



Substance use in youth adopted from foster care: Developmental mechanisms of risk

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ABSTRACT

Children who enter foster care are at unique risk for developing substance abuse due to experiencing early life stressors. A large body of research has revealed robust effects of various stressors on later substance use, implicating the role of early neurobiological changes that create chronic internalizing problems. However, less literature has investigated externalizing behavior as a mechanism underlying this relationship. Moreover, few studies have examined these mechanisms through a model of cumulative risk. The present study examined whether the prospective association between cumulative pre-adoptive risk (e.g., maltreatment, age at placement, foster placement instability, ever having lived with birth parent) and adolescent/young-adult substance use was mediated by childhood internalizing and externalizing problems in youth adopted from foster care. Participants included 82 adoptees, most with histories of prenatal substance exposure (72%). We tested parent-rated internalizing and externalizing problems across 5 years in childhood as simultaneous mediators of cumulative risk and level of substance use 11–15 years later. Bootstrapping mediation procedures, controlling for age, prenatal substance exposure, adolescent/young adult mental health symptomatology, and youth participation in follow-up, revealed a significant indirect effect of cumulative risk on substance use through childhood internalizing problems, but not externalizing problems. These results underline the importance of mitigating early risk for children in the child welfare system and call for targeting childhood emotion dysregulation to reduce likelihood of substance abuse among previously high-risk adoptees. Nevertheless, low rates of substance use overall in the present sample underscore the positive impact of adoptive placement on mitigating risk for substance abuse among foster youth.

1. Introduction

Youth who enter foster care are twice as likely as the normative population to later meet criteria for substance abuse or dependence (Tieman, van der Ende, & Verhulst, 2005). High rates of foster youth – upwards of 60% in several states – enter care directly or indirectly due to parental substance use, and many of these children were also prenatally exposed to drugs or alcohol (Seay, 2015). It is tempting to conclude, therefore, that heightened rates of substance use among foster youth can be attributed to prenatal substance exposure and genetic propensity. Although substance use outcomes may arise partially from these factors (Baer, Sampson, Barr, Connor, & Streissguth, 2003; Behnke et al., 2013), foster children also experience significant adversity and stressors both before and after entering care that have a profound impact on their developmental trajectories.

Although all foster youth experience some form of adversity, their level of exposure varies. Many foster youth are victims of abuse or neglect, and the link between early maltreatment and substance abuse/

dependence has been well founded (Dube et al., 2003; Reed, Anthony, & Breslau, 2007). Some are detained at birth due to prenatal substance exposure, whereas others remain with their biological parents for years in a chaotic, abusive, and/or neglectful caregiving environment (Sharma, McGue, & Benson, 1996). Upon entry into foster care, some children receive nurturing care from foster caregivers, while others are maltreated further (Euser, Alink, Tharner, van IJzendoorn, & Bakermans-Kranenburg, 2014; Hobbs, Hobbs, & Wynne, 1999). Some move often between foster homes, some reunify with their biological parents once the home is deemed safe, and others are adopted into stable, permanent placements. Given the link between early life stress and substance use outcomes, it is likely that youth adopted from foster care vary in their frequency of substance use based on their histories of pre-adoptive risk. Nevertheless, there have been almost no prospective longitudinal studies of foster youth, and none to our knowledge have examined substance use outcomes among adolescents/young adults who were adopted from foster care as children. These studies are essential to fully understand how early risk factors influence later

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outcomes among this unique population.

1.1. Early risk factors for substance use

Adverse family environments in childhood increase susceptibility to later substance abuse (Skeer, McCormick, Normand, Buka, & Gilman, 2009). Several factors indicative of family adversity are common to foster youth, especially among those from substance-using families of origin. In substance-abusing families, child maltreatment is especially prevalent (Wells, 2009). Neglect commonly occurs in such families as the needs of the child often come second to the needs of the substance-addicted parent (McKeganey, Barnard, & McIntosh, 2002). As such, the parent may often fail to meet the child's basic needs for safety, care, and supervision (Kroll & Taylor, 2003) and emotional needs for responsive and sensitive parenting (Goodman, Hans, & Cox, 1999). Moreover, substance-dependent parents may become abusive due to difficulties regulating anger and impulses as a result of their altered state (Child Welfare Information Gateway, 2014). Besides causing immediate harm to the child, maltreatment engenders enduring behavioral consequences by altering the architecture of the developing brain (Glaser, 2000; Twardosz & Lutzker, 2010). Moreover, maltreatment dysregulates the same neurobiological stress systems implicated in substance abuse, namely the hypothalamic-pituitary (HPA) axis (Schaefer et al., 2010).

Although the link between maltreatment and substance use has received the most attention in scientific literature, other risk factors play a similar role among children adopted from foster care. The inconsistent caregiving inherent to maltreating families also emerges through discontinuity in caregiver relationships among foster youth placed in multiple homes. Recent research has revealed that the same neurobiological mechanisms underlying internalizing problems in maltreated youth influence stress responses in foster youth who have experienced multiple disrupted placements. Placement instability, like maltreatment, creates alterations to the HPA axis that dysregulate stress response systems (Fisher, Van Ryzin, & Gunnar, 2011). Aarons et al. (2008) revealed a marginally significant association between number of foster care placements and level of substance use. Other variables that reflect chronicity of maltreatment or time in foster care may similarly predict substance use outcomes. For example, Sharma et al. (1996) found that older-adopted children engaged in greater substance use. Although little research has been conducted on the contribution of age of entry into foster care, it is likely that later entry signifies a longer chronicity of maltreatment, which has been linked to greater substance use (Benjet, Borges, Medina-Mora, & Méndez, 2013). Importantly, these risk factors often co-occur, giving rise to issues of multicollinearity when studied as individual predictors. Thus, measuring the totality of early environmental risk may provide a more comprehensive model.

1.2. Cumulative risk models of substance use

Substance use outcomes are multicausal, reflecting a complex coalescence of numerous environmental and genetic factors (Kendler, Jacobson, Prescott, & Neale, 2003; Meier et al., 2016). Although individual stressors have been demonstrated to predict substance use, the literature on children from high-risk backgrounds is increasingly shifting towards a model of “cumulative risk,” an additive model that captures a number of risk factors in tandem (Evans, Li, & Whipple, 2013). This model was first applied to substance use by Bry, McKeon, and Pandina (1982), who revealed that the sum of six risk factors linearly predicted level of substance use. Cumulative risk models not only take into account the presence of multiple factors that often co-occur but also capture interactions among risk factors (Newcomb & Felix-Ortiz, 1992), thus allowing for greater predictive power than would individual risk factors alone. A number of studies have validated the role of cumulative risk in predicting substance use (Andersen & Teicher, 2009; Turner & Lloyd, 2003), demonstrating that risk factors predict

outcomes linearly and additively (Dube et al., 2003). Cumulative risk has been associated with greater use of alcohol (Helen, Keri, Peihua, & Rajita, 2010), tobacco (Anda et al., 1999), marijuana (Butters, 2005), and illicit drugs (Hoffmann, Cerbone, & Su, 2000).

The implementation of a model of cumulative risk, while useful in studying the development of substance use generally, is especially advantageous in studying substance use among foster care populations. Foster youth possess a relatively unique set of risk factors that work cumulatively to increase risk of substance abuse; moreover, they are at much higher risk for substance abuse than the general population. Given the high rates of foster youth who come from substance abusing families of origin, occasional substance use may represent more of a “gateway” to substance abuse than just a developmentally appropriate phase; children of substance-abusing parents show steeper escalations in substance use than normative youth (Chassin & Barrera Jr, 1993). Investigating pathways towards substance use in a population of foster youth who were subsequently adopted, moreover, provides a precise model for the development of substance use following early life stress by defining adoption as a natural cutoff for pre-adoptive risk. Conclusions that can be drawn from the previously cited studies are limited due to possible co-occurrence of adversity and substance abuse. For example, studies on adverse childhood experiences (e.g., Anda et al., 1999; Dube et al., 2003) operationalize cumulative stress through indices that may continue to occur beyond childhood, such as family dysfunction. Others measure the association of lifetime adverse experiences with substance abuse (Turner & Lloyd, 2003) or measure cumulative risk and substance abuse concurrently (Butters, 2005). Thus, it is important to both science and practice to study cumulative risk pathways towards substance use in the context of youth adopted from foster care.

1.3. Pathways from cumulative risk to substance use

While research examining the impact of cumulative risk on substance use among foster youth is sparse, even less is known about the mechanisms that underlie this association. Research on the neurological underpinnings of the stress-substance use connection provides insight into the global mechanism that may underlie this link: dysregulation. Early life stress creates frequent elevations of cortisol in early childhood, followed by a blunted pattern of cortisol production (hypocortisolism) in middle childhood and beyond (Heim, Ehlert, & Hellhammer, 2000). Hypocortisolism has been demonstrated to be a risk factor for addictive disorders (Sinha, 2001), especially among offspring of addicts (Sorocco, Lovallo, Vincent, & Collins, 2006). While the behavioral correlates of these neurobiological changes have not been conclusively studied, Lovallo (2013) proposed that dysregulation of frontolimbic systems may lead to substance use through behavioral disinhibition or unstable affect regulation. These constructs of dysregulation can presumably represent both internalizing (inner-directed; e.g., anxiety, depression) and externalizing (outer-directed; e.g., aggression, rule-breaking behavior) psychopathology (Forns, Abad, & Kirchner, 2011). Indeed, behavioral research has demonstrated that cumulative risk heightens both internalizing and externalizing symptoms (Doan, Fuller-Rowell, & Evans, 2012; Trentacosta et al., 2008). Although the predictive effect of early life stress on substance use is robust, the developmental mechanisms underlying this process are unclear; both internalizing and externalizing problems have theoretically plausible mediating pathways linking environmental risk to later substance use. It is vital, therefore, to identify whether one of these mechanisms alone, or both in tandem, mediate this relationship.

1.3.1. Internalizing pathway to substance use

A number of studies have implicated the role of internalizing problems in connecting early risk to later substance use. For example, Douglas et al. (2010) found that mood and anxiety disorders mediated the link between number of adverse childhood experiences and level of

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