A practitioner's guide. Guilford Press; New York: 2003.

Zinn S, Stein R, Schwartzwelder HS. Executive functioning early in abstinence from alcohol. Alcoholism: Clinical and Experimental Research. 2004; 28:1338–1346.

Table 1

Mean differences between pilots and non-pilots on early maladaptive schemas.

Early Maladaptive Schema	Pilots (*n* = 64) *M(SD)*	Non-pilots (*n* = 45) *M(SD)*	*F*	*p*	*d*
Emotional Deprivation	4.83 (9.30)	7.13 (11.72)	.57	.20	.22
Abandonment	9.81 (16.02)	16.00 (21.50)	2.01	.12	.33
Mistrust/Abuse	9.69 (15.80)	15.49 (21.06)	2.67	.051	.31
Social Isolation	5.16 (9.20)	6.36 (13.16)	1.15	.33	.11
Defectiveness	6.91 (14.89)	8.18 (16.60)	.41	.75	.08
Failure	2.39 (5.24)	3.49 (8.05)	1.14	.34	.16
Dependence	3.39 (9.67)	5.84 (10.94)	1.91	.13	.24
Vulnerability	4.77 (7.78)	8.53 (10.41)	2.12	.10	.41
Enmeshment	3.11 (7.93)	3.18 (8.13)	2.06	.11	.01
Entitlement	7.47 (11.99)	9.18 (11.57)	.58	.63	.15
Insufficient Self-Control	12.80 (13.93)	21.18 (23.28)	3.79	.01	.44
Subjugation	4.91 (9.90)	7.96 (12.19)	.63	.60	.27
Self-Sacrifice	29.28 (22.99)	32.56 (25.43)	1.22	.31	.14
Approval-Seeking	13.81 (18.44)	14.33 (16.67)	1.59	.20	.03
Emotional Inhibition	5.22 (9.84)	7.78 (11.75)	2.08	.11	.24
Unrelenting Standards	31.67 (23.39)	23.18 (21.45)	3.08	.03	.38
Negativity/Pessimism	10.02 (13.82)	13.76 (17.27)	.98	.41	.24
Punitiveness	20.56 (17.93)	21.49 (18.35)	1.94	.13	.05

Note: d = effect size differences between pilots and non-pilots on early maladaptive schemas.

Table 2

Differences between pilots and non-pilots on schema interpretations.

Early Maladaptive Schema	Non-pilots ($n = 45$) (%)	Pilots ($n = 64$) (%)	χ^2(df), p
Emotional Deprivation			.50 (1), .48
High/Very High	15.6	10.9	
Low/Medium	84.4	89.1	
Abandonment			1.90 (1), .17
High/Very High	24.4	14.1	
Low/Medium	75.6	85.9	
Mistrust/Abuse			2.70 (1), .10
High/Very High	26.7	14.1	
Low/Medium	73.3	85.9	
Social Isolation			3.58 (1), .06
High/Very High	17.8	6.3	
Low/Medium	82.2	93.8	
Defectiveness			.35 (1), .56
High/Very High	11.1	7.8	
Low/Medium	88.9	92.2	
Failure			.13 (1), .72
High/Very High	4.4	3.1	
Low/Medium	95.6	96.9	
Dependence			.76 (1), .38
High/Very High	6.7	3.1	
Low/Medium	93.3	96.9	
Vulnerability			1.62 (1), .20
High/Very High	15.6	7.8	
Low/Medium	84.4	92.2	
Enmeshment			.05 (1), .82
High/Very High	6.7	7.8	
Low/Medium	93.3	92.2	
Entitlement			.50 (1), .48
High/Very High	15.6	10.9	
Low/Medium	84.4	89.1	
Insufficient Self-Control			3.69 (1), .06
High/Very High	31.1	15.6	
Low/Medium	68.9	84.4	
Subjugation			3.58 (1), .06
High/Very High	17.8	6.3	
Low/Medium	82.2	93.8	
Self-Sacrifice			.44 (1), .51
High/Very High	53.5	46.9	
Low/Medium	46.7	53.1	

Early Maladaptive Schema	Non-pilots (n = 45) (%)	Pilots (n = 64) (%)	χ^2(df), p
Emotional Inhibition			.14 (1), .70
High/Very High	13.3	10.9	
Low/Medium	86.7	89.1	
Unrelenting Standards			2.02 (1), .16
High/Very High	37.8	51.6	
Low/Medium	62.2	48.4	
Approval-Seeking			.14 (1). .71
High/Very High	20	17.2	
Low/Medium	80	82.8	
Negativity/Pessimism			3.91 (1), .05
High/Very High	35.6	18.8	
Low/Medium	64.4	81.3	
Punitiveness			1.67 (1), .20
High/Very High	46.7	34.4	
Low/Medium	53.3	65.6	