

DISSERTATION

SELF-ESTEEM MEDIATING THE RELATIONSHIP BETWEEN
PARENTAL MONITORING AND AMERICAN INDIAN CANNABIS USE

Submitted by

Dorothy Haruyama

Department of Psychology

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Fall 2022

Doctoral Committee:

Advisor: Ernest Chavez

Randall Swaim
Mark Prince
Nathaniel Riggs

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ABSTRACT

SELF-ESTEEM MEDIATING THE RELATIONSHIP BETWEEN PARENTAL MONITORING AND AMERICAN INDIAN CANNABIS USE

Adolescents are one of the largest age groups using cannabis in the U.S. Cannabis use has been associated with a variety of negative mental health outcomes and is a risk factor for the development of Cannabis Use Disorder. Among adolescents, minority populations like American Indians use cannabis at much greater rates and initiate at a younger age. While parental monitoring has generally been found to be a protective factor in adolescent substance use, limited research exists with American Indian youth examining specific domains of parental monitoring such as parental knowledge, parental control, child disclosure and parental solicitation. Similarly, while some studies have explored self-esteem as a mediator of the relationship between parental monitoring and adolescent substance use, fewer studies have examined how specific domains of parental monitoring may interact with specific domains of self-esteem. The current study tested a mediation model of parental monitoring factors and cannabis use among American Indian youth by internal (interpersonal) and external (intrapersonal) self-esteem. Data obtained from students in grades 7-12 attending schools on, or near reservations, throughout the United States during two academic years (2018-2019) was used. Results supported hypotheses that parental monitoring factors individually related positively to internal and external self-esteem and furthermore negatively related to American Indian youth cannabis use. However, while internal self-esteem was related to cannabis use, external self-esteem was not. The mediation model was supported as each parental monitoring

factor had an indirect effect on cannabis use via internal self-esteem. Results from this study being used to inform clinical interventions for the treatment and prevention of cannabis use disorder for American Indian youth is discussed.

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Introduction

It is important to understand the factors that contribute to cannabis use among adolescents given research findings that those who use cannabis in their youth are more likely to develop a cannabis use disorder than those who initiate in adulthood. Regular and heavy cannabis use is related to numerous physical, emotional, and psychosocial outcomes in addition to being a risk factor for developing a cannabis use disorder. While cannabis is second to alcohol as one of the most used substances among adolescents (Johnston et al., 2006; 2010; 2019; 2021), the changing legal status of cannabis within the United States may lead to changes in use rates. As the risks for adolescent's cannabis use are greater than for adult cannabis use, it is particularly important to understand contributing factors to adolescent cannabis use.

Outcomes of adolescent cannabis use

In the United States, 48.2 million Americans over the age of 12 endorsed cannabis use in the past month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). Individuals who use cannabis in their youth are more likely to develop a cannabis use disorder than those who initiate or use in adulthood (Han et al., 2018, Winters & Lee, 2008; Volkow et al., 2014). For example, Chen, Storr and Anthony (2009) found that those who begin cannabis use in adolescence versus adulthood were roughly 2 to 4 times more likely to develop cannabis dependence symptoms within 24 months after first use. Furthermore, Hall and Degenhardt (2007) reported that 1 in 6 of those who start using cannabis as teenagers will become addicted.

More recent studies continue to find connections between adolescent substance use and cannabis use disorder. Han and colleagues (2018) examined National Survey on Drug Use and

Health (NSDUH) data from 2015-2017 and found that one in five youth (age 12-17), compared to one in ten young adults who started using cannabis more than three years ago now endorsed symptoms of a cannabis use disorder. Examining data from the 2015–2018 National Survey on Drug Use and Health (NSDUH), Volkow and colleagues (2021) found that the likelihood of developing a cannabis use disorder from past-year use was higher for adolescents than young adults at all examined time frames. Additionally, within 12 months since first cannabis use, 10.7% of adolescents had cannabis use disorder versus 6.4% of young adults (Volkow et al., 2021). Volkow and colleagues (2021) found a clear association between younger age of first cannabis use and development of other (i.e., non-cannabis) substance use disorders. This literature shows the need for greater concern around youth cannabis use as the above studies have found that adolescents are more likely to develop cannabis addiction and cannabis substance use disorders than adults.

Additional Concerns

Many studies report finding additional concerns regarding long term and heavy adolescent cannabis use. These concerns include poor educational outcomes such as increased likelihood of school dropout (Bray, Zarkin & Ringwalt, 2000; Lynskey & Hall, 2000), and overall diminished life satisfaction and achievement, as well as greater risk for the development of schizophrenia and related disorders (Caspi et al., 2005). Some studies have shown that even short-term cannabis use can result in increased risk for paranoia and psychosis (Marconi et al., 2016) and anxiety and depression (Patton et al., 2002). Considering the negative impact of regular and heavy cannabis use and the development of a cannabis use disorder, the protective factors on adolescent cannabis use need to be better understood.

Cannabis Use Among American Indian (AI) Youth

Rates of endorsing cannabis use show variability by ethnicity/race. According to the Substance Abuse and Mental Health Services Administration (2014), rates of adolescent substance use are highest among multiracial youth (17.4%) compared to 8.8% for Latinos, 9.5% for Whites, and 10.5% for Black youth. Studies that examine American Indian youth (AI) show that they are at higher risk for drug use compared to other minority groups (Price et al. 2002; Wu et al. 2011). Compared to national rates, AI youth are also at greater risk of early use of cannabis (Stanley et al., 2014a; Swaim and Stanley, 2018), and some research supports that AI youth who initiate with cannabis rather than alcohol are more likely to progress to the use of other illicit drugs (Novins & Baron, 2004). Swaim and Stanley and Stanley (2018) found that AI youth were more likely to use cannabis while their White peers were more likely to consume alcohol. Similar to the national trends, cannabis use among AI youth is highest among 18–25-year-olds. However, AI 12–17-year-olds are endorsing last month cannabis use at consistently higher rates than the national data (SAMHSA, 2020a, 2020b). On average, from 2016–2019, 6.8% of 12–17-year-olds in the U.S. reported last month cannabis use compared to 11.2% of AI 12-17-year olds (range from 9.4% - 14.6% from 2016-2019) (SAMHSA, 2020a, 2020b). Due to the high rates of cannabis use among AI youth, this is a key population to study protective factors in order to be better equipped to develop appropriate and relevant interventions.

Social Cognitive Theory

Why are some adolescents engaging in more substance use than others? One explanation can be drawn from Social Cognitive Theory. Social Cognitive Theory, based on Bandura's (1997) Social Learning Theory argues that learning is a result of a dynamic and reciprocal interaction of the person, environment and behavior. In this model, past experiences influence

expectations of reinforcements for certain behaviors. As this model grew to include self-efficacy, it developed into the Social Cognitive Theory. Following this theory, the influence of parenting behaviors, the youth's sense of self-efficacy/self-esteem, and the surrounding environment would be expected to influence substance use behavior. Support for this model has been reported in several studies (Colder & Chassin, 1997; Cooper, 1994; Coskunpinar & Cyders, 2012; Willem et al., 2012), a few of which have examined the model with AI youth (Dieterich et al., 2013; Mitchell et al., 2006; Swaim, 2015).

Self Esteem (SE)

Many studies have previously examined self-esteem as a protective factor in adolescent substance use. Self-esteem is thought to relate to an individual's evaluation of themselves and their sense of self-worth (Coopersmith, 1967; Rosenberg, 1979; Donnellan et al., 2011; MacDonald & Leary, 2012). As Rosenberg (1965) points out, self-esteem is thought to include a positive attitude toward the self but does not necessarily imply that the individual feels superior to others (Rosenberg, 1965). Since much of the literature on self-esteem uses a global self-esteem measure that is either unidimensional or hierarchical (i.e., subdomains of self-esteem that feed into a global self-esteem factor) this paper will refer to such measures as Global Self-Esteem (GSE) measures. Numerous studies suggest variability in average GSE by age, sex and race/ethnicity/culture.

Age and Sex

Most studies show variability in average endorsed GSE by age, with an overall increase during adolescence (Harter, 2006a; Harter, 2006b; Harter, 2006c; Huang, 2010; Kling et al., 1999; Orth et al., 2014; Trzesniewski, Donnellan, & Robins, 2013). Harter (2006a; 2006b; 2006c) thought that GSE declines around ages 11-13 before starting to increase rapidly around

age 15. Orth (2010) found that average levels of GSE increased from age 4 to 11 but then remained stable from age 11 to 15. After the age of 15, average GSE increased until age 30 (Orth, 2010). Studies examining GSE in international contexts have found similar patterns of mean differences in GSE endorsement by age (Bleidorn et al., 2016). Bleidorn and colleagues found a consistent increase in average self-esteem with age during adolescence across 48 nations sampled (Bleidorn et al., 2016). In addition to age, studies often show mean level GSE differences by sex, such that males report slightly higher GSE than females (Bleidorn et al., 2016), including in the U.S. (Bachman et al., 2011; Twenge & Crocker, 2000).

Race/ Ethnicity/ Culture

Twenge and Crocker (2000) conducted a meta-analysis on literature comparing racial/ethnic groups' ratings of GSE within the U.S., finding mean differences in GSE endorsed by ethnic/racial group that changed based on age. Similar to previous studies, Twenge and Crocker also found that on average, Black individuals reported higher average GSE ($k= 354$, $d= 0.19$) than White individuals, but this did not hold for other minority groups who reported lower average GSE than White individuals (Hispanic: $K= 118$, $d= -0.09$, American Indian: $k= 28$, $d= -0.21$; Asian: $k= 38$, $d= -0.30$). Twenge and Crocker showed that average difference in GSE changed in relation to age such that the Black advantage in GSE increased from elementary school to college age.

Compared to White non-Hispanic (WnH), Black, Hispanic or Asian individuals, AI individuals on average across studies scored lower on the GSE measures, with the largest differences between AI and WnH ($K=38$, $d= -0.21$) individuals and lowest between Asian and AI ($K=3$, $d= -0.12$) individuals. Some have suggested that differences seen between racial/ethnic groups in average endorsement of GSE may be due to cultural differences such as those from

more collectivist cultural backgrounds reporting lower GSE compared to those from more individualist cultures (See Twenge: DuBray, 1985; Garrett, 1995; Garrett & Garrett, 1994; Kasten, 1992). This may help explain why Asian and AI individuals have lower scores than WnH or Black individuals.

Interestingly, the effect sizes found by Twenge and Crocker (2000) also varied significantly depending on the self-esteem measure used. For example, on the Rosenberg Self-Esteem scale, Black individuals had higher average GSE than WnH individuals, but this pattern was reversed when analyzing studies that used the Coopersmith Self-Esteem Inventory. The Rosenberg Self-Esteem Scale (Rosenberg, 1965) assesses GSE with 10 items, half positively valenced and half negatively valenced (e.g., “On the whole, I am satisfied with myself” and “All in all, I am inclined to feel that I am a failure”). The Coopersmith Self-Esteem Inventory is a longer questionnaire of 25 items for adults (16+ years old) and 58 items for school age children (8-15 years old). The school age questionnaire has both GSE measures and subdomains, including Social Self-Peers, Home-Parents, and School-Academic SE. The inventory used in a given study may explain some of the variability in differences in GSE observed by race/ethnicity.

Global Self-Esteem (GSE) and Substance Use

Many theorize that higher levels of GSE would predict lower substance use rates among adolescents (Baumeister, 1990; Jang & Thornberry, 1998; Jessor et al., 1995; Kaplan, 1975, Koval & Pederson, 1999; McGee & Williams, 2000; Wild et al., 2004). Some have suggested that adolescents with low GSE may use substances at greater rates to decrease negative feelings associated with low GSE (Baumeister, 1990; Jessor et al., 1995; Koval & Pederson, 1999; McGee & Williams, 2000). Others have suggested that when adolescents experience feelings of

rejection/ low GSE, they may lose motivation to continue conforming to conventions, leading to delinquent behaviors such as substance use (Kaplan, 1975; Jang & Thornberry, 1998). While many have theorized that GSE would lead to reduced substance use, much of the literature has shown mixed results (Emery et al., 1993; Wills, 1994; Young, Werch, & Bakeman, 1989).

Some studies have found evidence for a negative relationship between GSE and substance use among adolescents (Buster & Rodgers, 2000; Finke & Williams, 1999; Jackson, 1997; Kaplan, Johnson, & Bailey, 1988; Towberman & McDonald, 1993; Richardson et al., 2013). One study by Lee (2018) found a negative relationship between GSE and cannabis use that was significant at age 15 but grew weaker until it became statistically nonsignificant after age 21. However, other studies find no significant relationship or mixed results (Crocker, 2002; Greenberg, Lewis, & Dodd, 1999; Jones & Heaven, 1998; Luhtanen & Crocker, 2005; Resnicow, Smith, Harrison, & Drucker, 1999; Schroeder, Laflin & Weis; 1993) with one study known to the author reporting a positive relationship with alcohol use (DeSimone, Murray, & Lester, 1994).

Multi-dimensional measure of SE

The lack of consistent findings of GSE and adolescent substance use may be due to previous studies using a global measure of GSE instead of a multi-dimensional measure (Emery et al., 1993; Wills, 1994; Young et al., 1989). Several articles have demonstrated the differing relationship to substance use by specific SE domains (Crocker, 2002; Dolcini & Alder, 1994; Donnelly et al., 2008; Luhtanen & Crocker, 2005; Schick et al., 2020; Swaim & Wayman, 2004; Wild et al., 2004).

Many studies have examined SE from particular life domains, such as school, home, peer and athletics. Using a sample from South Africa, Wild and colleagues (2004) examined five

specific domains of SE (peers, school, family, body image, sports/athletics) along with GSE. They found varying relationships between their subdomains of SE and substance use. When controlling for the other SE scales, low Peer SE was associated with decreased likelihood of smoking, and Sports/Athletics SE was associated with lower likelihood of smoking for boys only. Conversely, low Family SE was associated with increased likelihood of alcohol, cigarette and drug use for both girls and boys, along with low School SE associated with increased likelihood of smoking. Finally, low Body Image SE was associated with increased likelihood of alcohol, cigarette and drug use for girls (Wild et al., 2004). Likewise, several other studies have found that high home and school self-esteem are protective factors against substance use (Emery, McDermott, Holcomb, & Marty, 1993; Young & Werch, 1990; Young, Werch, & Bakema, 1989). A more recent study using Home, School and Peer domains of SE found that Home and School SE were significantly related to adolescent drug use behavior more so than Peer SE (Donnelly et al., 2008). Like Wild and colleagues (2004), Donnelly and colleagues (2008) found that gender significantly changed the strength of the relationship between some of their variables, such as female adolescents using smokeless tobacco had much lower Home SE than females who did not use smokeless tobacco, whereas for males the difference between using smokeless tobacco on Home SE was much smaller.

While some studies have examined specific SE life domains, other studies have examined SE by internal vs. external contingencies (Crocker 2002; Dolcini & Adler, 1994). Dolcini and Adler (1994) used Harter's (1985) five-domain measure of SE and showed differential relationships in alcohol use among eighth grade students such that the Social Acceptance domain was positively related to alcohol use while the Behavioral Conduct domain negatively related to alcohol use (Dolcini & Alder, 1994). Crocker (2002) helps explain why this may be the case, as

“contingencies of self-worth that are external rather than internal, or dependent on others rather than our own behavior, are much more vulnerable to threat on a day-to-day basis, and constantly require earning the approval of yet another person, winning yet another award, or outdoing yet another competitor” (Crocker, 2002, p.600). Crocker distinguished SE from internal sources such as virtue from external sources such as other people’s approval, appearance, academic competence, and competition. Crocker found that level of self-esteem had little or no effect on how much time college students spent in most activities in their first semester, but contingencies of self-worth prior to entering college significantly predicted first semester activities and continued to predict subsequent activities even when controlling for gender, ethnicity, and socioeconomic status. Crocker also examined various negative outcomes such as drug use and found that students who based their self-esteem on external sources were higher in alcohol and drug use than those who based their self-esteem on internal sources (Crocker, 2002).

Differentiating internal vs. external aspects of SE was further supported in Swaim and Wayman (2004)’s examination of a SE measure used by Swaim, Oetting, Edwards, and Beauvais (1989) with a sample of Mexican American and WnH American high school students. They found evidence for a three-factor structure of SE by self-confidence, competence, and social acceptance. These subdomains have been noted as critical in measuring adolescent SE (Harter, 1985, 1990; Tafari & Swann, 1995). In their study, Swaim and Wayman used a prospective design in which participants were assessed two years apart to examine cross-cultural and sex differences among Mexican American and WnH alcohol use. When examining concurrent effects, Swaim and Wayman (2004) found that WnH youth in 9th and 10th grade showed a negative relationship between alcohol use and the SE domains of competence and self-confidence. However, alcohol use among WnH in the 11th and 12th grade did not have a

statistically significant relationship with any of the SE domains. For Mexican American youth, while self-confidence showed a negative relationship with alcohol use for all grades, this was not the same for competence which was only significant for male youth in the 9th and 10th grade. When looking at concurrent effects, Swaim & Wayman did not find significant results for social acceptance, except for WnH male and female youths in 11th and 12th grade who indicated a positive relationship with alcohol use. The only prospective relationship found was between lower self-confidence predicting higher alcohol use in Mexican American female adolescents.

It is interesting to note that Swaim and Wayman (2004)'s factors and the associated items of self-confidence and competence are closely aligned with Crocker (2002)'s internal factor SE while the items from Swaim and Wayman (2004)'s social acceptance factor were congruent with external contingencies factors from Crocker (2002). Like Crocker (2002)'s results internal self-worth, Swaim and Wayman (2004)'s self-confidence and competence measures generally showed a negative relationship with alcohol use among concurrent effects, and lower self-confidence predicted higher alcohol use in Mexican American female youth. Critically, Swaim and Wayman (2004)'s social acceptance measure, like Crocker (2002)'s external self-worth measure, demonstrated a surprising positive relationship with alcohol use for some of the youth among concurrent effects. The results from these two studies suggest not only the need to examine SE domains separately, but also highlight that internal vs. external SE may have differing direction of relationships with adolescent substance use.

Like Swaim and Wayman (2004), Schick and colleagues (2020) examined the factor structure of SE with similar results of differing relationships to substance use by SE domains. Schick and colleagues (2020) examined the factor structure of SE used by Swaim and Wayman (2004) expecting to find the same three subdomains (i.e., self-confidence, competence, and

social acceptance). However, in their sample of AI youth, they found that the best-fitting model was a two-factor structure. In Schick and colleagues' (2020) study, the competence and self-confidence factors combined to form a single factor of intrapersonal SE, dropping one item "I am good at games." The authors theorized that the first factor assessed SE from intrinsic sources (i.e., intrapersonal SE) and the second factor (previously called social acceptance by Swaim and Wayman) assessed SE from extrinsic sources (i.e., interpersonal self-esteem). Schick and colleagues (2020) then used this measure to examine the intrapersonal and interpersonal SE factors in relation to alcohol use among AI youth. Like Swaim and Wayman (2004) who found that different domains of SE had different directions of relationship with adolescent alcohol use, Schick et al. (2020) found that the intrapersonal SE was negatively related to alcohol use while interpersonal SE was positively related to alcohol use among AI youth. While these studies demonstrate the importance of examining specific domains of self-esteem on alcohol use, less is known about how internal vs. external SE subdomains relate to cannabis use among AI youth.

Family Factors – Parental Monitoring

As part of the social and environmental context in which youth are raised, family variables often play a critical role in youth substance use rates. Aspects of family such as parental attitudes towards substance use, parenting styles and family cohesion/identification have all been shown to relate to differing levels of substance use in adolescents within the U.S. (Barnes et al., 2000; Whitbeck et al., 2001), including multi-racial youth (Fisher et al., 2019) and AI youth (Henry et al., 2011; King et al., 1992; Spear et al., 2013; Stanley et al., 2014b). One such family variable studied extensively in the literature is parental monitoring.

Parental monitoring, sometimes previously referred to in the literature as parental supervision, has generally been found to be a protective factor in youth substance use for both AI

and non-AI youth (Craig & Glick, 1968; Glueck & Glueck, 1959; McCord, McCord, & Howard, 1963; West & Farrington, 1973). Parental monitoring includes concepts of awareness, watchfulness, and supervision/implementing control in the adolescent's activities by parents in multiple domains of an adolescent's life (Dishion & McMahon, 1998; Bray 2001a, 2001b). Many studies have established a connection between parental monitoring and early substance use (Baumrind, Moselle, & Martin, 1985; Brown et al., 1993; Chilcoat & Anthony, 1996; Clark, Shamblen, Ringwalt, & Hanley, 2012; Dishion, Reid, & Patterson, 1988; Dishion, Capaldi, Spracklen, & Li, 1995; Fletcher, Darling, & Steinberg, 1995; Flannery et al., 1994), adolescent alcohol and cannabis use generally (Dishion and Loeber, 1985; Steinberg & Silverberg, 1986), and for AI youth substance use (Smith, 2019; Swaim & Stanley, 2016; Haruyama et al., 2021). Studies examining parental vs. youth report of parental monitoring and outcomes, have generally found youth reports are most correlated to outcomes (Abar et al., 2015; Gentile et al., 2012). One study comparing elementary school children's reports of parent monitoring related to media use showed that the children's reports were found to be slightly more predictive than parental reports (Gentile et al., 2012). In another study comparing youth and parental reports of parental monitoring of 6th-8th graders, Abar and colleagues (2015) also found youth reports were more closely related to outcomes of substance use than parental reports (Abar et al., 2015). Thus, there is strong evidence for using youth self-reports of parental monitoring.

AI Parenting Styles

While it is challenging to generalize different AI parenting styles, previous literature has discussed some general differences between AI and non-AI parenting practices. For example, some earlier research suggests that many traditional AI parenting styles use more indirect and non-interfering styles, such as nonverbal communication, patience, observation, encouragement,

role playing, modeling, and storytelling rather than direct confrontation, questioning, or lecturing of children (Everett, Proctor & Cartmell, 1983; Garrett, 1996; Garrett & Garrett, 1994). In addition, AI parenting techniques may facilitate natural consequences (BigFoot & Funderburk, 2011; Glover, 2001) by allowing youth to face the outcomes of their decisions, both good and bad (Davis, Dionne, & Fortin, 2014; Robinson-Zañartu, 1996) unless those consequences would result in serious harm (BigFoot & Funderburk, 2011). Additionally, AI parenting practices tend to build on more active extended family members' involvement in discipline (BigFoot & Funderburk, 2011; Boyd-Ball et al., 2014; Burnette, 2016; Glover, 2001; Mmari, Blum, & Teufel-Shone, 2010; Walls et al., 2019). These generalizations of AI parenting styles may impact the appropriateness of any parental monitoring measure developed with only non-AI youth.

Parental Monitoring and GSE

Numerous studies show connections between parenting and GSE among youth (Banstola, 2020; Cakar & Takay, 2015; McGee et al., 2001; Rice, 1990; Spoth et al., 1996). Research has shown that parenting practices such as supportive parenting and parental monitoring are positively associated with adolescent GSE (Bulanda & Majumdar, 2009; Dekovic & Meeus, 1997; Liu et al., 2018; Spoth, et al., 1996; Rice, 1990; Hoelter & Harper, 1987). For example, Liu and colleagues (2018) found that maternal support significantly and positively predicted GSE for boys and girls and Bulanda and Majumdar (2009) showed that adolescent reports of mothers' and fathers' involvement is positively associated with adolescent GSE. Conversely, the reverse has been shown, such as poor family connections being associated with low GSE in adolescence and early adulthood (McGee, Williams, & Nada-Raja, 2001).

Studies have also suggested that GSE may partially mediate parenting and youth outcomes. For example, some studies have shown that GSE has indirect effects between parental

support and youth depression (DuBois et al. 1994; Garber et al. 1997; Plunkett et al. 2007a, b). Several studies have examined GSE mediating parenting and deviant behaviors such as substance use (Cakar & Tegay, 2015; Caldwell et al., 2006; De Vries, Hoeve, Stams, & Asscher, 2015; Hunter, Barber, & Stolz, 2015; Peterson et al., 2010; Wang et al., 2016). For example, Liu and colleagues (2018) found a significant negative indirect effect of maternal support on youth deviance by GSE. While this indirect effect did not significantly vary by sex, the strength of segments of the relationship between maternal support, GSE and deviance did vary significantly by sex. For girls, the association between maternal support and GSE was significantly stronger than for boys. Conversely, the association between GSE and deviance was significantly stronger for boys than for girls (Liu et al., 2018). These studies provide some evidence that GSE may have indirect effects on the relationship between parental monitoring on youth cannabis use. However, it is less clear how specific domains of SE may act as mediators of youth outcomes.

Parental Monitoring Measuring Parental Knowledge

Parental monitoring was conceptualized as parenting behaviors that included attention to and tracking of the child/adolescent's whereabouts, activities, and adaptations as well as implementing control in child/ adolescent's activities (Dishion & McMahon, 1998). However, while the terms *supervision* and then *monitoring* were conceptualized to include parental action such as tracking and control, Kerr & Stattin (2000) highlighted that many of the parental monitoring measures being used in the literature were only assessing parental *knowledge* of their child's activities.

Parental Knowledge. Many of the earlier measures used to assess parental monitoring focused on questions asking about parental knowledge. For example, the scale used by Cernkovich and Giordano (1987) included three items meant to assess parental "control" and

“supervision”, all asking for the child to indicate the perceived level of knowledge or desired knowledge that their parents had of their activities: "My parents want to know who I am going out with when I go out with other [opposite sex]"; "In my free time away from home, my parents know who I'm with and where I am"; "My parents want me to tell them where I am if I don't come home right after school." (Cernkovich & Giordano, 1987, p. 303). Other examples of parental monitoring measures assessing only parental knowledge can be seen in Bailey, Hill, Oesterle, and Hawkins' (2009) study (“How often do you know where your child is and who s/he is with?” and “How often do you talk with (CHILD) about what s/he has done during the day?” and “When (CHILD) is out, how often do you know when s/he will be home?”); or DiClemente and colleagues' (2001) study (“Do your parents know where you are and who you are with when not at school and away from home?”). The four items used in the Haruyama and colleagues' (2021) study with AI youth also focused on parental knowledge: “My parents know where I am after school,” “When I go out at night, my parents know who I am with,” “When I go out at night, my parents know where I am,” and “When I go out on weekend nights, I have to be home by a set time.” Since parental monitoring was conceptualized to include parental actions of tracking and control, studies by Kerr and Stattin and others have started to include additional domains into their measures of parental monitoring.

Domains of Parental Monitoring. Kerr & Stattin (2000) proposed a multi-domain measure of parental monitoring to better capture the multifaceted aspects of this concept. To better understand the unique contribution of parenting behaviors and sources of parental knowledge on adolescent adjustment, Kerr and Stattin (2000) conducted a cross sectional study with Swedish 14 year-olds and their parents with distinct items targeting parental control (how parents require children's explanation of, or permission to, engage in activities), parental

solicitation (how parents solicit information from their child, from their child's friends, or their child's friends' parents), child disclosure (how youth spontaneously share information about their activities with their parents) and parental knowledge (parent's level of information about their children's activities). They found that monitoring, or parental knowledge, was indeed still related to positive outcomes of both internal and external adjustment (external: school, delinquency; internal: mood, GSE, etc.) as well as more positive relationships with parents. Of note, they found that child disclosure was a much better predictor of parental knowledge than parental control or solicitation. These findings held for both parent and adolescent ratings. The authors Stattin and Kerr (2003) repeated these parental monitoring measures including new variables of adolescent norm-breaking behaviors, parent-child relationships, and family closeness. Similarly, they found that adolescent disclosure significantly predicted parental knowledge more than the parenting behaviors of solicitation or control.

Later studies found that child personality (Eaton, 2009) as well as parenting behaviors influence child self-disclosure (Fletcher, 2004; Soenens, 2006), and in keeping with Kerr and Stattin (2000) and Stattin and Kerr (2003), such self-disclosure was a significant predictor of parental knowledge. Fletcher (2004) found in their sample of U.S. students that parental warmth, control, and monitoring (measured with parental solicitation items) all predicted parental knowledge, and that parental knowledge, control and monitoring had significant predictions of substance use. Thus, the growing literature suggests that parental knowledge is closely correlated with substance use outcomes, and such knowledge is influenced by parenting behaviors such as solicitation, warmth, and control in addition to youth self-disclosure.

Parental Monitoring Among AI Youth. The research is sparse examining these new and expanded measures of parental monitoring with AI populations. One such study was conducted

by Swaim and Stanley (2022) in which they formulated the Parental Monitoring Short Scale (PMSS) which abbreviated and simplified the language of the parental monitoring scale used by Stattin and Kerr. Using the four domains of parental monitoring suggested by Stattin and Kerr (i.e. parental knowledge of their children's activities (PK), parental control (PC) of their children's activities, non-elicited child disclosure of their activities to their parents (CD), and parental solicitation of information of their children's activities (PS)), they tested the psychometric properties of the 12-item PMSS with AI youth and White students who attended schools on, or near, reservations (Swaim & Stanley, 2022). Due to differences noted earlier between AI and non-AI parenting styles, Swaim and colleagues examined if the PMSS measured the same construct across AI and White youth by completing a series of psychometric invariance tests. They found strong support for a three-factor structure in which child disclosure and parental solicitation loaded onto the same factor. Furthermore, they found moderate evidence that this three-factor scale was invariant across sex, grade, and ethnicity (Swaim & Stanley, 2022). These findings provide some initial evidence for cultural invariance of the PMSS for AI and White youth. However, to the author's knowledge, no study has examined these domains of parental monitoring (PK, PC, CD and PS) with internal and external SE on cannabis use among AI youth.

Current Study

Due to the known negative repercussions of early onset cannabis use, the pathways that provide protection from cannabis use for AI youth need to be better understood. While parental monitoring has been shown to act as a protective factor, little research has examined specific domains of the parental monitoring construct on AI youth cannabis use using a mediation model with specific domains of self-esteem. This study tested a mediation model of SE by examining if

the SE measure developed by Swaim, Oetting, Edwards, and Beauvais (1989) had indirect effects between PMSS domains of parental monitoring and AI youth cannabis use. Due to the literature suggesting possible differences in SE by age and sex, these variables were also included as control variables. Independent variables included perceived parental monitoring, parental knowledge, parental control, and child disclosure/parental solicitation. This model assumed that internal SE and external SE would show indirect effects in the relationships between the independent variables and last month cannabis use among AI youth. The author hypothesized the following:

H1: There is a significant positive relationship between Parental Monitoring and each of its three subdomains with Internal Self-Esteem

H2: There is a significant positive relationship between Parental Monitoring and each of its three subdomains with External Self-Esteem

H3: There is a significant negative relationship between Internal Self-Esteem and AI youth cannabis use

H4: There is a significant positive relationship between External Self-Esteem and AI youth cannabis use

H5: Parental Monitoring and each of its three subdomains have a direct negative relationship on AI youth cannabis use

H6: Parental Monitoring and each of its three subdomains have an indirect effect on AI youth cannabis use through SE

Methods

Participants

This study used cross-sectional data from surveys collected in 2018-2019 which are part of an ongoing epidemiological study of AI youth living on or near reservations. The sampling frame, following the American Association for Public Opinion Research (AAPOR) reporting guidelines, was built from 3 primary sources: The National Center for Education Statistics Common Core of Data, the National Center for Education Statistics Private School Universe Survey, and the Bureau of Indian Education National Directory. Forty schools were randomly drawn from a sampling frame of schools with students in 7th-12th grade, located on, or within, 25 miles of a reservation or tribal lands, with at least 20% of students enrolled being American Indian. The sample consisted of 4056 11-18-year-old students (48.7% female, 50.6% male), self-identifying as AI. Schools outside the continental United States were excluded, as were Oklahoma tribal statistical areas. Oklahoma was not included among schools surveyed because unlike other areas of the continental U.S. most AI populations in Oklahoma do not reside on reservations which may lead to significant differences in responding patterns (See Beauvais et al., 2004; Stanley et al., 2014a). Schools sampled were stratified into 7 regions (Northeast, Northwest, Southeast, Southwest, Northern Plains, Southern Plains, and Upper Great Lakes) based on cultural and other similarities among American Indian groups.

For each participating school, the appropriate tribal and school board approvals were obtained. Each school received a comprehensive report of their survey findings and compensation for resources used to complete the survey process, ranging from \$750 to \$5000 depending on enrollment, with median payment being \$1500.

All survey responses were collected anonymously, and all procedures were approved by the Colorado State University institutional review board. The board approved a waiver of signed parental consent; however, assent was obtained from both parents and students.

Measures

Parental monitoring

This study used the Parental Monitoring Shortened Scale (PMSS) developed by Swaim and Stanley (2022). Due to the fact that this measure was recently analyzed in a paper by Swaim and Stanley with AI youth and White youth living on or near AI reservations, the psychometrics of the parental monitoring measure will not be re-examined in this paper. Swaim and Stanley found evidence for combining the factors of child disclosure and parental solicitation (Cronbach alpha: PK= 0.91, PC=0.86, CDPS=0.89), suggesting that the youth did not perceive their own disclosure and parental requests for information about their behavior to be separate dimensions (2022). The three factors of PMSS contain 3 items about Parental Knowledge (PK), 4 items about Parental Control (PC) and 5 items about a combined factor of Child Disclosure and Parental Solicitation (CD) (See Appendix). All items are measured on a five-point Likert scale (1=Never, 2=Rarely, 3=Sometimes, 4=Most of the Time, 5=Always).

Self Esteem

This study used the self-esteem measure developed by Swaim, Oetting, Edwards, and Beauvais (1989) and reviewed by Swaim and Wayman (2004) ($\alpha = 0.80$). While Swaim and Wayman (2004) found a three-factor structure for Hispanic and WnH youth, Schick and colleagues (2020) used a similar measure and found a two-factor structure for AI youth (intrapersonal SE: $\alpha=0.83$; interpersonal SE: $\alpha=0.84$). Thus, the first step in analysis included factor analysis to determine best fit. The SE measure includes 11 items (See Appendix

B). The SE items were measured on a four-point Likert scale with responses of “a lot”, “some”, “not much”, and “not at all.”

Ethnicity

Ethnicity was assessed with the question, “Are you” with the option to endorse any of the following: White, Black or African American, American Indian/Native American, Latino or Hispanic, Alaska Native, Hawaiian or Pacific Islander, Asian American, and Other. For the purposes of this study, any participant who endorsed “American Indian/Native American” was included.

Current Cannabis Use

The criterion variable investigated in this study was current cannabis use and was assessed with the question “How many times (if any) have you used cannabis (weed, pot) or hashish (hash, hash oil) during the last 30 days?” Participants chose among seven possible responses (“0 times”, “1-2 times”, “3-5 times”, “6-9 times”, “10-19 times”, “20-39 times” and “40 or more times”).

Statistical Analyses

Factor Analysis of SE

Since some studies use a unidimensional measure of SE, while others have found support for using a 2 or 3 factor model (Schick et al., 2020; Swaim & Wayman, 2004) this study started with an exploratory factor analysis (EFA). An EFA was conducted to compare one, two, three and four factor SE models. As suggested by Kline (2015) when testing for differences of free and fixed loadings onto the latent construct, multiple fit statistics were used since using chi-square statistic alone may result in significant results due to unimportant deviations from a “perfect” model fit (Chen, 2007; Cheung & Rensvold, 2002; French & Finch, 2006; Meade, Johnson, &

Braddy, 2008). Following the recommendations cited by Putnik & Bornstein (2016) deemed appropriate for large samples, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean-square Residual (SRMR) in addition to chi-square and p-values were used to test model fit. The author used cut-off conservative scores of $CFI \leq 0.95$ and $RMSEA \leq 0.06$ and a $SRMR \leq 0.08$ (See Chen, 2007; Rutkowski & Svetina, 2014). After exploring the best factor structure with this sample, the author then examined the items within each factor, keeping only items conceptually similar with robust factor loadings. Finally, a confirmatory factor analysis was conducted.

Mediation Analysis

Using cross-sectional data, this study used an atemporal mediation analysis (Winer et al. 2016) to test the hypothesized model (See Figure 2). Mediation was tested using path analysis and examining the product coefficients (Baron & Kenny, 1986; MacKinnon, 2008) (i.e., the multiplication of the coefficients from the pathway from the IV to the mediator [pathway *a*] with the coefficient from the mediator to last month cannabis use [pathway *b*]) using Mplus 8.1 (Muthén & Muthén, 1998–2017).

Since last-month cannabis use was highly positively skewed with a floor effect (i.e., with most participants selecting the lowest value of “zero times” in the last month) (See Haruyama et al., *manuscript*) traditional approaches to testing mediation, such as the Sobel Test, suffer a loss of statistical power. Thus, Bayesian Credibility Intervals (BCI) were used to confirm statistical significance. Unlike classic Confidence Interval (CI)’s that use a procedure to find a range of values designed to include the true parameter (usually at 95%), the BCI assumes that there is one true, unknown value for the parameter that can be found from a probability distribution. BCI uses a posteriori probability approach whereby the data that has already been collected is used to

calculate the distribution of the probability of different values of the parameter (Curran, 2005; Hespanhol et al., 2019). If at 95% these credibility intervals do not contain zero, then it would be considered statistically significant

Results

Factor Analysis: Self-Esteem

Exploratory Factor Analysis (EFA)

Initial EFA included all eleven SE items and compared model fit and factor loadings of one, two, three and four factor structures (See Table 2 and Table 3). Each inclusion of an additional factor was shown to be a statistically significantly better fit than the previous (Single factor: RMSEA= 0.175, CFI= 0.789, SRMR= 0.071; 2 factors: RMSEA= 0.084, CFI= 0.962, SRMR= 0.034; 3 factors: RMSEA= 0.058, CFI= 0.987, SRMR= 0.017; 4 factors: SRMR= 0.040, CFI= 0.996, SRMR= 0.009). However, when examining the oblique (Browne, 2001; Jennrich, 2004; Yates, 1987) rotation under GEOMIN which is recommended when items have substantial loadings on more than one factor (Asparouhov and Muthen, 2015) none of the items loaded strongly onto the third factor in the 3-factor model. Additionally, in the four-factor model the third and fourth factor each only had one item that loaded strongly onto the factor. Thus, the two-factor model demonstrated more robust factor loadings for multiple items per factor while still being a stronger fit than the one-factor structure. As predicted, the best model found in the EFA was for 2 factors containing items matching the expected factors of internal (IN) and external (EX) SE. Next, the author examined the 2-factor structure removing one item at a time for items that did not load strongly onto either factor 1 or factor 2. Items were removed in the following order: “I am good at games”, “I am good looking”, “I am lucky”, “I am smart” and “Other people my age ask me to do things with them” (See Table 4). This left 6 items with three items loading strongly onto IN and three onto EX.

Confirmatory Factor Analysis (CFA)

After conducting the EFA and reducing the measure to a two-factor structure with 6 items, the author then conducted a CFA. Model fit indices for the CFA suggest a robust fit despite a significant chi-square results (RMSEA= 0.047, CFI= 0.996, SRMR= 0.016). All standardized model results of the correlation between the specified factor and the associated items were significant, as well as the correlation between IN and EX ($b=0.618$, $S.E= 0.005$, $p<0.000$).

Mediation Model Testing

After having demonstrated a strong model fit for a two-factor structure of SE with IN and EX the author then tested the proposed mediation model (see Figure 2) whereby parental monitoring as a whole as well as each of the individual three factors of parental monitoring would be tested for direct effects on CU and indirect effects on CU through IN and EX. Age and sex were included in the model as control variables. All hypotheses (1-6) were supported with significant results, except for hypothesis 4 due to the fact that EX was not statistically significantly associated with CU in any of the models.

Parental Monitoring (PM)

Direct Effects. All direct effects specified in the PM model were found to be statistically significant other than hypothesis 4, as EX was not significantly related to cannabis use. These findings provide support for hypotheses 1, 2, 3, and 5. Specifically, PM was positively associated with IN (PM: $b_1=0.327$, $SD=0.013$, $p<0.000$) and EX (PM: $b_1= 0.279$, $SE=0.013$, $p<0.000$). This suggests that higher values of IN and EX were associated with higher values of PM, supporting both hypotheses 1 and 2. For both IN and EX, males endorsed higher SE (IN-SEX: $b_1= -0.322$, $SD=0.026$, $p<0.000$; EX-SEX: $b_1= -0.119$, $SD=0.029$, $p<0.001$). In the PM model, age was

significantly positively correlated with IN (Age: $b_1=0.020$, $SD=0.008$, $p<0.000$), EX (Age: 0.012 , $SD=0.007$, $p<0.05$) and CU (Age: $b_1=0.273$, $SD=0.024$, $p<0.000$). As predicted, IN and PM were negatively associated with CU (IN: $b_1= -0.194$, $SD=0.059$, $p<0.000$; PM: $b_1= -0.417$, $SD=0.053$, $p<0.000$). Thus, higher values of IN and PM were associated with lower values CU, supporting hypotheses 3 and 5. However, CU was not found to be statistically significantly related to EX in this model or any other model tested in this study. Thus, hypothesis 4 was not supported in any model. The results of statistical significance were confirmed with Bayesian credibility intervals which are used when data is not normally distributed. Bayesian credibility intervals were evaluated at 95% (IN-PM= 0.302, 0.353; EX-PM=0.256, 0.308; CU-IN= -0.310, -0.101; CU-EX= -0.034, 0.188).

Indirect Effects. Hypothesis 6, which predicted that PM has an indirect effect on CU, was supported by results from IN pathway (CU-IN-PM: $b_1= -0.063$, $SD=0.020$, $p<0.000$) but not through the EX-pathway. This result of statistical significance was confirmed with Bayesian 95% confidence intervals (CU-IN-PM: -0.100, -0.027) in which the interval did not contain zero.

Parental Knowledge (PK)

Direct Effects. Hypotheses 1, 2, 3 and 5 were supported by the direct effects observed in the PK model. All direct effects specified in the model other than CU-EX were significant such that PK was positively associated with IN (PK: $b_1=0.249$, $SD=0.012$, $p<0.000$) and EX (PK: $b_1=0.203$, $SD=0.012$, $p<0.000$). This suggests that higher values of IN and EX were associated with higher values of PK, supporting both hypotheses 1 and 2. Like the PM model, males endorsed statistically higher IN and EX (IN-SEX: $b_1= -0.309$, $SE=0.028$, $p<0.000$; EX-SEX: $b_1= -0.095$, $SD=0.025$, $p<0.000$). In this model, older age was significantly correlated with higher levels of IN (Age: $b_1=0.022$, $SD=0.008$, $p<0.000$), EX (Age: $b_1= 0.016$, $SD=0.008$,

$p < 0.05$) and CU (Age: $b_1 = 0.267$, $SD = 0.028$, $p < 0.000$). As predicted, IN and PK were negatively associated with CU (IN: $b_1 = -0.181$, $SD = 0.064$, $p < 0.000$; PK: $b_1 = -0.359$, $SD = 0.045$, $p < 0.000$). This suggests that higher values of IN and PK were associated with lower values CU, supporting hypotheses 3 and 5. These results of statistical significance were confirmed with Bayesian intervals at 95% (IN-PK= 0.224, 0.269 EX-PK= 0.177, 0.221; CU-IN= -0.336, -0.074; CU-EX= -0.063, 0.157).

Indirect Effects. Hypothesis 6 which predicted that PK has an indirect effect on CU was supported by results from the IN pathway (CU-IN-PK: $b_1 = -0.045$, $SD = 0.016$, $p < 0.000$). Bayesian confidence intervals at 95% for internal self-esteem (CU-IN-PK: -0.083, -0.018) confirmed statistical significance.

Parental Control (PC)

Direct Effects. Hypotheses 1, 2, 3, and 5 were supported by the direct effects observed in the PC model. All direct effects specified in the model other than CU-EX were significant. Specifically, PC was positively associated with IN (PC: $b_1 = 0.196$, $SD = 0.012$, $p < 0.000$) and EX (PC: $b_1 = 0.166$, $SD = 0.011$, $p < 0.000$). This suggests that higher values of IN and EX were associated with higher values of PC. For both IN and EX, males endorsed statistically higher IN ($b_1 = -0.318$, $SD = 0.027$, $p < 0.000$) and EX ($b_1 = -0.108$, $SD = 0.028$, $p < 0.000$). In this model, older age was significantly correlated with higher levels of IN (Age: $b_1 = 0.019$, $SD = 0.008$, $p < 0.05$) and CU (Age: $b_1 = 0.265$, $SD = 0.023$, $p < 0.000$). IN and PC were associated negatively with CU (IN: $b_1 = -0.214$, $SD = 0.064$, $p < 0.000$; PC: $b_1 = -0.329$, $SD = 0.038$, $p < 0.000$). This suggests that higher values of IN and PC were associated with lower values CU. However, CU was not found to be statistically significantly related to EX in this model. These results of statistical significance were confirmed with Bayesian intervals at 95% (IN-PC= 0.171, 0.216 EX-

PC=0.148, 0.188; CU-IN= -0.333, -0.096; CU-EX= -0.073, 0.174).

Indirect Effects. Hypothesis 6 which predicted that PC has an indirect effect on CU was supported by results from the IN pathway (CU-IN-PC: $b_1=-0.042$, $SD=0.013$, $p<0.000$). Bayesian confidence intervals at 95% for internal self-esteem (CU-IN-PC: -0.083, -0.018) confirmed statistical significance.

Child Disclosure/ Parental Solicitation (CD)

Direct Effects. Finally, the CD model also supported hypotheses 1, 2, 3, and 5 with findings of significant results. Specifically, CD positively predicted IN (CD: $b_1=0.313$, $SD=0.014$, $p<0.000$) and EX (CD: $b_1=0.273$, $SD=0.013$, $p<0.000$). This suggests that higher values of IN and EX were associated with higher values of CD. For both IN and EX, males endorsed statistically higher IN ($b_1= -0.291$, $SD=0.027$, $p<0.000$) and EX ($b_1= -0.093$, $SD=0.028$, $p<0.000$). In this model, older age was only significantly correlated with higher levels of CU ($b_1=0.274$, $SD=0.023$, $p<0.000$). In terms of CU, IN and CD were negatively associated with CU (IN: $b_1= -0.192$, $SD=0.055$, $p<0.000$; CD: $b_1= -0.309$, $SD=0.046$, $p<0.000$). This suggests that higher values of IN and CD were associated with lower values CU. Like the previous models, CU was not found to be statistically significantly related to EX. These results of statistical significance were confirmed with Bayesian intervals at 95% (IN-CD= 0.287, 0.339; EX-CD=0.245, 0.300; CU-IN= -0.300, -0.077; CU-EX= -0.039, 0.171).

Indirect Effects. Hypothesis 6 which predicted indirect effects was also supported in the CD model from the IN pathway (CU-IN-CD: $b_1=-0.060$, $SD=0.017$, $p<0.000$). Bayesian confidence intervals at 95% for internal self-esteem (CU-IN-CD: -0.093, -0.024) confirmed statistical significance.

Discussion

Cannabis use among adolescents has been shown to have unique negative outcomes. Given that adolescents who identify as American Indian (AI) endorse greater cannabis use than their peers, it is important to better understand the protective factors against AI adolescent cannabis use. Parental monitoring and global self-esteem (GSE) have both been identified as protective factors against AI adolescent substance use, including cannabis use. However, previous studies of both parental monitoring and GSE have often used measures that overlooked important nuances in the relationship between sub-domains of these measures.

A few studies have shown important variability when examining specific domains of self-esteem and substance use, such as Swaim and Wayman (2004) showing differing relationships between domains of SE (competence, self-confidence, and social acceptance) and adolescent alcohol use. Schick and colleagues (2020) further demonstrated the importance of examining subdomains of SE by showing that two subdomains of SE (internal vs. external) had opposite relationships with adolescent alcohol use with AI youth. However, the literature examining these two subdomains of SE with youth is still developing and not well established. Using the same SE items as Swaim and Wayman (2004) and Schick and colleagues (2020) this study examined the factor structure with this sample of AI youth, finding support for a 2-factor model of internal and external SE. Furthermore, this study also demonstrated a strong model fit for a more concise two-dimensional measure of SE with robust psychometric qualities for AI youth. This simplified SE measure contains six-items, with three items assessing internal SE and three items assessing external SE. While these results are congruent with the internal and external factors found by Schick and colleagues (2020) 10-item measure, this study went beyond that of Schick and

colleagues (2020) by also demonstrating evidence for reducing the measure to six items. Such a reduction in items may make the inclusion of examining both internal and external SE more feasible in future studies.

Parenting practices such as warmth, support and monitoring have been found to generally relate positively to GSE (Banstola et al., 2020; Bulanda & Majumdar, 2009; Cakar & Takay, 2015; Dekovic & Meeus, 1997; Hoelter & Harper, 1987; Rice, 1990; Spoth et al., 1996) with some studies examining parental monitoring subdomains as discussed by Stattin & Kerr (2000) of parental knowledge (Bacikova-Sleskova et al., 2021), parental (behavioral) control (Bacikova-Sleskova et al., 2021) and child disclosure/parental solicitation (Perez-Fuentes et al., 2019). However, very few studies have examined the relationships between these specific parental and monitoring domains and SE with youth in the U.S. (Bean et al. 2003; Garber et al., 1997; Gecas & Schwalbe, 1986; Hunter et al., 2015). As part of the mediation model proposed in this study, the author expected to find parental monitoring and its subdomains associated positively with internal and external SE (hypotheses 1 and 2). As expected, parental monitoring as a whole and each of its three sub-domains (knowledge, control, child disclosure/parental solicitation) were found to have a significant positive relationship with both internal and external SE. Finding three subdomains of parental monitoring that each relate significantly to adolescent SE adds important information that has been previously scarce in the literature. Furthermore, no previous study to the author's knowledge has examined these three subdomains of parental monitoring with internal and external SE.

It is important to note that the findings of this study are somewhat inconsistent with a few studies finding no significant relationship between parental monitoring and GSE (Amato & Fowler, 2002; Caldwell et al., 2006; Krauss & Orth, 2021; Vries et al., 2016). However, the lack

of significant results in previous studies may be due to differences in the method of measuring parental monitoring and SE or in the population sampled. For example, while Amato and Fowler did not find a relationship between parental monitoring and GSE, they used four parental monitoring items, three of which related more to the supervision and rules of the youth while at home (i.e., child not allowed home alone, knowing child's whereabouts, rules about amount of television, and rules about types of television programs).

In other cases, differences in results may be due to differing relationships between parental monitoring and SE based on the population sampled, such as Vries et al. (2016) who conducted their study with youth in the Netherlands. Likewise, although Krauss and Orth (2021) used a measure of parental monitoring that appears conceptually similar to parental knowledge and a measure of SE similar to internal SE examined in this study, the population focused on Krauss and Orth has important distinctions from the AIY sample of the current study. Krauss and Orth (2021) used a 14-item parental monitoring measure adapted from Small & Kerns (1993): "Over the past 3 months, your [mom/dad] knew what you were doing after school" and "When you went out at night, your [mom/dad] knew where you were going to be" and two measures of SE, including the General Self scale from the Self-Description Questionnaire II short-form (Marsh et al., 2005) which had 6 items (e.g. "Overall, you have a lot to be proud of" and "You can do things as well as most people."). However, Krauss and Orth's (2021) results came from a sample of Mexican-origin families living in the United States. Similarly, Caldwell and colleagues (2006) also found non-significant results between parental monitoring and self-esteem and their sample was comprised of adjudicated Mexican American male adolescents who were on probationary status. Thus, it is possible that relationships between SE and parental monitoring subdomains vary by population. More research is needed to better understand if such

discrepancies in results are due to the use of different measures, different populations, or some other factor. Thus, while more research is needed to test these measures with other populations, this study has furthered the field by showing preliminary evidence that each subdomain of parental monitoring (i.e., parental knowledge, parental control and child disclosure/parental solicitation) was individually, significantly, and positively related to both internal and external SE among AI youth.

The connection between GSE and adolescent substance use has been mixed in the literature, with some showing evidence of a negative relationship (Buster & Rodgers, 2000; Finke & Williams, 1999; Jackson, 1997; Kaplan, Johnson, & Bailey, 1988; Lee et al., 2018; Towberman & McDonald, 1993; Richardson et al., 2013) and others finding a null or contradictory relationships (Crocker, 2002; DeSimone, Murray, & Lester, 1994; Greenberg, Lewis, & Dodd, 1999; Jones & Heaven, 1998; Luhtanen & Crocker, 2005; Resnicow, Smith, Harrison, & Drucker, 1999; Schroeder, Laflin & Weis; 1993). These mixed findings may be due to the fact that these studies used global or unidimensional measures of SE. The few studies that have separately examined SE by internal and external contingencies of self-worth have demonstrated important differences in the relationship between type of SE and youth substance use (Swaim & Wayman, 2004; Schick et al., 2020). It is interesting to note that while Swaim and Wayman (2004) found several concurrent relationships and one prospective relationship between internal SE (i.e., competence and self-confidence) and alcohol use for Hispanic and WnH youth, they only found significant results for external SE (i.e., social acceptance) with WnH youth in 11th and 12th grade. Additionally, while internal SE was negatively related to alcohol use, external SE was positively related (Swaim & Wayman, 2004). This differing relationship based on internal vs. external SE was replicated in Schick and colleagues' (2020) examination of

internal (i.e., intrapersonal) and external (i.e., interpersonal) SE with AI youth and alcohol use. They found that internal SE was negatively related and external SE was positively related to AI alcohol use. Due to these previous findings with youth alcohol use, this author expected to find a significant relationship between both internal and external SE with AI youth cannabis use (hypotheses 3 and 4). As expected, internal SE was found to have a significant negative relationship with cannabis use (hypothesis 3). However, unlike Swaim and Wayman (2004) and Schick and colleagues (2020), no significant relationship between external SE and AI youth cannabis use was found (hypothesis 4).

The lack of significant results with external SE and cannabis use could be due to the fact that external SE is more relevant to youth alcohol use rather than cannabis use. Since external SE items used questions asking if others liked the respondent, it may be that those who score higher in external SE put more energy into being liked, already view themselves as socially well liked, or that drinking behavior increases the perception of being liked by others. Indeed, this is consistent with Swaim and Wayman (2004)'s finding that both male and female WnH youth who drink feel more accepted by others their own age and Dolcini and Adler (1994)'s finding of a positive relationship between social acceptance and alcohol use among 8th grade students. As Swaim and Wayman (2004) pointed out, since drinking is a social event in high school, adolescents may perceive alcohol consumption as enhancing social standing and social acceptance (Thompson, 1989). Additionally, alcohol has often been viewed as a social enhancer (Bradford, Shapiro & Curtin, 2013; Steele & Robert, 1988; Fairbarim & Sayette, 2014; Monahan & Lunnutti, 2000; Sayette, 2017; Sayette et al., 2012). It may be that alcohol, but not cannabis, use significantly increases the perception of being liked among adolescents (external SE). It will

be important in future studies to examine how particular types of substance use relate to internal and external SE.

This study adds to the accumulating evidence of discrepancies in the relationships between internal and external SE and adolescent substance use. Furthermore, results of this study may help clarify why previous literature has mixed findings on the protective relationship of SE and youth substance use since they used only global or unidimensional measures of SE (Crocker, 2002, Richardson et al., 2013). It is important to consider that the use of global SE measures for examining youth substance use may overlook critical nuances that significantly influence the relationship between predictors and outcomes.

A plethora of literature has demonstrated strong connections between parental factors and youth outcomes (From Lac: Bendezu et al., 2018; Borawski, Ievers- Landis, Lovegreen, & Trapl, 2003; Cernkovich & Giordano, 1987, Dishion et al., 1998; Dittus et al., 2015; Eaton et al., 2009; Fosco et al., 2009, Hoeve et al., 2009; Li et al., 2019; Magoon & Ingersoll, 2006) including cannabis use (See meta-analysis by Lac & Crano, 2015) and AI cannabis use (Lee, Kim-Gowin & Hur, 2021; Stanley, Swaim & Dieterich, 2017; Swaim & Stanley, 2016; Swaim et al., 1993; Whitesell et al., 2014). However, fewer studies have examined specific domains of parental monitoring, such as parental knowledge (Van Ryzin, 2012; Walls et al., 2019; Wintraub & Gold, 1991), parental control (Swaim & Stanley, 2016) and child disclosure/parental solicitation (Willoughby & Hamza, 2011) with youth cannabis use. Hypothesis 5 stated the expectation that parental monitoring and its subdomains would each show a significant negative relationship with AI youth cannabis use. As expected, parental monitoring as a whole and each of its three subdomains were found to have significantly negative relationships with AI cannabis use. While these results are consistent with much of the literature to date (Van Ryzin, 2012; Swaim &

Stanley, 2016; Walls et al., 2019; Wientraub & Gold, 1991) the finding concerning child disclosure/parental solicitation was discrepant with findings from Willoughby and Hamza (2011). While Willoughby and Hamza also found support for parental knowledge and control negatively related to youth problem behaviors, they actually found a positive relationship with parental solicitation. Additionally, child disclosure was only related to problem behaviors indirectly through parental knowledge. However, it is important to note that the outcome variable (problem behavior) used by Willoughby and Hamza (2011) was a composite of delinquent activity in addition to multiple types of substance use, including cannabis use. The fact that the current study showed a consistently negative relationship between all parental monitoring domains and AI youth cannabis use while the protective aspect of parental monitoring varied by domain in Willoughby and Hamza (2011) may be due to the fact that depending on the type of outcome examined, the domains of parental monitoring may have differing relationships. The results of the current study help demonstrate that parental monitoring generally and its three subdomains act as protective factors in AI youth cannabis use. More research is needed to better understand if these same three subdomains are equally protective for other types of substance use and risky/delinquent adolescent behaviors among AI youth.

Some studies have focused on possible mechanisms that may explain part or all of the relationship found between parenting and youth outcomes. Accumulating evidence suggests that SE often plays a mediating role across a variety of parenting practices, SE measures, and types of outcomes (Huey et al, 2020; Hunter et al., 2015; Garber, Robinson & Valentiner, 1997; LoCascio et al., 2016; Salazar et al., 2005; Tur-Portcar et al., 2018). Some of the literature clustering on youth outcomes of depression, aggression, and anti-social behavior, find that self-esteem mediates the relationship between these outcome variables and parenting practices, such

as parental support and monitoring (DuBois et al. 1994; Garber et al. 1997; Huey et al., 2020; Plunkett et al. 2007a, b) with a few studies showing no mediation effect (see Hunter et al., 2015). However, few studies have focused on testing if self-esteem partially mediates parenting practices and adolescent substance use (Slicker et al., 2004). This study helps develop this emerging literature by examining possible mechanisms through which parental monitoring and its subdomains are related to AI cannabis use.

Due to the literature of self-esteem mediating the relationship between parenting variables and youth outcomes, the author hypothesized that parental monitoring and its subdomains would each have a significant relationship with AI youth cannabis use partially through indirect effects of SE (hypothesis 6). These hypotheses were supported by significant results. Parental monitoring and the subdomains of parental knowledge, parental control and child disclosure/parental solicitation models were all found to have significant indirect effects through internal SE. It is important to note that in all models only internal self-esteem showed indirect effects in the relationship between parental monitoring and its subdomains but not external SE (see discussion above). These results suggest that while parental monitoring factors continue to act as a protective element, part of the success of such factors may be affected by the youth's sense of internal self-worth.

The relationships between control variables of sex and age with the independent and dependent variables were also examined. In all of the models, males endorsed greater internal and external SE than females. These results are congruent with other studies that have found males report higher SE than females (Bachman et al., 2011; Bleidorn et al., 2016; Twenge & Crocker, 2000). Like other studies that have found increases in GSE over adolescence (Harter, 2006a, b; Harter, 2007; Huang, 2010; Kling et al., 1999; Orth & Robins, 2014; Trzesniewski,

Donnellan, & Robins, 2013), this study also showed a positive relationship between age and internal SE and external SE for models examining parental monitoring and parental knowledge. However, in the parental control model, age was only positively related to internal SE but not external SE. Additionally, in the child disclosure/ parental solicitation model, age was not related to either internal or external SE. It seems that perhaps differences in SE based on age are more relevant when examining parental monitoring, knowledge and parental control. Additionally, it is possible that age differences found in the literature on GSE might not consistently apply when using an internal vs. external measure of SE. More research with internal vs. external SE is needed to better understand possible nuances in the changing role of age in level of youth endorsed SE.

The results of this study demonstrated statistically different indirect pathways between parental monitoring factors on AI youth cannabis use through internal vs external SE. While internal SE was found to be a significant mediator between parental monitoring and its subdomains (i.e., parental monitoring: parental knowledge, parental control, child disclosure/parental solicitation) and AI youth cannabis use, external SE was not. The differing relationships between internal and external SE on AI youth cannabis use found in this study provide further support for distinguishing specific factors of SE for predicting youth outcomes. Additionally, these results lend further evidence that internal SE, unlike external SE, may act as a protective factor in youth substance use (Crocker 2002; Dolcini & Adler, 1994; Schick et al., 2020).

Limitations

Interpreting the above results should be undertaken carefully considering the limitations of this study. While the sample in this study represents one of the largest samples of AI

adolescents living on or near reservations, the results may not generalize to populations of urban-dwelling AI youth. Additionally, additional studies are needed to understand possible nuances in dimensions of SE or item factor loadings based on non-AI populations. It is also important to note that this study used an a-temporal mediation model as this study used cross sectional data. While it is hypothesized that parental monitoring occurs first and acts through self-esteem on cannabis use behaviors, it is possible that cannabis use influences youth' sense of self-esteem which in turn affects parenting behaviors. Thus, this study cannot confirm the direction of effects observed.

Another important factor to consider is that this study relied exclusively on self-report measures which may underestimate actual substance use rates in adolescents (Brener, Billy, & Grady, 2003) or may not reflect actual parenting practices. However, studies examining parental vs. youth report of parental monitoring and outcomes generally find youth reports are most correlated to outcomes (Abar et al., 2015; Gentile et al., 2012) providing support for using youth report of parental monitoring. Additionally, this study relied on school-based samples which may overlook important factors among youth who dropped out of school, such as youth who left school due to severe cannabis use.

Conclusion

Although further research is needed, the findings of the current study improve our understanding of self-esteem (SE) among AI adolescents and of the differing role of internal and external SE in mediating the protective relationship between parental monitoring, parental knowledge, parental control, and child disclosure/parental solicitation on AI adolescent cannabis use. The significant negative relationships between parental monitoring and its subdomains with cannabis use suggest that interventions focused on these areas may continue to assist in reducing cannabis use for AI youth living in communities on, or near, American Indian reservations. Additionally, since the indirect effect between parental monitoring and each of its subdomains on AI cannabis by internal self-esteem (SE) was significant, interventions focused on helping adolescents develop healthy internal self-esteem may also assist in changing targeted outcomes, such as cannabis use. Thus, future programs or interventions that consider supporting or enhancing both parental monitoring and internal SE may be particularly successful.

Tables

Table 1: Descriptive Statistics of Key Variables

	Mean	Median	SD	Min	Max
Grade	9.03	9.00	1.67	7	12
Age	14.61	14.00	1.75	11	21
Sex	1.49	1.00	0.16	1	2
CU	0.83	0.00	1.75	0	6
IN	3.13	3.33	0.87	1	4
EX	2.84	3.00	0.84	1	4
PM	3.50	3.69	0.95	1	5
PK	4.22	4.67	1.10	1	5
PC	3.63	4.00	1.22	1	5
CD	3.05	3.17	0.98	1	5

Table 2: EFA Comparing 1, 2, 3 and 4 Factors of Self Esteem (SE)

Model Fit	Numbers of Parameters	Chi-Square	Degrees of Freedom	P-Value
1-Factor	33	5069.267	44	0.000
2-Factor	43	926.073	34	0.000
3-Factor	42	343.510	25	0.000
4-Factor	60	116.326	17	0.000

Models Compared	Chi-Square	Degrees of Freedom	P-Value
1-Factor against 2-Factor	4143.193	10	0.000
2-Factor against 3-Factor	582.563	9	0.000
3-Factor against 4-Factor	227.184	8	0.000

Table 3: EFA Model Fit of Self Esteem (SE)

Model	RMSEA	CFI	SRMR
1-Factor	0.175	0.789	0.071
2-Factor	0.084	0.962	0.034
3-Factor	0.058	0.987	0.017
4-Factor	0.040	0.996	0.009

Table 4: Self Esteem (SE) GEOMIN Rotated Factor Loadings

Item	1	2	3	4	5	6	7	8	9	10	11
1-Factor Model											
Item Loading on Factor 1	0.765	0.753	0.762	0.740	0.704	0.743	0.780	0.694	0.609	0.464	0.597
S.E. Factor 1	0.008	0.009	0.008	0.009	0.009	0.009	0.008	0.009	0.011	0.014	0.011
2-Factor Model											
Item Loading on Factor 1	0.933	0.772	0.869	-	0.401	-0.061	0.012	0.375	0.437	0.248	0.080
Item Loading on Factor 2	-	0.045	0.055	0.002	0.833	0.361	0.905	0.869	0.369	0.209	0.240
S.E. Factor 1	0.013	0.014	0.005	0.004	0.018	0.017	0.014	0.018	0.019	0.022	0.020
S.E. Factor 2	0.017	0.018	0.001	0.007	0.018	0.013	0.011	0.018	0.020	0.022	0.018
3-Factor Model											
Item Loading on Factor 1	1.011	0.753	0.848	0.042	0.339	-0.018	0.037	0.217	0.227	0.035	-0.027
Item Loading on Factor 2	-	0.009	0.053	0.020	0.820	0.287	0.894	0.834	0.821	-0.014	0.022
Item Loading on Factor 3	-	0.128	0.028	0.000	0.017	0.178	-0.015	0.032	0.407	0.551	0.542
S.E. Factor 1	0.022	0.016	0.013	0.016	0.030	0.012	0.018	0.053	0.067	0.053	0.015
S.E. Factor 2	0.004	0.018	0.014	0.015	0.021	0.010	0.013	0.024	0.004	0.030	0.023
S.E. Factor 3	0.027	0.023	0.007	0.012	0.033	0.014	0.020	0.047	0.056	0.034	0.021
4-Factor Model											
Item Loading on Factor 1	0.962	0.754	0.803	0.036	0.334	-0.023	0.035	0.006	0.263	0.016	-0.017
Item Loading on Factor 2	-	0.021	0.068	0.010	0.821	0.293	0.897	0.839	0.010	0.035	-0.012
Item Loading on Factor 3	-	0.016	0.040	0.115	0.011	0.147	-0.004	0.021	0.956	0.239	-0.005
Item Loading on Factor 4	-	0.031	0.071	0.012	0.000	0.037	-0.014	0.006	0.003	0.257	0.781
S.E. Factor 1	0.016	0.016	0.018	0.032	0.013	0.035	0.010	0.012	0.003	0.043	0.011
S.E. Factor 2	0.014	0.014	0.019	0.011	0.012	0.026	0.011	0.014	0.010	0.031	0.011
S.E. Factor 3	0.011	0.011	0.014	0.046	0.012	0.064	0.010	0.017	0.011	0.078	0.011
S.E. Factor 4	0.012	0.012	0.021	0.010	0.012	0.022	0.011	0.011	0.004	0.036	0.050

Table 5: Self Esteem (SE) Geomin Rotated Factor Loadings by items included

Model	1	2	3	4	5	6	7	8	9	10	11
11 items											
Factor 1	0.933	0.772	0.869	-0.001	0.401	-0.061	0.012	0.375	0.437	0.248	0.080
Factor 2	-0.045	0.055	0.002	0.833	0.361	0.905	0.869	0.369	0.209	0.240	0.565
10 items											
Factor 1	0.937	0.771	0.869	0.000	0.400	-0.062	0.012	0.372	0.434		0.078
Factor 2	-0.048	0.055	0.002	0.083	0.361	0.907	0.870	0.368	0.207		0.561
9 items											
Factor 1	0.955	0.774	0.860	0.001	0.396	-0.062	0.012		0.426		0.076
Factor 2	-0.060	0.054	0.004	0.834	0.358	0.909	0.870		0.201		0.559
8 items											
Factor 1	0.961	0.774	0.856	0.001		-0.064	0.014		0.422		0.075
Factor 2	-0.063	0.055	0.005	0.835		0.914	0.865		0.199		0.559
7 items											
Factor 1	0.971	0.764	0.851	0.001		-0.064	0.013				0.071
Factor 2	-0.068	0.060	0.010	0.835		0.915	0.865				0.560
6 items											
Factor 1	0.971	0.765	0.851	0.004		-0.054	0.018				
Factor 2	-0.069	0.058	0.009	0.835		0.906	0.864				

Figures

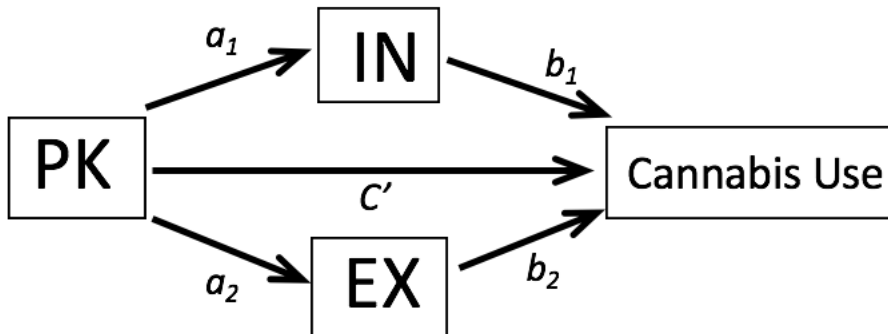


Figure 1: Proposed model with Parental Knowledge (PK) as an example

Note:

- 1. IN refers to self-esteem from beliefs about internal qualities (i.e., intrapersonal SE)*
- 2. EX refers to self-esteem from beliefs about external perspectives on self (i.e., interpersonal SE)*

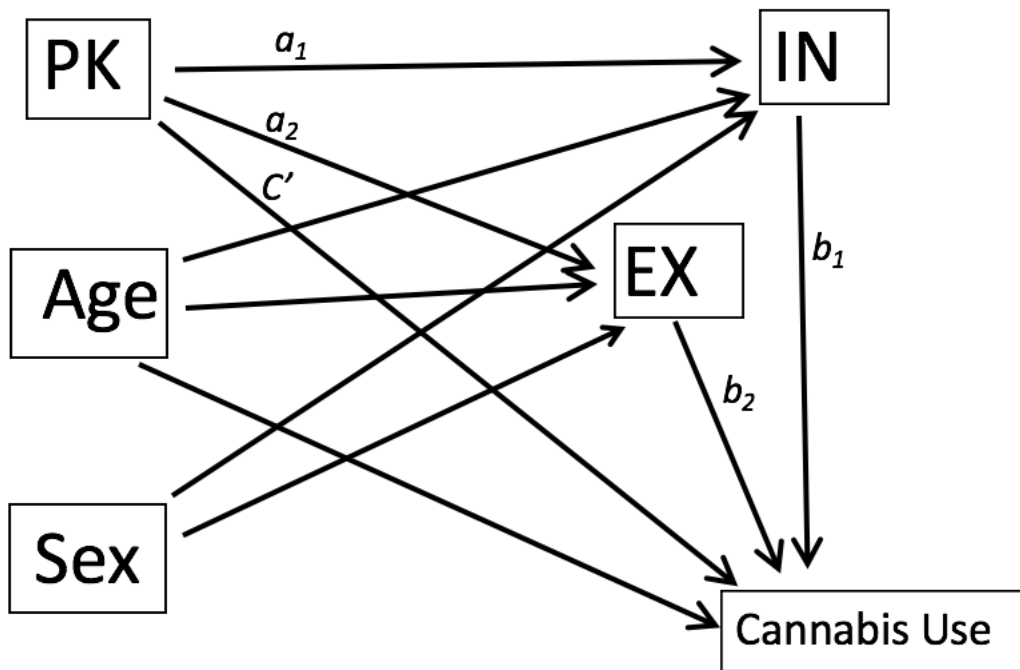


Figure 2: Proposed model including control variables with PK as the example

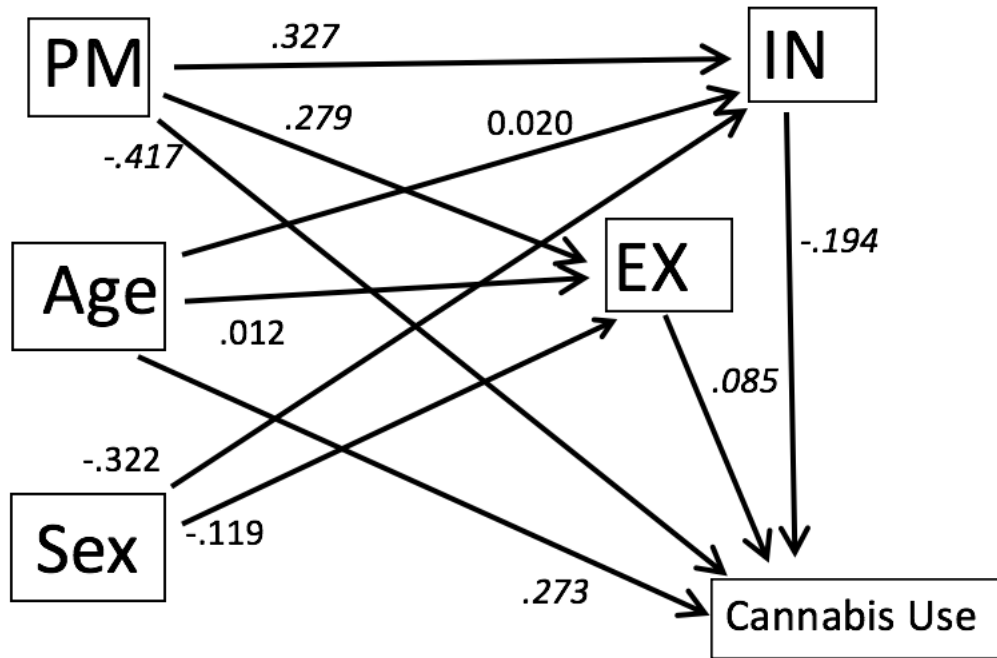


Figure 3 Self-esteem mediational model for parental monitoring (PM). All reported paths were significant at the $p < .05$ level other than external self-esteem and cannabis use.

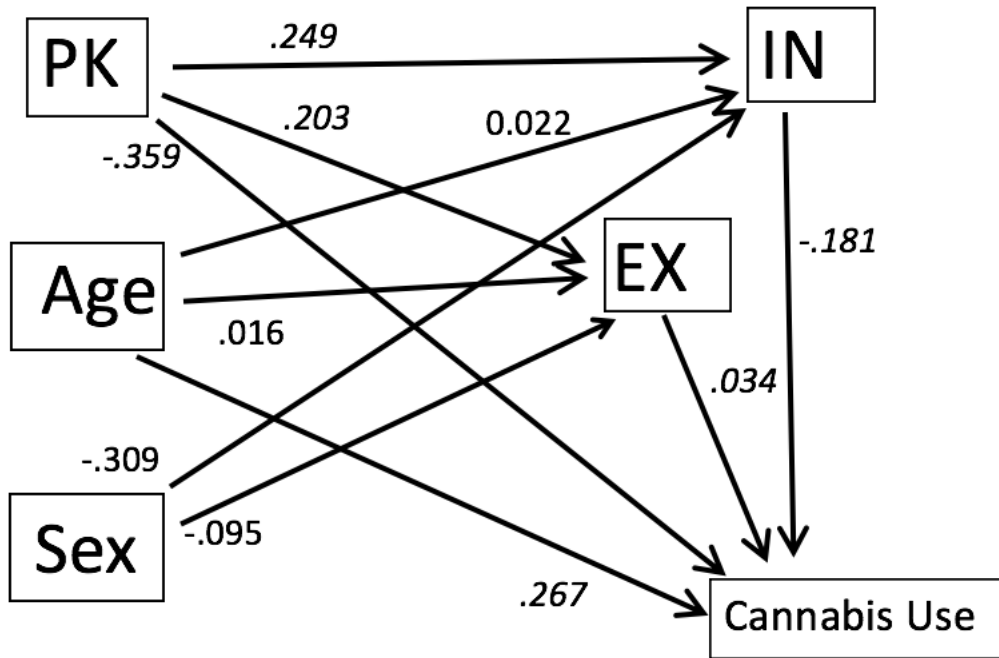


Fig. 4 Self-esteem mediational model for parental knowledge (PK). All reported paths were significant at the $p < .05$ level other than external self-esteem and cannabis use.

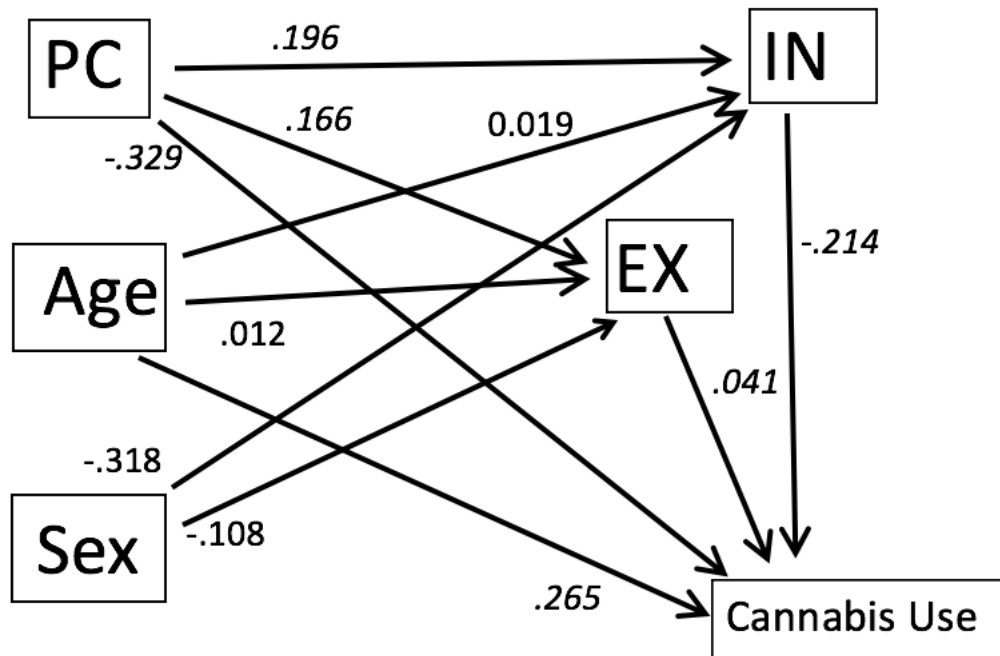


Fig. 5 Self-esteem mediational model for parental control (PC). All reported paths were significant at the $p < .05$ level other than external self-esteem and cannabis use as well as age and external self-esteem.

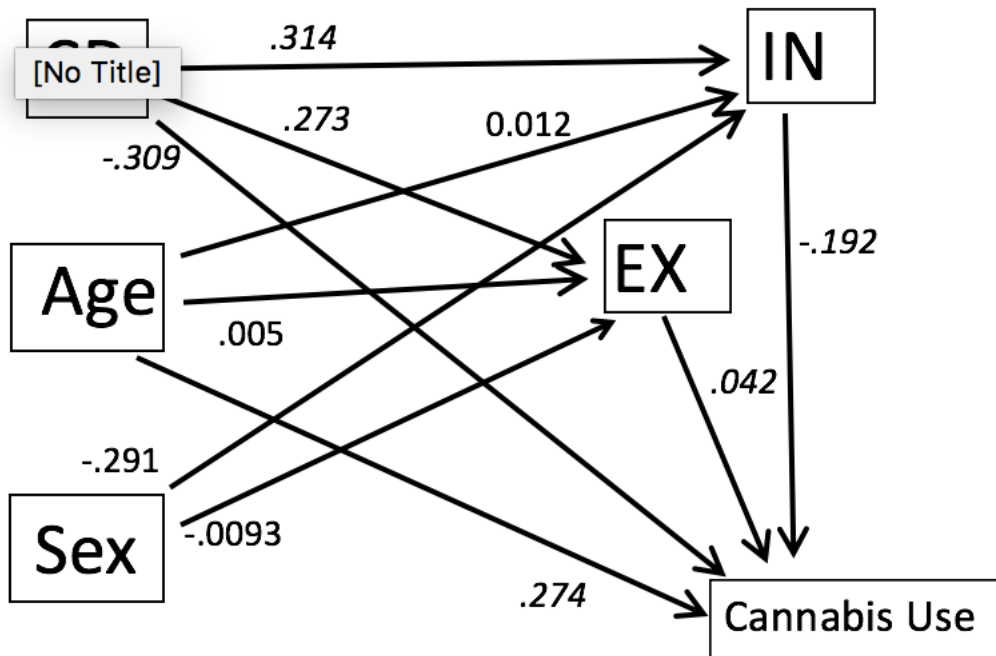


Fig. 6 Self-esteem mediational model for child disclosure/parental solicitation (CD). All reported paths were significant at the $p < .05$ level other than external self-esteem and cannabis use, age and external self-esteem as well as age and internal self-esteem.

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Appendix A:
Parental Monitoring Items

1. (PK) My parents know where I am after school.
2. (PK) When I go out at night, my parents know who I am with.
3. (PK) When I go out at night, my parents know where I am.
4. (PC) When I go out on weekend nights, I have to be home by a set time.
5. (PC) I have to tell my parents who I'm with and what I'm doing at night with friends.
6. (PC) I have to tell my parents my plans for weekend nights.
7. (PC) I need permission to be out late on weeknights.
8. (CD) I tell my parents how I'm doing in school.
9. (CD) I tell my parents about my activities with friends.
10. (CD) I keep secrets from my parents about what I do in my free time. (Reverse Coded)
11. (PS) My parents ask what I do in my free time.
12. (PS) My parents ask about things that happen at school.
13. (PS) My parents talk to my friends.

Appendix B:
Self-Esteem Items

1. I am proud of myself.
2. I am able to do things well.
3. I like myself.
4. Other people my age like.
5. I am lucky.
6. Other people my age like to be with me.
7. People like me.
8. I am good looking.
9. I am smart.
10. I am good at games.
11. Other people my age ask me to do things with them.