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<ATL>BOYS, EARLY RISK FACTORS FOR ALCOHOL PROBLEMS, AND THE DEVELOPMENT OF THE SELF: AN INTERCONNECTED MATRIX</ATL>

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<RRH>Boys' Early Risk Factors for Alcohol Problems</RRH>

<ABH>ABSTRACT:</ABH> <ABS><P>Alcohol-use disorders are a major public health issue worldwide. Although drinking and problematic alcohol use usually begins during adolescence, developmental origins of the disorder can be traced back to infancy and early childhood. Identification of early risk factors is essential to understanding developmental origins. Using data from the Michigan Longitudinal Study, an ongoing, prospective, high-risk family study, this article summarizes findings of family context and functioning of both children and parents. We draw attention to the development of the self, an understudied

aspect of very young children being reared in alcoholic families that exacerbates exposure to high childhood adverse experiences. We also provide evidence demonstrating that young boys are embedded in a dynamic system of genes, epigenetic processes, brain organization, family dynamics, peers, community, and culture that strengthens risky developmental pathways if nothing is done to intervene during infancy and early childhood.</P></ABS>

<KWG>Keywords: alcohol-use disorders, risk, developmental pathways, externalizing behavior, intersubjective self</KWG>

<P>Harmful use of alcohol results in disease as well as significant social and economic burden worldwide (World Health Organization, 2014). In fact, the 2014 World Health Organization Global Status Report estimated that there were 3.3 million deaths (5.9% of all global deaths) attributable to alcohol consumption in 2012, and the overall global burden of disease and injury from alcohol use was 5.1%. Historically, the study of alcohol use disorders (AUDs) focused on adults, with emphasis on the origins of AUDs as emergent in adolescence. Beginning in the latter part of the 20th century, numerous longitudinal studies with origins in infancy and early childhood began to provide empirical evidence that the etiology of antisocial behavior (Moffitt, Caspi, Rutter, & Silva, 2001), aggression and violence (Shaw & Gilliam, this issue), conduct disorder (Conduct Problems Prevention Research Group, 2013), borderline personality disorder (Fonagy, Luyten, & Strathearn, 2011), alcohol-use disorders (Eiden, Edwards, & Leonard, 2007), and attachment disorders (Sroufe, Egeland, Carlson, & Collins, 2005) may be grounded in organizational dynamics that first show up in infancy and early childhood. Regarding AUDs, research from the past several decades also has focused attention on developmental origins that can be traced to the period of infancy and early childhood (Zucker, 2014; Zucker et al., 2006), with actual drinking onset starting during the transitional years from childhood to adolescence (Donovan et al., 2004; Zucker et al., 2006).</P>

<P>In this article, we draw upon mostly previously published data from the Michigan Longitudinal Study (MLS; Zucker et al., 2000) to provide insights into risk factors for boys, particularly those who are exposed to adverse childhood experiences (ACEs) in relation to parental drinking and comorbid psychopathology (Loukas, Fitzgerald, Zucker, & von Eye, 2001; Poon, Ellis, Fitzgerald, & Zucker, 2000), and family dynamics (Ellis, Zucker, & Fitzgerald, 1997). We first provide a brief overview of AUD as an introduction to the MLS. We then summarize findings from the MLS within the context of family dynamics and

child functioning, with a larger discussion of the development of the self and cognitive schema because they are understudied components in the alcohol literature. While exposure to ACEs affects both boys and girls (e.g., Fitzgerald, Zucker, Puttler, Caplan, & Mun, 2000), our focus in this article is on boys at risk for AUDs and comorbid psychopathology because the problems are still about twice as likely in boys and, perhaps more important, because the dynamics of these relationships appear to be less complex and are somewhat better understood than they are for girls (Nolen-Hoeksema, 2004). Nolen-Hoeksema (2004) suggested that there appears to be an absence of many of the risk factors for alcohol use and abuse for girls than for boys as well as a greater sensitivity to the negative consequences for females.</P>

<P>As defined in the of the <I>Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition</I> (American Psychiatric Association, 2013), AUD is the current nomenclature for misuse of alcohol. The disorder involves a problematic pattern of alcohol use leading to significant distress and requiring two of a possible 11 symptoms co-occurring within a 12-month period to meet diagnostic criteria (see Table 1). In the United States, using data from the National Epidemiologic Survey on Alcohol and Related Conditions-III (Grant et al., 2014), national estimates of the prevalence of AUDs for adults 18 years and older during 2012 and 2013 was 13.9% for the past 12 months, and 29.1% for a lifetime diagnosis (Grant et al., 2015). The prevalence of AUDs is highest during the emerging adult years (18–29), and important to this special issue regarding "boys at risk," AUDs are still more common among men than among women, with adjusted odds ratios of approximately 2:1 (Grant et al., 2015).<!--HELP: Comp: Insert Table 1 here. :ENDHELP-->

<P>It was not until the 1980s that a paradigm shift began, with investigators positing that AUDs emerged from developmental pathways beginning, or at least identifiable, as early as infancy rather than when they might be expressed during early adolescence (Zucker, 2014). Toward the end of this decade, several longitudinal studies began of children at risk for alcohol and substance-use disorders due to a positive family history of alcohol problems; a significant risk factor for adult AUDs (e.g., see Chassin, Rogosch, & Barrera, 1991; Sher & Rutledge, 2007; Zucker et al., 2000). This developmental perspective stimulated exploration of the pathways of risk for early antecedents and intervening mechanisms of AUDs (Hussong et al., 2007), including pathways that included equifinal as well as multifinal outcomes. <I>Equifinality</I> refers to different pathways leading to the same endpoint (in this case, AUD), and <I>multifinality</I> refers to the same pathway resulting in different

expressed outcomes (e.g., AUD, delinquency, antisocial behavior, or combinations of comorbid psychopathologies). Our current understanding of these pathways suggests that facing many individuals who go on to develop AUDs is a complex and dynamic system of genes, epigenetic processes, brain, family, peers, community, and culture. This system undergoes change as development proceeds and enhances the risk for future problems in these individuals if nothing is done to disrupt the risky pathways. Thus, both equifinal and multifinal pathways are operative.</P>

<H1>THE MLS</H1>

<P>The MLS (Zucker et al., 2000) is a prospective, high risk for AUD, other substance-use disorders (SUDs), and comorbid psychopathology family study that began in the mid-1980s and is still ongoing. The MLS was originally conceived as an opportunity to longitudinally follow children and their parents even before birth, but was for logistical and epidemiological reasons later changed to start with a focus on preschool-aged boys. The early specific aims were to map the evolution of risk and protective factors involved in the development of AUDs, to identify the evolution of alcohol-specific learning in young children, to explore the development of risk among alcoholic subtypes, and to specify the determinants of diverse pathways over the life span. It was expected that as we gained such understanding, policy making would be influenced, and new prevention and intervention programs would be established.</P>

<P>To achieve these goals, risk level of the offspring in the MLS was varied through recruitment of a population-based sample that differed in level of AUD among the fathers (Zucker et al., 2000). The highest risk group of the 466 families recruited into the study had a father who was a drunk driver at initial recruitment, with at least a 0.15% blood alcohol level, recruited from all district courts blanketing four counties within mid-Michigan. Other inclusionary criteria were that the parents be currently coupled and have a 3- to 5-year-old son who was the biological child of both parents. The medium risk group was uncovered during neighborhood canvassing for control families and included fathers meeting AUD criteria, with both parents again coupled and having a 3- to 5-year-old biological son. In both the court- and the community-recruited alcoholic groups, the mother's history of having a substance-use disorder was free to vary. The lowest risk group was an ecologically comparable set of control families accessed via door-to-door canvassing in the same neighborhoods where the court alcoholics lived. However, for this group, neither parent met criteria for an AUD or SUD as an adult. Again, the parents needed to be coupled and have a

3- to 5-year-old biological son. Subsequently, all full biological male and female children of the two parents from all three groups who were within 8 years of age of the original targeted preschool-aged son were enrolled.</P>

<P>The MLS involves repeated measurement for all family members of behavioral and psychological functioning, environment, substance use and problems of use, and psychiatric symptoms. Full-wave assessments take place every 3 years. To shorten an otherwise 3-year retrospective report, an annual assessment on just the youth occurs between the ages of 11 and 23 for a subset of important variables. The comprehensive measurement model was designed to evaluate multiple content areas for all study participants, at multiple time points, that would allow for comparisons of continuities and discontinuities over time and that could take into account normative developmental progression. In addition to psychosocial data, as the study continued, additional data collection began probing neuropsychological functioning (primarily executive functioning), brain functioning through the use of fMRI (to understand the neural systems underlying risk), genetic markers of risk (assessed via blood or saliva assays), and a small study of sleep functioning in a subset of the children. Currently, the majority of the original targeted sons are now aged 27 to 35, although many are still younger along with many of the later recruited siblings.</P>

<P>Before moving into the findings from the earlier years of the MLS, it is worth taking a quick look at the level of AUDs in the MLS child sample as they enter into early adulthood. Figure 1<zaq;1> shows the rates of a <I>Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition</I> (American Psychiatric Association, 2000<zaq;2>) diagnosis at ages 18 to 23 years for study participants who had reached at least age 23 to date. At these ages, 49% of the sample (53% for males, 42% for females) make a positive diagnosis for Alcohol Abuse, 31% (35% for males, 20% for females) make a diagnosis of Alcohol Dependence, and 64% of the sample (68% for males, 56% for females) make a positive diagnosis for an AUD (either Abuse and/or Dependence during that age range). These data are from 534 current participants, about one fourth of the child sample. Not surprisingly, due to the high-risk design of the MLS, the AUD among MLS participants is much higher than the national rates of 18- to 29-year-olds from the general U.S. population in the early 2000s, where about 7% met abuse criteria and 9% met dependence criteria (Grant et al., 2006), and the higher male-to-female ratio usually found in population studies is not as large in the MLS sample.</P>

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<P>To expose the reader to the complexity of what can take place developmentally to reach these levels of AUDs, Figure 2{FIG2}<zaq;3> shows a heuristic model involving multiple levels of influence at each stage and across time (Zucker, Hicks, & Heitzeg, 2016). The model involves genes, brain response/reactivity systems, intermediate alcohol nonspecific phenotypes (encompassing personality/temperament and behavior), and environmental influences leading first to the initiation of alcohol use and culminating in the occurrence of an AUD (depicted as SUD since AUD is but one of the SUDs). Taking a step back, however, we turn next to examine data that helped contribute to the development of the model depicted in Figure 2.</P>

<H1>FAMILY-CONTEXT IMPACT DURING THE CHILD'S PRESCHOOL YEARS</H1>

<P>It is well-known that the impact of living in a stressful family environment has the potential to negatively impact child development (Fitzgerald, Puttler, Refior, & Zucker, 2007; Fitzgerald, Wong, & Zucker, 2013; Weatherston & Fitzgerald, 2010). One factor often contributing to this is parent psychopathology (Zucker, 1986). As can be seen from Table 2{TBL 2}, the MLS recruitment strategy resulted in a sample of families with different levels of parent psychopathology in the homes in which these young boys were being raised (Zucker et al., 2000). Generally, parents in the alcoholic families were functioning at lower levels than were control families on various psychopathology indicators, with the lowest functioning most often seen in the highest risk families (i.e., those recruited from the courts). This was seen among fathers in terms of their antisocial behavior both as children and adolescents, the life-severity of their depression, their history of lifetime alcohol problems, and their overall low global adaptive functioning. Among mothers, those from court-recruited families had lower functioning in these areas as well, although the contrast between those from the community-recruited alcoholic families and control families was not as stark. Although recruitment was not based on mother's alcohol problems, other than that mothers in control families could not have substance problems, the fact that mothers' functioning also was poorer in the alcoholic families indicated assortative mating, or was the result of living with a more damaged partner (Nolen-Hoeksema, Wong, Fitzgerald, & Zucker, 2006; Zucker et al., 2000). Such family-level indicators add to the ecological risk environment for young children growing up in these homes, in effect creating high levels of ACE.</P>

<P>Other environmental stress factors that likely influenced both distal and proximal

outcomes for the offspring also were found early on in the MLS families. The alcoholic families had more troubles in job-related, financial, and legal matters, and also were lower in socioeconomic status (Fitzgerald & Zucker, 1995). Negative marital interactions (Floyd, Cranford, Klotz-Daugherty, Fitzgerald, & Zucker, 2006; Cranford, Floyd, Schulenberg, Fitzgerald, & Zucker, 2011), father–son conflict (Loukas et al., 2001), poorer quality parent–child interactions (Whipple, Fitzgerald, & Zucker, 1995), high family residential mobility (Buu et al., 2007), and neighborhood stress (Buu et al., 2009) also characterized families who were of higher risk for AUD and comorbid outcomes.</P>

<H1>CHILD FUNCTIONING AND EARLY RISK INDICATORS</H1>

<P>Although the family, both in terms of environmental and genetic influences, provides initial risk components for the development of AUDs, even early on child personality, temperament, and behavioral factors are pertinent. Importantly, these are not just the consequences of parental risk, but contribute to risk levels themselves as development ensues over the life span. In addition to results from the MLS, in this section we also use results from the Buffalo Longitudinal Study (BLS), which followed a sample of alcoholic and nonalcoholic families beginning when the children were 10 months old (Eiden, Chavez, & Leonard, 1999; Eiden, Edwards, & Leonard, 2002), to help demonstrate other child characteristics which are likely distal factors along the pathways to an eventual AUD outcome. Results from the BLS showed that infants from alcoholic homes generally had more insecure attachments than did children from nonalcoholic homes, and in homes where both parents had drinking problems and antisocial behavior and depression, the incidence of disorganized attachment was 30% (Eiden et al., 2002).</P>

<P>Regarding children's temperament, both the BLS and the MLS showed differences between children reared in an alcoholic environment and children not reared in such situations. The BLS results showed that infants of alcoholic fathers were more likely to be impulsive and have difficult temperaments than were children of nonalcoholic fathers (Eiden et al., 1999; Fitzgerald & Eiden, 2007). The MLS results showed more impulsiveness in young boys of alcoholics and also higher activity, shorter attention spans, and higher reactivity in these boys, which later predicted higher levels of externalizing behavior (Fitzgerald & Eiden, 2007; Loukas et al., 2001). In addition, boys with parents with two or more lifetime psychiatric diagnoses, tended to have higher externalizing behavior problems and activity levels, shorter attention spans, and higher reactivity (Mun, Fitzgerald, von Eye, Puttler, & Zucker, 2001). Similarly, in the BLS, boys with alcoholic fathers

showed lower levels of effortful control than did boys with nonalcoholic fathers (Eiden, Edwards, & Leonard, 2004, 2007).</P>

<P>In terms of what actual brain mechanisms might be involved that impact the occurrence of this behavior, recent fMRI studies from the MLS have suggested that an attenuated deactivation of the left ventral striatum may lead to inappropriate motivational responding and thus may be a preexisting risk factor of familial risk of alcohol through the externalizing pathway (Heitzeg, Nigg, Yau, Zucker, & Zubieta, 2010), that activation of the nucleus accumbens increased as a function of externalizing problems among children of alcoholics (COAs; Yau et al., 2012), and that maturational trajectories that are inconsistent with normal response inhibition development, particularly in the right hemisphere, may be a contributing factor for subsequent problem substance use (Hardee et al., 2014).</P>

<P>An advantage as well as a disadvantage of doing longitudinal research is that the field changes, with new knowledge in the measurement of constructs, the analytic possibilities, and theory, as a function of paradigm shifts. Early MLS analyses, when the children were between the ages of 3 to 5 years, mostly used COA status as the primary grouping variable. Focusing on risk in this manner, and consistent with other extant literature, we noted that early findings from the MLS showed significant differences between 3- to 5-year-olds who were COAs and those who were not; the COAs had higher levels of externalizing and internalizing behavior, lower intellectual functioning, and higher levels of difficult temperament (Fitzgerald et al., 1993; Puttler, Zucker, Fitzgerald, & Bingham, 1998).</P>

<P>Although COAs are at higher risk for subsequent problems both as children and adults, not all COAs develop such problems (West & Prinz, 1987). There is a long history of looking at alcoholism as a heterogeneous disorder (Zucker, Heitzeg, & Nigg, 2011). Thus, as the MLS children grew older, analyses of their functioning used groupings based on one of the most common subtypes, antisocial comorbidity with alcoholism. Using fathers' developmental history of antisocial behavior and their AUD diagnosis as a categorizing variable, the MLS families were divided into groups of antisocial alcoholic families (AALs), nonantisocial alcoholic families (NAALs), and controls. Results showed that children ages 3 to 8 years from AAL families had greater levels of behavior problems (both externalizing and internalizing) than did those children from NAAL families and controls (Puttler et al., 1998; Zucker et al., 2000). Boys from AAL families also had higher scores on a hyperactivity index and more risky temperament, and displayed the worst IQ and academic achievement, as

compared with children of nonantisocial alcoholics (NAALs) and controls. In addition, children of AALs displayed relatively poorer abstract planning and attentional capability, as compared with children from control families (Poon et al., 2000; Zucker et al., 2000). For externalizing behavior, children from NAAL families were at an intermediate risk level; they had greater problems than did children from control families, but fewer than did children from AAL families (Puttler et al., 1998). For the other outcomes, the risk burden was seen only in the children from AAL families; children from NAAL families were statistically indistinguishable from children from control families. In addition, even using T-scores normed for gender, overall, boys had higher levels of total behavior problems and externalizing and internalizing behavior, as compared to girls (Puttler et al., 1998<zaq;4>).</P>

<P>Adding in the child's own early behavioral functioning into the mix of risk for later problems, Zucker, Wong, Fitzgerald, and Puttler (2003) created four groups based on parental risk (presence of AUD and antisociality) and early child behavior problems (above or below the 80th percentile for total behavior problems) when the children were between 3 to 5 years of age. The four groups of children were labeled: <I>Vulnerable</I> (children with high parental and child adversity, <I>Resilient</I> (children with high parent and low child adversity), <I>Non-Challenged</I> (children with low parent and low child adversity), and <I>Troubled</I> (children with low parent and high child adversity).</P>

<P>Figures 3 and 4{FIG3 and 4} show the results for externalizing and internalizing behavior from early childhood through early adolescence. As can be seen in Figure 3, at all ages the Vulnerable group had the most externalizing behavior symptoms, followed by the Troubled, Resilient, and Non-Challenged groups. The pattern also has a normative developmental decrease in such behavior during middle childhood, which then increases again during adolescence (Achenbach, 1991). Resilient children are similar to Non-Challenged children at early ages, but showed an increase in externalizing problems during adolescence, bringing them closer to those children with higher adversity early in life.</P>

<P>Figure 4 shows a somewhat differing pattern for internalizing behavior problems. The Vulnerable and Troubled groups were highest in symptoms while the Resilient and Non-Challenged were lowest. Interestingly, although relatively low in symptoms again during early childhood and looking like the Non-Challenged group, the Resilient group's internalizing symptoms increased during adolescence to the point that they resembled the higher two risk groups, showing how exposure to sustained adversity can lead to a shift from

more normative to more troubled behavior (Zucker et al., 2016).</P>

<P>Regarding alcohol-specific risk factors in the development of AUD, the initiation of drinking at an early age is now understood to be a common risk factor for a variety of negative outcomes (Dewit, Adlaf, Offord, & Ogborne, 2000; Hingson, Heeren, & Winter, 2006). In the MLS, Mayzer, Fitzgerald, and Zucker (2009) showed that higher levels of early externalizing and internalizing behavior were predictive of both early onset of drinking as well as higher levels of externalizing and internalizing behavior and delinquent activity in adolescence.</P>

<P>Thus far, we have focused on the identification of problem behaviors in preschool-aged boys—behaviors that are elevated in families that generate high ACEs due to alcohol and other drug abuse, comorbid psychopathology, and marital conflict. We have mirrored the majority of the AUD literature (i.e., focusing on the observable behaviors that often predict transition into problem behaviors of childhood through emergent adulthood). However, behavioral manifestations, along with their underlying neurobiology and neuroendocrinology (see Schore, this issue), are not the only aspects of the organization of risk or its cascade to pathology over the life course. Equally important, though rarely studied in the AUD literature, are the subjective internalized aspects of the intersubjective self that affect personality development.</P>

<H1>DEVELOPMENT OF ALCOHOL EXPECTANCIES, THE SELF AND AND MENTAL REPRESENTATIONS</H1>

<P>During the years from birth to 5, children exposed to high degrees of parent conflict, paternal and maternal psychopathology, and poor family and neighborhood resources are more likely to develop pathological mental representations of self, other, and self–other relationships than are children who are not exposed to such rearing environments (Gaensbauer, 2016). There is strong evidence that during the preschool years, children begin to form working models, schemas, or autobiographical memories about familiar events (Karlen, 1996; Mennella & Garcia, 2000; Schneider & Bjorklund, 1998). In most instances, these memories are positive and provide the basis for normative developmental pathways to adulthood; but this is not always the case. Gaensbauer (2016) noted that

<BQ>Children's needs to recreate unhealthy, but affectively meaningful, moments with their caregivers can lead to ingrained, automatically operating pathological patterns of social

behavior and affective expression that can take on a life of their own and strongly shape the child's subsequent socioemotional functioning. (p. 172)</BQ>

Underlying the organization of such negative "automatically operating pathological patterns" are core issues related to the development of the self and the meaning-making that occurs during self–other relationships that become internalized as mental representations. Few studies of children at high risk for AUD have attempted to ascertain how mental representations are organized, and how they scaffold into more complex representations primarily by incorporating socioemotional or affective aspects of development. The field also has not spent much time assessing how exposure to highly adverse rearing environments affects the organization of such representations or the neural networks that mediate connectivity between such neural structures and behavior (Fitzgerald, Puttler, Mun, & Zucker, 2000; Fitzgerald & Zucker, 2000). That said, as a way to help the reader understand what follows, Figure 5{FIG5} shows a heuristic model of how early mental representations in the context of parental psychopathology and marital conflict may unconsciously impact the behavior of the developing child with respect to the etiology of AUD and comorbid psychopathology (Fitzgerald et al., 2013). This model is an expansion of our original model (Fitzgerald & Zucker, 2000; Fitzgerald et al., 2000).</P>
<H2>Self and Mental Representations</H2>
<P>The study of the development of the self draws upon numerous concepts (empathy, meaning-making, mind reading, mental and representational models). In addition, it is guided by an equally broad set of theories (simulation theory, embodied simulation theory, theory of mind, theory–theory, interaction theory, and systems theory) (Ammaniti & Gallese, 2014; Fitzgerald et al., 2013). The infant enters the world, in essence, not knowing anything in the sense of conscious awareness of self (Trevarthan, 1980). While infants might not "know" anything at birth, they are biologically prepared to quickly learn. By the preschool years, a child can converse, think, solve problems, manipulate objects, show affection, tease, recall and verbalize experiences, and otherwise relate to others in ways not imaginable from observation of the newborn's functional abilities. This rapid transition starts with the development of a self, which fuels self–other differentiation, self-awareness, and the emergence of self–other relationships. This developmental transition is facilitated, in part, by the development of mental representations of the events and relationships that form during the first 5 years.</P>

<P>Mental representations, or schemas, involve the encoding of experiences into long-term memory. They begin very early in life, but are influenced by rehearsal and reminders from adults (Fitzgerald & Zucker, 2006) as well as observation (Ammaniti & Gallese, 2014; Howe & Courage, 1997). In terms of alcohol, findings from the MLS have suggested that as early as preschool age, children are developing mental models or schema that include context, motivation, affect, and norms about alcohol use (Zucker & Fitzgerald, 1991; Zucker, Kincaid, Fitzgerald, & Bingham, 1995). These schemas are based primarily on child sensory and perceptual experiences related to their exposure to the use of alcohol beverages in the home, the individuals who are using them, and the contexts of their use. Within that frame, we found that sons of male alcoholics are more able to identify specific alcoholic beverages, to identify a greater number of alcoholic beverages, and to demonstrate the contextual understanding that often the role of father includes drinking (Zucker et al., 1995).</P>

<P>As development continues, both positive and negative expectancies for alcohol use also are created. Over the years, these expectancies can have a strong impact on adolescent alcohol involvement in other studies, even after controlling for other variables (M.S. Goldman, Del Boca, & Darkes, 1999). In the MLS sample, adolescent boys' negative and positive alcohol expectancies were longitudinally associated with higher odds of any intoxication 3 years later, and positive alcohol expectancies further predicted frequency of drunkenness, independently of parental alcohol involvement (Cranford, Zucker, Jester, Fitzgerald, & Puttler, 2010).</P>

<H2>Self and Intersubjectivity</H2>

<P>Observations of events are only part of the mental representations that are aspects of the emergent self. Over 100 years ago, William James (1890) drew attention to two aspects of the self, the empirical self (me) and the existential self (I). Lewis and Brooks-Gunn (1979) expanded on James' views with their distinction between the categorical self (empirical, what am I), and the subjective (existential, who am I) self. Categorical features of the self are anchored to external contexts, observable events; those characteristics that give observable definition to <I>what</I> I am, such as gender, height, skin color, eye color, physical activity, a COA, and so on. These are the group memberships one can identify based upon both self and other observations. Thus, I am a boy because I look like my father, and others affirm that I am a boy. They are linked to sensorimotor and perceptual experiences related to observable events. The alcohol schema that we described previously is directly related to the

alcohol smells and containers present in the child's home, to the individuals who use them, and to their behavior as a result of use. On the other hand, subjective features of the self are internalized, and relate to <I>who</I> I am. They are the narratives of shared experience that parents construct and become the scripts or knowledge structures (conscious and unconscious) that children use to create their initial autobiographical memories. The subjective facet of the self is phenomenological, formed via intersubjective relationships, and the meaning-making that flows from language and communication with caregivers and others.</P>

<P><I>Intersubjectivity</I> refers to the development of shared meaning between the self and others. It is an aspect of procedural or unconscious knowledge that underlies that gives<zaq;6> rise to the development of the moral self during infancy and early childhood (Emde, Biringen, Clyman, & Oppenheim, 1991). While the processes involved in developing procedural knowledge of rules may be biologically based, as Emde et al. (1991) contended, the content of what is and is not moral behavior is not. It emerges from self–other interactions, which during infancy are intensely affective, mother–infant centered, and involve the social construction of meaning about what is right and wrong and who is right or wrong. In the context of children reared in highly adverse environments, including alcoholic families with high comorbid psychopathology, it is important to note findings such as those reported by Radke-Yarrow, Belmont, Nottelmann, and Bottomly (1990) that "children's self-references are consistent with an interpretation that mothers' negatively toned comments influence children's negative-self references (p. 359)." In addition, children who are maltreated not only have poor attachment relationships with their mothers but also have poorly internalized mental models of relationships and self (Cicchetti, Beeghley, Carlson, & Toth, 1990).</P>

<P>Emde's<zaq;7> procedural rules (unconscious representations) are what Bürgin (2011) referred to as "intrapsychic entities" (p. <zaq;8>), which give symbolic meaning to observed events and which are unconsciously evoked during subsequent self–other interactions. Fraiberg, Adelson, and Shapiro's (1975) concept of "ghosts in the nursey" metaphorically refers to the intrapsychic entities or procedural rules generated during a mother's own upbringing; rules or memories that interfere with her ability to form positive, nurturing relationships with her own infant. Barrows (1994)<zaq;9> viewed fathers' ghosts primarily within the context of the father–mother relationship and noted that in the final analysis, it is the father–mother relationship that plays a key role in shaping the

child's intersubjectivity. What "ghosts in the nursery" are acquired by infant and toddler COAs that interfere not only with their relationships with others but also with their own reflective awareness of self? The work by Mennella and Beauchamp (1998), showing that infants nursing with mothers who drink are more likely to choose toys scented with the smell of alcohol, provides one concrete example of the very early beginnings of an awareness of self and others that in this instance includes alcohol in actively alcoholic families. Thus, a toy smelling of alcohol (sensory-perceptual schema about objects) is preferred because it is not only recognized via the senses but also may be consistent with the child's emergent awareness of the existential I.</P>

<P>Stern (1985) asserted that intersubjective relatedness organizes during Postnatal Months 7 to 15, and includes the time when infants become aware that they have a mind and that others do as well. The infant becomes consciously aware that intersubjective experiences can be shared through interattentionality (joint attention), interaffectivity (affect attunement), and interintentionality (mutual sharing of intention and motives). It is the same time when infants begin to organize self-regulation and self–other relationships within the context of contingencies between self and others that brings procedural knowledge of self–other relationships to conscious awareness (Trevarthen, 1980). Note that in the BLS, 30% of the infants exposed to dual-parent psychopathology were classified as having disorganized attachment relationships (Eiden et al., 2002). It is not surprising, therefore, that very young children of alcoholic fathers also were more likely to have difficult temperaments, negative moods, and problems with impulsivity than were the infants and toddlers of nonalcoholic fathers, as also was the case for the MLS children both when they were preschool age (Fitzgerald et al., 1993) and older (Loukas et al., 2001). Thus, there is increasing synchrony between the child's behavior and feedback systems that strengthen the child's intersubjective sense of self, and not always with a positive outcome.</P>

<P>Contemporary neuroscientists and philosophers have linked the categorical and subjective aspects of self to the specialization of the left and right hemispheres of the brain (McGilchrist, 2016; Schore, 2001, this issue), and the neural networks that organize and integrate social, emotional, and cognitive aspects of self and self–other relationships. The left-hemisphere (LH) mediated self is viewed as categorical. It is objective, external, certain, and event- or action-oriented. It involves left motor cortex, speech centers, and logic. The right-hemisphere (RH) mediated self, in contrast, is social, empathic, dynamic, uncertain, and relationship-oriented. It involves the right frontal and right cingulate cortex. As

McGilchrist (2016) characterized it,

<BQ>The RH, with its understanding of possibility, change, and flow, is far better than the LH at incorporating new information into a schema, without having necessarily to abandon it, while the LH, with its attachment to the fixed and certain, sticks stubbornly to what I 'knows' at all costs, in the teeth of evidence to the contrary. (pp. 205–206)</BQ>

The schema we described for COAs in the MLS is perceptual, sensory, event-based, concrete, and left-hemisphere oriented. Ammaniti and Gallese (2014) posited that intersubjectivity has its origins in sensorimotor processing of events that get coded by mirror neurons and become scaffolded into complex socioemotional and cognitive relationship dynamics. Scaffolding, largely a right-hemisphere-mediated process, affects the organization of the self, self–object differentiation, attachment relationships, and the emergence of cognitive representational memories, in part, from meaning-making conversations with parents and significant others.</P>

<P>As mentioned earlier, the literature on mental representations encompasses concepts of meaning-making, mind reading, and mental and representational models while embracing simulation theory, embodied simulation theory, theory of mind, theory–theory, interactive theory, and systems theory (Ammaniti & Gallese, 2014; Bowby, 1969; Carruthers, 2013; A.I. Goldman, 2006; Howe & Courage, 1997; Sameroff, 2000; Tronick & Beeghly, 2011). The key parameter cutting across all of these literatures and theoretical approaches is that through the process of parent–child relationship development, parents play a key role in constructing current, past, and future experiences (meaning-making) whereas children simultaneously organize their memories of lived experiences and subsequent self-referenced understandings of meaning both categorically and existentially. The dynamic interpersonal relationship experiences of infancy and early childhood contribute to the very young child's understanding of both the objective and subjective aspects of self, others, and self–other relationships (Fitzgerald et al., 2013), and we posit that they also create mental representations that guide choice behaviors later in childhood with respect to peer selection, drinking and smoking onset, and antisocial and relationship-based behaviors (see Figure 5).</P>

<P>Interestingly, many studies have documented the relationship between early relationship disorders (right-hemisphere-mediated) and early exposure to trauma, and children's

narratives. Such narratives often take the form of behavior that may originate from mirror neurons located in the brain's ventral premotor cortex, the inferior parietal lobe, or the inferior frontal gyrus (Fox et al., 2016). For example, analyses from the MLS indicate that preschool-age children who are exposed to parental use of aggression and conflict display high levels of aggression, externalizing, and antisocial behavior (Muller, Fitzgerald, Sullivan, & Zucker, 1994). It would be easy to attribute these behavioral parallels between sons and their fathers to the domain of the categorical self (Caruthers, 2013), but there is a deeper explanation as well, one that may prime the very young child to integrate the categorical self (fathers' observed acts of aggression) with the right-hemisphere-mediated subjective or existential self. Is it possible that during the earliest years of development, children exposed to very high ACEs embody far more into their emergent sense of self than the simple observed actions of adults in their environments? Children's observations of parental conflict and violence within the context of drinking provide opportunities to code such dynamics into procedural or nondeclarative memory, or what we refer to as <I>scripts</I> or <I>mental representations</I>. Clearly, such events lead to high rates of disorganized attachment (Zeanah et al., 1999) and fear in very young children (Main & Hesse, 1990). Figure 5 shows a visual representation of how early experiences may maintain, increase, or decrease cumulative risk affecting the organization of the self, priming the toddler to embark on a pathway of normative development, or one that leads to the organization and eventual expression of psychopathology, including AUD, antisocial behavior, and poor interpersonal relationships. Our model suggests that parents, particularly mothers during infancy and toddlerhood (Fitzgerald, Zucker, Maguin, & Reider, 1994), play a critical role in helping their children construct meaning with their experiences, layering relational meaning onto observed acts that are encoded into neurobiological networks that mediate mental representations and contribute to the development of the child's subjective self, an unconscious awareness of the I.</P>

<H1>CONTINUITY AND DISCONTINUITY PATHWAYS TOWARD DEVELOPMENT OF AUD</H1>

<P>One way to sum up the information provided in this article is to emphasize the importance of understanding the continuity and discontinuity of risk over the developmental span. A potential continuity pathway involves the early emergence of problems sustained by familial, neighborhood, and peer influences that impact biobehavioral dysregulation over time (Fitzgerald & Eiden, 2007). The early problems include difficult temperament,

insecure attachment, poor self-regulation, externalizing behavior, and lower cognitive abilities that emerge before or during the elementary school years, then often transition into substance use, sexual behavior, poor school performance, and involvement with the criminal justice system during adolescence. Often, these problems continue in even more severe forms when the individuals become adults. This pathway is hypothesized to be more common among families with alcoholism and other comorbidities such as the AALs (described previously).</P>

<P>Fitzgerald and Eiden (2007) also suggested two potential discontinuity pathways that show more individual differences and greater diversity in both risk and protective factors. During early years, these children show little signs of problems or the impact of risk, but stressors such as family disorganization, conflict, parent marital problems, and peer-group influences impact the push away from more normative development to more risky behavior during adolescence. The two proposed pathways diverge in that one involves the expression of both internalizing and externalizing behavior while the other involves mostly externalizing behavior. The discontinuity pathways are proposed to be more common in NAAL families and those in which the mother is relatively free of psychopathology (Fitzgerald & Eiden, 2007<zaq;8>). Regardless of pathway variation, it is clear that in research with children, little attention is given to the subjective or intersubjective experiences of the child with respect to his or her internalization of lived experiences apropos of etiologic contributions to AUD and comorbid psychopathology.</P>

<P>We now know a great deal about the development of AUDs from research done over the past few decades. This disorder is developmental in its nature and places children, boys in particular, at risk for many problems if the pathways to the disorder are not interrupted. Fortunately, research is having an impact on the creation of new prevention and intervention programs. Although it is beyond the scope of this article to provide details of this work here, the reader is referred to a very recent publication from the National Institute of Drug Abuse (2016) as one example for further discussion of such programs.</P>

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{FIG1}<FC1>F<SC>IGURE</SC> 1. Rates of <I>DSM-IV<zaq;2></I> alcohol-use disorders in the Michigan Longitudinal Study young adults ages 18–23</FC>

{FIG2}<FC1>F<SC>IGURE</SC> 2. Flow over time of a heuristic model of developmental systems framework for the development of alcohol-use disorder. SUD = substance-use disorder; IBP = <zaq;3></FC>

{FIG3}<FC1>F<SC>IGURE</SC> 3. Stability and change in externalizing symptoms through early adolescence.</FC><!--HELP: COMP: Change "Resllent" to "Resilient" in the box on the right. Also add at the end of the Table Footnote: "Resilience and vulnerability among sons of alcoholics: Relationship to developmental outcomes between early childhood and adolescence. In S. Luthar (Ed.), Resilience and vulnerability: Adaptation in the context of childhood adversities (pp. 76–103). New York: Cambridge University Press." :ENDHELP-->

{FIG4}<FC1>F<SC>IGURE</SC> 4. Stability and change in internalizing symptoms through early adolescence.</FC><!--HELP: COMP: Add at the end of the Table Footnote: "Resilience and vulnerability among sons of alcoholics: Relationship to developmental outcomes between early childhood and adolescence. In S. Luthar (Ed.), Resilience and vulnerability: Adaptation in the context of childhood adversities (pp. 76–103). New York: Cambridge University Press." :ENDHELP-->

{FIG5}<FC1>F<SC>IGURE</SC> 5. Mental representations and priming for alcoholism and coactive psychopathology.</FC>

{TBL1}<TC>TABLE 1. Eleven Symptoms of Alcohol-Use Disorder (AUD); Mild AUD (presence of 2–3 symptoms), Moderate (4–5 symptoms), Severe (6 or more symptoms)</TC>

_____

<TB>1. Alcohol is consumed in larger amounts or over a longer period than was intended.
2. There is a persistent desire or unsuccessful effort to reduce or control alcohol use.
3. Significant time is spent trying to obtain alcohol, use it, recover from its effects.
4. Individual craves or has a strong desire or urge to use alcohol.
5. Alcohol use results in a failure to meet obligations at work, school, or home.

6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol.

7. Important social, occupational, or recreational activities are given up or reduced because of alcohol use.

8. Individual continues to use alcohol in situations that are physically hazardous.

9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol.

10. Tolerance:
    1. A need for markedly increased amounts of alcohol to achieve desired effect.
    2. A markedly diminished effect with continued use of the same amount of alcohol.

11. Withdrawal syndrome is experienced.</TB>

_____

<TF>Adapted from the American Psychiatric Association (2013), <I>Diagnostic and Statistical Manual of Mental Disorders</I> (5th ed.). Arlington, VA: American Psychiatric.</TF>

<!--HELP: COMP: For Table 2, please align at decimal and center column heads and entries in columns 2-4. :ENDHELP-->

{TBL2}<TC>TABLE 2. Parent Psychopathology as Indicators of Family Psychosocial Adaptation During the Early Child-Rearing Years among the Michigan Longitudinal Study Participants (boys at ages 3–5)</TC>

	Court Recruited (n = 158) M (SD)	Community Recruited (n = 60) M (SD)	Controls (n = 90) M (SD)	F
<TB>Father Psychopathology				
Beck Depression	3.04 (3.19)	2.47 (2.60)	1.85 (2.11)	4.95**[a]
Hamilton Depression	15.54 (10.22)	13.37 (12.89)	7.82 (7.11)	16.32***[ac]
Child Antisociality	11.69 (7.78)	8.53 (4.74)	6.49 (4.51)	18.32***[abc]
Adult Antisociality	12.18 (7.97)	7.71 (4.11)	5.35 (3.46)	33.73***[abc]
LAPS	11.24 (2.00)	10.19 (1.68)	7.70 (2.01)	89.94***[abc]
GAF	53.64 (10.05)	63.39 (8.62)	67.38 (10.27)	57.33***[abc]
Mother Psychopathology				
Beck Depression	3.60 (3.54)	2.57 (2.22)	2.97 (3.33)	2.29*[b]
Hamilton Depression	17.54 (10.82)	16.67 (14.27)	12.95 (10.81)	4.46*[ac]

Child Antisociality	8.17 (6.60)	6.10 (4.17)	4.65 (3.41) 11.98***^{abc}
Adult Antisociality	6.56 (4.94)	4.96 (3.27)	4.34 (3.71) 12.09***^a
LAPS	10.43 (1.88)	10.23 (1.30)	9.11 (1.25) 8.83***^{ac}
GAF	57.67 (11.28)	63.35 (7.45)	66.13 (9.85) 19.78***^{ab}</TB>

<TF><P>LAPS = Lifetime Alcohol Problem Score; GAF = Global Adaptive Functioning (<I>Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition</I><zaq;2> Axis V).</P>
<P>*<I>p</I> < .05. **<I>p</I> < .01. ***<I>p</I> < .001.</P>
<P>^aCourt > Control. ^bCourt > Community. ^cCommunity > Control.</P></TF>

AUTHOR NOTE: Feel free to change the running head.

1<<enote>>"N = 534 (380 males, 184 females)" This adds up to 564, not 534; please check.

2<<enote>>The <I>DSM-IV</I> was published in 1994, not 2000. Are you referring to the <I>DSM-IV-TR</I> instead, which was published in 2000? If so, please change to "<I>Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision</I>."

3<<enote>>What does IBP stand for? Integrative Body Psychotherapy? Please add.

4<<enote>>I added 1998, as mentioned earlier in the text and as listed in the References; correct as added?

5<<enote>>Please check "that underlies that gives."

6<<enote>>Are you referring to Emde et al., 1991? If so, the citation should be "Emde et al.'s (1991) procedural. . . ."

7<<enote>>Please add the page number for the material in quotes.

8<<enote>>Barrows (1994) is not in the References; please add a complete entry there.

9<<enote>>I added "2007;" correct as added?

10<<enote>>Barrows, P. (2004) is not in the text. Either add a citation in the text or delete the entry in the References.

11<<enote>>Please add the initisl(s).

12<<enote>>Please add the page range.