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EXAMINING THE PARENT-ADOLESCENT BOND AND PARENT-OFFSPRING  
MARIJUANA COMMUNICATION ON MARIJUANA USE AND PROBLEMS: A TEST OF  
PRIMARY SOCIALIZATION THEORY

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of  
Philosophy at Virginia Commonwealth University.

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## **Abstract**

### **EXAMINING THE PARENT-ADOLESCENT BOND AND PARENT-OFFSPRING MARIJUANA COMMUNICATION ON MARIJUANA USE AND PROBLEMS: A TEST OF PRIMARY SOCIALIZATION THEORY**

By Nikola Zaharakis, M. S.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2015

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Chair and Professor of Psychology  
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Marijuana use among American young adults is rising, and perceptions of harm are declining. Individual states continue to enact more lenient marijuana use and possession laws. Marijuana use is associated with many serious negative outcomes. Thus, marijuana use among this age group has become a public health concern. According to Primary Socialization Theory, parents exert their influence on youth behavior through the parent-adolescent bond and through communication. Previous researchers have identified parent-offspring communication about alcohol and tobacco as a potentially important target of prevention efforts. Little research has yet explored marijuana communication and its potential influence on use-related outcomes. This study sought to model the influence of the parent-adolescent bond and parent-offspring communication about marijuana on marijuana use and problems related to use. In order to model this influence, the Communication about Marijuana (CAM) measure first was developed. In

Study 1, an initial pool of items tapping marijuana communication was tested using a sample of 18-25 year old ( $M=20.22$ ) undergraduate students ( $N=433$ ). Confirmatory factor analyses were performed to test the fit of the data to the proposed model. In Study 2, a revised CAM measure was tested with a second sample of 18-25 year old ( $M=20.40$ ) undergraduate students ( $N=432$ ). The final measure included four content topic factors comprising 9 items, and 3 descriptive items tapping communication context. Structural equation models were specified to model the parent-adolescent bond and marijuana communication content on student self-reported past year marijuana use and marijuana use problems. Results suggested that the parent-adolescent bond was protective on marijuana use frequency, while models including only the manifest variable parental support better fit the data with regard to marijuana use problems. Communication content was somewhat differentially related to outcomes. Discussions encouraging abstinence, offering advice on peer pressure and monitoring use were related to more frequent use. Communication that conveyed disappointment about marijuana use and offered advice about peer pressure and choosing non-using friends was related to more marijuana use problems. Positive relations between communication and use outcomes were unexpected, but may reflect reactive parenting. Results and implications for future research are discussed in the context of the extant literature.

## Examining the Parent-Adolescent Bond and Parent-Offspring Marijuana Communication on Marijuana Use and Problems: A Test of Primary Socialization Theory

In 2014, almost half of high school seniors had tried marijuana before graduation (44.4%), according to data from the Monitoring the Future (MTF) study, an annual survey of a nationally representative sample of 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grade students (Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015a). Representative subsamples of the 12<sup>th</sup> grade graduates then are surveyed annually into adulthood. Results show that post-high school, marijuana use peaks, with almost a fifth of young adults ages 19 to 30 (18.3%) reporting marijuana use in the past 30 days (Johnston, O'Malley, Bachman, Schulenberg, & Miech, 2015b). Many of these young adults are enrolled in college. Over the past five years, the number of full-time college students reporting past month marijuana use has been steadily increasing, and the number of students using marijuana on a daily basis in 2014 reached a high not seen since the early 1980's (Johnston et al., 2015b). Not unexpectedly, there have been very substantial declines in perceived risk associated with marijuana use among young people since 2006 (Johnston et al., 2015a), and significant increases in the perceived availability of marijuana among high school students and young adults (Johnston et al., 2015a).

However, prevalence data alone are not a compelling reason to study factors surrounding marijuana use; the fact that marijuana use is associated with a host of negative outcomes, including memory, concentration, and attention problems (Buckner, Ecker, & Cohen, 2010; Price, McQueeny, Shollenbarger, Wieser, & Lisdahl, 2015), anxiety and depression, financial problems, lower productivity, and lower self-esteem and self-confidence (Buckner et al., 2010), impaired respiratory functioning (Hancox, Shin, Gray, Poulton, & Sears, 2015), and poorer school performance (Hall, 2009) is. Given the rising rates of marijuana use among youth and the

significant negative consequences associated with use, marijuana use among young people has become a public health problem. Current changes in popular opinion and state laws regarding marijuana use compound the problems associated with the increases in youth marijuana use. To date, twenty-three states and the District of Columbia have legalized marijuana in some form, either medicinally, recreationally, or both (“State Marijuana Laws Map,” 2015). Four states have made recreational use by persons above the age of 21 legal; several other states have decriminalized the possession of small amounts of marijuana use. In addition, eighteen states have legalized marijuana for medicinal use. In the past 5 years, support for marijuana legalization has grown drastically, increasing by 11 points between 2010 and 2013 alone among American adults (Motel, 2015). Almost seventy (69%) percent of Americans now believe alcohol is more harmful to a person’s health than marijuana (Motel, 2015). Young people’s increasingly favorable attitudes toward marijuana appear to be a marker of the change of opinion of the country at large.

Parents are in a unique situation to assist adolescents and young adults in navigating the changes in public opinion regarding marijuana and coming to responsible decisions. One protective factor that has begun to gain ground in the literature and that agencies and interventionists involved in preventing adolescent substance use promote widely is parent-offspring communication. Generally, research suggests that the more communication about substance use that a parent engages in with her child, the less likely the child is to engage in substance use in adolescence. National agencies invested in the fight against youth substance use, such as the Partnership for a Drug Free America, have created media campaigns to encourage parents to discuss alcohol and other drugs (AOD) with their children. Family-focused interventions often teach parents communication skills and encourage conversations about

substance use. However, the extant literature on parent-offspring communication is limited; most of the available research has utilized brief measures and focused on one or two aspects of communication, without considering other dimensions. Most of this research has focused on alcohol or tobacco, with only a few studies focusing on marijuana communication among older adolescents and young adults, who are in their prime marijuana use years. The current proposal is designed to fill these gaps in the literature by developing a measure of multiple dimensions of parent-offspring communication about marijuana and beginning to explore outcomes of this communication.

### **Review of the Literature**

#### **Development in Late Adolescence and Emerging Adulthood**

Among American teenagers, the eighteenth birthday marks the acquisition of several new rights and privileges that signal the beginning of the transition to adulthood. The right to vote, to serve in the military, to buy tobacco products and to act without the consent of a parent or guardian are markers of the new avenues for autonomy afforded to adolescents at this age. Furthermore, within this period, many teenagers experience a host of new transitions, including graduating from high school, entering college, moving out of the family home, and gaining employment.

Despite this new legal adult status, older adolescents and emerging adults – those between the ages of 18 until the late twenties – are still developing cognitively. Researchers have discovered that the brain continues rapid development until approximately the age of 25 (Steinberg, 2007). Development of the frontal lobe, the area of the brain responsible for decision making and planning, is now understood to occur within the late teens and early twenties and has serious implications for risk taking behavior (Steinberg, 2007). Researchers have suggested that

the development of motivational behavior and the associated underlying subcortical brain regions involved in the ‘bottom-up’ processing of intrinsically motivating behaviors are curvilinear and peak between 13 and 17 years old (Casey & Jones, 2010), while prefrontal regions involved in the ‘top-down’ processing of behavior continue to develop well into the 20s. The dissonance in development between these two systems is theorized to create vulnerability in cognitive control processes and increased susceptibility to chemicals with motivational properties, such as alcohol and drugs (Casey & Jones, 2010).

Emerging adults are still developing in other areas as well, such as socio-emotionally. Self-esteem, for example, increases from adolescence through emerging adulthood, largely related to normative gains in sense of mastery (Erol & Orth, 2011). Relatedly, prosocial behavior in adolescence is related to emotional competence in young adulthood (Hallam et al., 2014). Social cognition, as measured by tasks of theory of mind and emotion recognition, also develops and improves across adolescence and young adulthood (Vetter, Leopold, Kliegel, Phillips, & Altgassen, 2013). Thus, youth in their late teens and early twenties find themselves with a dilemma. They begin to assume substantially increased adult privileges in the context of a brain reward system that is freshly primed for the incentives associated with external intoxicants, and with decision-making and emotion regulation abilities that are not yet fully developed, making this a critical time for engagement in risk behavior.

### **Emerging Adulthood: A Distinct Developmental Period**

Recognizing the need to capture the developmental processes unique to this age group, Arnett (2000, 2004) proposed the concept of emerging adulthood, comprising the ages of 18 to 30, with a particular focus on those 18 to 25 years (Arnett, 2000, 2004). A theoretically distinct period of development in which adolescents transition to young adulthood through five primary

pathways, emerging adulthood has gained ground in the literature in the decade since its proposal. According to Arnett, five key pathways or features describe the period of emerging adulthood: the age of identity explorations, the age of instability, the age of self-focus, the age of feeling in-between, and the age of possibilities (Arnett, 2004). As a proponent of the idea that emerging adulthood is a distinct developmental period, Arnett argues that emerging adulthood is not “late adolescence,” as emerging adults have moved past puberty, compulsory schooling and more intense parental supervision and are legally adults in many ways. Further, Arnett argues that emerging adulthood is not “young adulthood,” as emerging adults have not yet really reached adulthood, with its stability and commitments.

Emerging adulthood is a time of identity explorations for many late teens and twenty-somethings, as they seek out and try on the variety of possible futures available to them, particularly in the areas of love and work (Arnett, 2004). Arnett argues that this identity exploration is a central feature of emerging adulthood. According to Arnett, emerging adulthood is the opportune time for this self-exploration and clarification of personal identity and future plans for several reasons. During this period, most emerging adults are no longer “beholden to their parents nor committed to a web of adult roles” (Arnett, 2004, p. 8), free to explore new possibilities. It is during this period that emerging adults can begin to find their niche in the world. While this process of exploration and identity formation begins in adolescence, it intensifies in emerging adulthood and begins to lay the foundation for a more stable identity in adulthood (Arnett, 2004).

A second key feature of emerging adulthood, according to Arnett, is instability. Arnett argues that, while emerging adults feel the pressure to create a plan toward becoming more stable adults, their plans are subject to numerous changes (Arnett, 2004). During this period, emerging

adults move residences often, change career plans, and end romantic relationships for new ones. Arnett argues that this instability goes hand in hand with exploration, allowing emerging adults multiple opportunities to reflect on the path they are moving along and to make changes.

Thirdly, according to Arnett's model (2004), emerging adults are self-focused. As they are supervised much less, if at all, by their parents and usually without the responsibility of a permanent job or children, emerging adults have many fewer daily obligations and commitments than adolescents or adults (Arnett, 2004). Thus, they are free to decide their own schedule and to focus their plans on themselves. Arnett argues that this self-focus is healthy and important, allowing emerging adults to develop the self-sufficiency skills that will benefit their work and personal relationships in adulthood.

Fourth, emerging adults often feel "in-between" during this period of their lives – between the obligations of secondary school, the supervision of parents during adolescence and the commitments of adulthood, including marriage, parenthood, and careers (Arnett, 2004). Arnett proposes that many emerging adults gauge their own developmental status against the criteria they set for adulthood. Often this comprises three primary criteria: accepting personal responsibility, making independent decisions, and becoming financially independent (Arnett, 2004). Until they can meet all of these criteria, emerging adults often feel somewhere "in-between" being dependent adolescents and self-sustaining adults.

Finally, emerging adulthood is a period of new possibilities. Without the constraints of their family of origin, many emerging adults are free to transform their lives into what they want them to be; most are optimistic about this transformation, as the range of choices available at this age is far greater than at any earlier point in their life (Arnett, 2004). Taken together, these key pathways offer a better conceptualization of the developmental stage of persons in their late teens

and early twenty-somethings than either adolescence or young adulthood. It is important to note that these characteristics of emerging adults are most applicable to Western cultures (Arnett, 2000).

### **Emerging Adults and Engagement in Risk Behavior**

Within this period of decreased responsibility and parental supervision and increased exploration and self-focus comes increased opportunities to engage in risk behaviors. Participation in risky behaviors, such as substance use and sexual behavior, increases across adolescence and often peaks in emerging adulthood. For example, reports from a recent national study of American teens revealed that 27% of 15- to 17- year-olds report ever engaging in sexual intercourse; among 18-19 year olds, this number skyrockets to 63% (Martinez, Copen & Abma, 2011). Further, researchers have shown that reports of condom use decrease from age 14 to age 22 (Santelli, Robin, Brener, & Lowry, 2001). During this same developmental period, reports of substance use increase, as do reports of driving under the influence, alcohol-related car crashes, injury, and death (SAMHSA, 2012), and these behaviors are associated with binge drinking and illicit substance use (Dowdall, 2009).

Increased engagement in risk behavior is particularly concerning among college students. Life transitions in general often are times of increased risk for substance use; however, the transition to college poses additional factors that may increase the likelihood of substance use among this population (Ross & DeJong, 2008). The freedom of less parental supervision, the stress of an increased school workload, and the adjustment to life away from home combine to create what some researchers have termed the “College Effect” – a stark increase in substance use as compared to use among high school students (Ross & DeJong, 2008). Thus, college students engage in more substance use, particularly alcohol use, than those of a similar age who

are not attending college (Johnston et al., 2015b; O'Malley & Johnson, 2002). While this finding typically pertains to alcohol (college students generally use marijuana at rates lower than their non-college same-age peers do), it holds relevance for understanding marijuana use and developing appropriate prevention programs. Simultaneous use of alcohol and marijuana (SAM; Terry-McElrath, O'Malley, & Johnston, 2013) has been linked with even greater consequences than use of either substance alone (Brière, Fallu, Descheneaux, & Janosz, 2011).

Arnett (2000) conceptualizes that this period of increased engagement in risk behavior can be understood in the context of emerging adults' identity explorations. During this developmental period, emerging adults gain increased autonomy and are able to seek out novel experiences. In this way, emerging adults are able to explore the new behaviors and work on identifying who and what they will be. Novelty and sensation seeking are associated with participation in risk behavior (Arnett, 1994; Wills, Windle & Cleary, 1998), and thus help explain emerging adults' increased involvement in substance use.

### **Marijuana Use in Emerging Adulthood**

Researchers have identified transition periods during adolescence, such as the transition from high school to college, as a time of heightened risk for substance use (Nelson & Barry, 2005). Though many full-time college students are under the legal drinking age, a clear majority (63.9%) report regular alcohol use and an alarming proportion (43.5%) engage in binge drinking (SAMHSA, 2012). In addition, almost one-quarter (22.7%) report past year illicit substance use. According to the most recent data from Monitoring the Future, rates of daily marijuana use now surpass those of daily cigarette use, with 5.2% of college students reporting any daily cigarette use, but 5.9% reporting daily marijuana use in the past 30 days (Johnston et al., 2015).

Furthermore, the perceived risk associated with marijuana use has been declining among emerging adults ages 18 to 30 since 2006 (Johnston et al., 2015a).

Marijuana use among emerging adults is associated with a host of negative outcomes, including increased mental health symptoms such as anxiety, depression, and substance use problems (Buckner et al., 2010; Keith et al., 2015); cognitive deficits, such as memory and concentration problems (Buckner et al., 2010), and poor complex attention (Price et al., 2015); and worse educational outcomes, such as poorer school performance and fewer years of education pursued (Hall, 2009). Marijuana use among college students may act as a barrier to academic achievement by directly and indirectly leading to poorer class attendance (Arria, Caldeira, Bugbee, Vincent, & O'Grady, 2015). Furthermore, marijuana use has been associated with medical conditions, such as impaired respiratory functioning and bronchitis (Hancox et al., 2015), cardiovascular disease (Hall, 2009), mental health and substance use problems, such as increased use of other illicit drugs, psychotic symptoms, and development of a cannabis use disorder (Hall, 2009), and unsafe driving behaviors and increased crash risk (Dubois, Mullen, Weaver, & Bedard, 2015). Estimates suggest that half of college students who have used marijuana in the past month operated a motor vehicle while under the influence of cannabis (Whitehill, Rivara, & Moreno, 2014).

Chronic marijuana use among adolescents is associated with reduced odds of high school completion, reduced likelihood of degree attainment, and increased odds of later cannabis dependence, use of other illicit drugs, and suicide attempt (Sillins et al., 2014). Research has suggested that these negative outcomes are not limited to young adults, but that adults who use marijuana regularly are also at increased risk of adverse outcomes, including lower educational attainment, welfare dependence and unemployment, illicit drug use, and psychotic

symptomatology (Fergusson, Boden, & Horwood, 2015) and increased involvement in road traffic crashes (Gjerde, Strand, & Morland, 2015). Persistent cannabis users show neuropsychological decline from childhood through midlife (Meier et al., 2012) and impaired cognition in a variety of ways, including poor executive function, memory problems, and difficulty controlling emotions and behavior (Crean, Crane, & Mason, 2011). Taken together, these results suggest that emerging adults in college are an ideal target group to understand increases in substance use and develop harm reduction strategies to prevent continued adverse outcomes into later adulthood.

### **Primary Socialization Theory: A Framework for Understanding Youth Drug Use**

Though emerging adults are experiencing increased freedom and responsibility and less parental input on their daily decisions, parents' influence on emerging adults' behavior persists. Primary Socialization Theory (PST) provides a useful framework for understanding the role of parents on emerging adult substance use. This theory posits that adolescents are enmeshed within a primary socialization network consisting of three major domains, or clusters, that ultimately influence youth behavior: family, peers, and school (Oetting & Donnemeyer, 1998). The connections between each of these clusters and the adolescent is argued to be a bond; this bond creates a channel for communication through which prosocial and deviant norms are transmitted. PST argues that all other sources of influence are secondary and exert indirect influence, through the three main clusters of the primary socialization network.

The family cluster is conceptualized as influencing youth behavior through both interaction and communication. Oetting and Donnemeyer (1998) argue that most families are a source of prosocial norms. Interaction includes both the closeness of the bond between the parent and youth, as well as the parent's actual parenting practices. Communication includes direct

discussion regarding prosocial and deviant behaviors, such as substance use. In order to transmit strong prosocial norms, parents must have strong bonds with their child and must use these bonds to communicate prosocial norms. Oetting and Donnemeyer (1998) argue that some more severely dysfunctional families, such as those characterized by child abuse or by parental substance abuse create environments where both (1) children likely form weaker bonds with their parent, and (2) the parent transmits positive norms around deviant behavior by directly modeling the behavior (e.g., alcohol abuse).

Oetting and Donnemeyer (1998) contend that a more frequent and potentially preventable situation arises when a parent and youth have developed a strong bond, but the parent lacks the necessary parenting skills to adapt to the various stages of youth development. These parenting skill deficits weaken the bond between parent and youth, reducing the effectiveness of the transmission of prosocial norms. Weak bonds with the family cluster may potentially lead to deviant behavior, by creating an environment that encourages stronger bonds to form with potentially deviant peers. Thus, how parents attempt to manage youth behavior through both parenting practices, such as monitoring, and by communicating about risk behavior are key concepts in exploring pathways of influence on youth substance use.

### **Parental Influence in Emerging Adulthood**

A vast literature has demonstrated the important influence of parents on adolescent substance use, extending into emerging adulthood. A variety of parent factors have been related to marijuana use, including maternal marital status, quality of marital relationships, maternal cigarette and alcohol use, and maternal depression when the child was 5 years old (Hayatbakhsh, Williams, Bor, & Najman, 2013). Parental histories of divorce and depression also are related to young adult marijuana use (Sakyi, Mechior, Chollet, & Surkan, 2012). Per PST, the parent-

adolescent relationship and the parent's parenting practices are two of the mechanisms by which parents exert their influence on youth behavior; researchers have demonstrated that both are related to substance use outcomes. A supportive parent-adolescent relationship is negatively related to alcohol, marijuana, and tobacco use among high school students (Johnson, McBride, Hopkins, & Pepper, 2014), as is a secure parent-adolescent attachment (Kostelecky, 2005). Parental monitoring in later childhood and mid-adolescence predicts reduced alcohol use (Guo, Hawkins, Hill & Abbott, 2001) and less problematic alcohol use (Turrisi & Ray, 2010) in emerging adulthood. Increased parental behavioral control also is related to decreased risk of problem drinking (Roche, Ahmed, & Blum, 2008). In addition, researchers have shown that parental discipline (King & Chassin, 2004) and parental messages about alcohol and other drugs (Miller-Day, 2008) serve as protective factors for youth substance use. Several researchers have replicated these results in college student samples, suggesting that parenting continues to exert a protective influence into emerging adulthood even among college samples (e.g., Arria et al., 2008; Patock-Peckham & Morgan-Lopez, 2007).

More recently, researchers have demonstrated the influence of parents on marijuana use among emerging adults in particular. For example, college students whose parents monitor their behavior and who report having greater parental warmth during college are more likely to have less favorable marijuana attitudes and to use marijuana less frequently (Lac, Alvaro, Eusebio, Crano, & Siegel, 2009; Napper, Hummer, Chitambo, & LaBrie, 2015). Parents' impact on offspring marijuana use and attitudes is long-acting, as researchers have demonstrated that parental monitoring during high school is associated with less marijuana use exposure during college (Pinchevsky et al., 2012) and with a lower likelihood of alcohol or cannabis dependence during the first year of college (Kaynak et al., 2013). The parent-offspring relationship also

matters. For example, the affective quality of the relationship during 12<sup>th</sup> grade is related to less alcohol, tobacco, and illicit drug use two years later (Ralston, Trudeau, & Spoth, 2012). Thus, the parent-adolescent bond is an important protective factor to consider in the context of understanding emerging adult marijuana use.

### **Parent-Offspring Communication**

Parents also exert influence on youth behavior through communication, according to PST. Research on parent-offspring communication in general has shown that conversations between the two groups occur infrequently (Noller & Bagi, 1985). Of the communication that does occur, evidence suggests that communication patterns differ between mothers and fathers, with adolescents talking more with and disclosing more to moms than dads (Noller & Bagi, 1985). Mothers communicate with their adolescents on a wider range of subjects than fathers and can more accurately judge their adolescents' perceptions (Noller & Bagi, 1985). Adolescents' perceive mothers as more open, understanding, willing to listen and interested in the day-to-day problems adolescents' face (Youniss & Smollar, 1985). Both mothers and adolescents perceive each other as more open in communication than father-adolescent discourse (Barnes & Olson, 1985), and adolescents report more positive interactions with mothers throughout adolescence than with fathers (Noller & Callan, 1990).

In general, parent-offspring communication has protective effects on youth substance use (e.g. Brody, Flor, Hollett-Wright, & McCoy, 1998). More recently, researchers have begun to explore parent-offspring communication specifically related to alcohol, tobacco, and other drug (ATOD) use (e.g., Ennett, Bauman, Foshee, Pemberton, & Hicks, 2001; Miller-Day, 2008; Miller-Day & Dodd, 2004). Like parent-offspring communication in general, parent-offspring communication about ATOD has been hypothesized to exert a protective effect on youth

substance use; however, results thus far have been equivocal. This more specific form of communication is discussed in greater detail below.

### **Parent-Offspring Communication About Substance Use: Influences on Substance Use**

Researchers have examined a variety of aspects of parent-offspring communication about substance use, including message content and communication frequency and quality; relations with substance use appear to differ according to how communication is operationalized.

Researchers have demonstrated that message content is related to both increased and decreased likelihood of initiation of alcohol and tobacco use (e.g., Andrews, Hops, Ary, & Tildesley, 1993; Ennett et al., 2001; Turrisi, Mastoleo, Mallett, Larimer, & Klimer, 2007). Similarly, the frequency of substance use communication has been differentially related to both initiation and maintenance of substance use. A growing body of research has begun to explore the potential differential effects of message content on substance use. For example, LaBrie and colleagues (2015) found that college students who were light drinkers and received more messages related to abstinence and disapproval of use drank fewer drinks and drank less often than light drinkers who received harm-reduction messages. Further research is needed to better flesh out the relationships of different message content to use outcomes.

The data on frequency of substance use communication and youth substance use and attitudes is equivocal. Some researchers have found that higher rates of substance use communication can act as a risk factor for youth substance use and pro-substance use attitudes (e.g. Engels & Willemsen, 2004; Miller-Day & Kam, 2010); other researchers have suggested that communication has a protective effect (e.g., Huver, Engels, & de Vries, 2006; Kodl & Mermelstein, 2004). Still other researchers have found frequency to be unrelated to substance use (e.g., Harakeh, Engels, Blokland, Scholte, & Vermulst, 2009).

Fewer researchers have examined the quality of communication; however, results thus far have been somewhat more consistent than those examining the content or frequency of messages have. Results suggest that communication that is more open and bi-directional is related to lower levels of smoking (e.g., de Leeuw, Scholte, Harakeh, van Leeuwe & Engels, 2008). Likewise, a paucity of research has examined how the timing of communication relates to youth substance use. Thus far, this sparse area of the research suggests that timing may be an important factor, revealing that youth substance use predicts later communication (e.g., Harakeh et al., 2009; Huver, Engels, Vermulst, & de Vries, 2007). In summary, research on the links between parent-offspring communication about substance use and youth substance use behavior suggest that a more consistent definition of communication is needed to better examine the protective or risk effects of this parenting strategy.

Most of the research cited above has addressed alcohol and tobacco use, without exploring how communication might affect marijuana use. More recently, a few studies have begun to address marijuana in the context of communication. Some studies have investigated general communication on marijuana use, finding that better quality general communication between parents and adolescents predicts less alcohol and marijuana use (Marsiglia, Nagoshi, Parsai, & Gonzalez Castro, 2014). Only a few studies have examined marijuana-specific communication; results thus far have been equivocal as with alcohol and tobacco communication. For example, Huansuriya and colleagues (2013) investigated the impact of an ad campaign promoting parent-adolescent drug communication on youth intentions to use. Results suggested the frequency and breadth of topics discussed between parent and child about drugs was related to less positive attitudes toward marijuana, which in turn predicted lower intentions to use marijuana (Huansuriya, Siegel, & Crano, 2013). In another analysis of data from the same

sample, drug communication was negatively related to marijuana use according to youth report, but unrelated to use according to parent report (Nonnemaker, Silver-Ashley, Farrelly, & Dench, 2012). To date, no studies could be identified that have addressed marijuana communication among an emerging adult population.

### **Parent-Offspring Communication About Specific Risk Behaviors: Borrowing a Framework From Parent-Offspring Communication About Sexual Behavior**

A framework proposed within the literature focused on parent-offspring communication about sexual behavior offers a starting point from which to explore parent-offspring communication about marijuana. Guilamo-Ramos and Bouris (2009) put forth a framework focused on four critical areas. *Content* refers to the specific topics or messages relayed within conversations about risk behaviors. *Context* comprises “how parents talk and the extent to which they seem knowledgeable, open and accessible” during risk behavior communication. The *timing* of communication refers to when these conversations take place in relation to the risk behavior of interest – whether talks occur before or after the risk behavior. The *frequency* of communication encompasses how often parents discuss the risk behavior with their offspring. Taken together, these four critical areas offer a multidimensional framework from which to investigate parent-offspring communication about substance use. Applying this model to the extant literature on substance use communication reveals the dearth of knowledge about parent-offspring communication about substance use as well as areas for further exploration.

### **Parent-Offspring Communication About Alcohol, Tobacco, and Other Drugs**

A growing body of research lends insight into the construct of parent-offspring communication about alcohol, tobacco and other drugs. With regard to content, researchers have revealed that parents communicate a variety of messages about alcohol, tobacco and other drugs.

These messages include cautionary statements about use and threats of punishment for use (Andrews et al., 1993), messages about the health risks, addictive qualities and price of cigarettes (Huver, Engels & de Vries, 2006), rules and restrictions on use and expectations for youth's use (Ennett et al., 2001; Huver et al., 2006; Jackson & Henriksen, 1997), media portrayals of use (Ennett et al., 2001) and inquiries into the youth's personal substance use (Herbert & Schiaffino, 2007).

A few researchers have examined how parent-offspring communication occurs, or the context of these conversations. Miller-Day and colleagues have defined one aspect of context – communication form – as whether communication was direct or indirect and whether messages were conveyed in ongoing daily conversations or in more specific targeted events (Miller-Day & Dodd, 2004). More recently, this group of researchers sought to develop a measure of targeted parent-offspring communication about alcohol. Factor analyses of their results suggest that direct and indirect talks represent unique domains of communication, with direct and indirect messages loading onto separate factors (Miller-Day & Kam, 2010). Other researchers have examined the quality and bi-directionality of ATOD communication. Findings suggest that higher quality conversations (defined as those conversations that are perceived as easier and more open; de Leeuw et al., 2008) and more bi-directional conversations (or communication in which parents and youth engage with each other; Brody et al., 1998) exert protective effects on youth substance use attitudes and behavior.

Most often studied within the literature is the frequency of communication about alcohol, tobacco and other drugs, or the repetition with which messages are conveyed (e.g. Engels & Willemsen, 2004; Ennett et al., 2001). Researchers have explored frequency in two ways within the literature: some have examined the overall frequency of substance use communication (e.g.

Engels & Willemsen, 2004; Miller-Day & Kam, 2010; Otten, Harakeh, Vermulst, van den Eijnden, & Engels, 2007), while other researchers have explored the frequency of specific messages (e.g., Ennett et al., 2001). However, research on the frequency of parent-offspring communication about substance use echoes the findings about general communication between the parties. For example, in one sample of teens, less than 60% reported that their parents had even mentioned ATOD prevention messages to them, while only about 43% reported a more in-depth discussion on the topic (Miller-Day, 2002). Thus, as in other topic areas, communication between parents and adolescents about ATOD appears to be infrequent.

The timing of parent-offspring communication about alcohol, tobacco and other drugs has been least often examined within the extant literature. However, some researchers (e.g., Miller-Day & Dodd, 2004) have suggested that communication may be proactive – occurring before youth initiate substance use – or reactive – occurring in reaction to suspicion or knowledge of youth substance use. The limited longitudinal data available on the topic shed some light on the issue. For example, in one sample of Dutch teenagers, youth smoking behavior predicted an increase in communication frequency (Harakeh et al., 2009) and was related to a greater variety of topics discussed (Huver et al., 2007). These findings suggest that youth substance use may trigger parents to engage in substance use conversations with their offspring and that understanding the timing of communication is important in developing effective prevention strategies.

### **Using Parent Socialization Theory to Examine Parental Influences on Emerging Adult Marijuana Use**

Much of the research described above is limited methodologically, utilizing cross-sectional samples and brief measures of communication about substance use. For example, one

of the most frequently cited measures of parent-offspring communication about ATOD includes only eight items (Ennett et al., 2001); items represented the content of a substance use intervention program that included a communication component. A smaller but growing area of the literature has utilized qualitative methodologies to explore parent-offspring communication about ATOD. A few recent studies have investigated communication within longitudinal samples, offering further insight. For example, in a sample of Dutch high school students followed for three years, findings revealed that the number of topics discussed increases with age (Huver et al., 2006). Most of these studies have examined only one or a few aspects of substance use communication, without considering the multiple dimensions of these conversations. Further, only a few studies have examined parent predictors of communication.

### **Purpose and Description of Research**

The purpose of this dissertation was two-fold. First, it sought to build a multidimensional measure of parent-offspring communication regarding marijuana. The existing literature in this area has most often utilized limited measures of parent-offspring communication and has primarily focused on alcohol and tobacco, without considering marijuana – a drug for whom use may be growing among young populations. Furthermore, few researchers have examined predictors or outcomes of such communication. Towards these aims, a two-study design was used to collect data then to test the fit of measure developed to the proposed model of communication and to explore predictors and outcomes of this communication. Specifically, Study 1 tested a new measure of parent-offspring communication about marijuana use, the Communication about Marijuana (CAM) scale, to determine whether these items fit with the proposed model. The CAM was developed with guidance from: (1) the prior published work of others in this area, as well as (2) prior published work by myself and colleagues in this area, and

(3) personal unpublished data relevant to the topic (in-depth qualitative interviews with college students on parent-offspring communication about alcohol, marijuana, and other drugs). In addition, the reliability and validity of the CAM were investigated. Study 2 tested a revised version of the CAM based on the results of Study 1. Factor analyses were conducted to confirm the structure of the revised CAM. Structural equation modeling was used to examine predictors and outcomes of communication. The psychometric properties of the revised measure were again examined.

## **Research Questions**

### **Factor structure and psychometric properties of the Communication about Marijuana (CAM) Measure.**

#### *Study 1.*

1. Does the structure of the CAM measure fit the proposed 4-dimensional model?
2. Do the resulting CAM factors show good estimated internal consistency as evidenced by Cronbach's alpha?
3. Do the resulting CAM factors show evidence of estimated reliability, as assessed with split-half correlations?
4. Do the resulting factors of the CAM show convergent validity with the Parent-adolescent Communication about Alcohol and Tobacco measure?
5. Do they show evidence of divergent validity with the Experiences in Close Relationships subscales?

#### *Study 2.*

1. Does this revised and shortened version of the CAM measure exhibit the same 4-factor content structure that the original measure did in Study 1?

2. Do the resulting CAM factors show good estimated internal consistency as evidenced by Cronbach's alpha?
3. Do the resulting CAM factors show evidence of reliability, as assessed with split-half correlations?
4. Do the resulting factors of the CAM show convergent validity with the Parent-adolescent Communication about Alcohol and Tobacco measure?
5. Do they show evidence of divergent validity with the Experiences in Close Relationships subscales?

**Structural equation models of late adolescents' perceptions of parent influence on self-reported use and use problems.**

1. Is the parent-adolescent bond (represented by parental support and parent knowledge) and parent-offspring communication about marijuana negatively associated with past year marijuana use?
2. Is the parent-adolescent bond (represented by parental support and parent knowledge) and parent-offspring communication about marijuana negatively associated with past year marijuana use?

**Study 1: Method**

**Participants**

Participants ( $N=433$ ) were mostly female (68%) undergraduate students at Virginia Commonwealth University (VCU) who were between 18 and 25 years old ( $M=20.22$ ,  $SD=1.83$ ). The sample represented the university's diverse student body in terms of race: 55% identified as White, 21% as Black, 13% as Asian, and 11% as other (including American Indian/Alaskan Native, Native Hawaiian / Other Pacific Islander, and Other). Nine percent identified as being of

Latin ethnicity. More freshman students (34%) completed the survey than sophomores (18%), juniors (25%), seniors (17%) and students of other class standings (advanced senior or non-matriculated student; 7%).

## **Measures**

Measures were included in the battery to develop the survey instrument and to test initial instrument validity.

**Demographics.** Participants reported on their sex, age, race, ethnicity, and class standing.

**Parent-adolescent Communication about Alcohol and Tobacco.** Ennett and colleagues' (2001) Parent-adolescent Communication about Alcohol and Tobacco measure was used to assess the frequency of communication about different topics, including the negative consequences of alcohol and tobacco use, peer pressure to use, media portrayals of use, directives and rules not to use and discipline. Communication about alcohol and tobacco was assessed with separate but identical items. Participants were asked to rate how frequently in the past 6 months they had spoken about each topic; response choices were *0 times*, *1 time*, *2 times*, and *3 or more times*. An example item is, "In the past 6 months, how many times has at least one of your parents talked to you about the negative consequences of tobacco use?" Items were summed to create three subscale scores: Rules, Consequences, and Media according to Ennett and colleagues' (2001) method. Evidence of good estimated internal consistency has been reported, with Cronbach alphas of .84 to .87 in one sample of adolescents (Ennett et al., 2001). Similarly, in this present study, estimated internal consistency was good (Rules: alpha = .84, Consequences: alpha = .88, Media: alpha = .70).

**Attachment.** Parent-offspring attachment was measured with a modified version of The Experiences in Close Relationships-Revised (ECR-R) questionnaire (Fraley, Waller, & Brennan,

2000). For this study, items were edited to query the participant's attachment relationship to the parent who was the primary parent who communicated with them about marijuana as identified earlier in the survey within the Communication about Marijuana measure. Participants were then instructed to think about that parent when answering the attachment relationship questions. This 36-item measure consists of two 18-item subscales: Anxiety and Avoidance. Participants chose responses from a 7-point scale ranging from *Strongly Disagree* to *Strongly Agree*. An example item is, "I worry a lot about my relationship with my parents." Eight items were reverse coded before scoring so that higher scores represented more anxious or avoidant attachment. Items then were averaged to create two subscale scores. Previous researchers studying college students (Fairchild & Finney, 2006) have reported good estimated internal consistency with this measure, citing a Cronbach's alpha of .93 for the Avoidant Attachment Subscale and .92 for the Anxious Attachment Subscale. In the current study, each subscale demonstrated excellent estimated internal consistency, with a Cronbach's alpha of .91 for the Anxious Attachment subscale and .89 on the Avoidant Attachment subscale.

### **Scale Development**

First, I created an initial list of parent-offspring communication about marijuana topics based on similar prior work done in this area by both myself and colleagues (e.g., (Zaharakis, Taylor, & Kliewer, 2015) and that of others (e.g., Ennett et al., 2001; Miller-Day and Dodd, 2004), as well as from my own unpublished data that was collected in this area (interviews with undergraduate students about parent-offspring communication about alcohol and other drugs). From this list of topics, I generated an initial item pool. My graduate advisor reviewed these items, and I incorporated suggestions for revisions as appropriate. The final measure included 31 items, with four proposed dimensions, as described below.

**Proposed dimensions.** The measure was designed to address the four proposed dimensions of marijuana communication, as described earlier (Content, Context, Frequency, and Timing). Content was hypothesized to include 6 individual topic factors comprising Providing Examples of Others Who Have Used, Encouragement to Abstain, Rules, Advice for Managing Peer Pressure, Consequences of Use, and Monitoring Use. When rating the 15 content items, participants were instructed to think back to their middle school years up to the present day. Items were answered using a 5-point response format coded from 0 to 4 with response choices as follows: *Not at all, A little, Some, A lot, A whole lot*. Seven items queried the Context of communication and were hypothesized to load onto a single factor, tapping the degree of comfort, openness, shared opinion and conversationality within the communication. Items were answered on a sliding numerical scale; respondents moved a vertical bar along a continuum from 1 to 100, with qualitative anchors unique to each item. See table \_\_\_ for a list of items and response anchors. Five items queried the Frequency of communication and were hypothesized to load onto a single factor, tapping how often the participant and his or her parents discussed marijuana in elementary school, middle school, high school, college, and in general. Response choices were *Not at all, A little, Some, A lot, and A whole lot*, and were coded from 0 to 4. Finally, four descriptive items queried the Timing of communication, including 3 tapping the length of the first ever conversation about marijuana, the length of the most recent conversation, and the average conversation length. Response choices were as follows: *Less than 5 minutes, 5-10 minutes, 10-15 minutes, 10-30 minutes, and More than 30 minutes*. The final Timing item queried the time period of the first communication about marijuana, with response options of *Elementary school, Middle school, High school, or College*.

## **Procedures**

Recruitment of participants occurred through the SONA® system – VCU Department of Psychology’s online research matching system from February through September 2014. The SONA® system matches undergraduate students enrolled in psychology courses with active research studies ongoing within the department. After reading a brief description of the study and completing a screening question about their age, interested participants who met the age requirement registered for the study. Within two days, participants received an email invitation containing an individualized link to survey completed through RedCAP, an online VCU-hosted survey software program. After clicking on the survey link, participants read a detailed description of the study; they then provided informed consent by indicating whether they understood the study and consented to participate. Students who consented to participate immediately entered a confidential self-report assessment battery administered online. The survey took 45 to 60 minutes to complete and was anonymous. The RedCap survey software program tracked completed surveys by highlighting email addresses associated with completed survey links, without linking any individual data record with a specific email address. Participants received 1 hour of research credit toward their course requirements for completing the survey.

## **Analysis Plan**

**CAM factor structure.** Confirmatory factor analyses using maximum likelihood estimation were conducted using MPlus 7.0 (Muthén & Muthén, 2012) to test the fit of each of the proposed factor models to the data. Fit indices were examined to evaluate the fit of each model to the data, with statistics that included a Chi-square test, the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean squared error of approximation (RMSEA) as

previous researchers (DeVellis, 2004; Hu & Bentler, 1998, 1999) have demonstrated the sensitivity of these statistics. Recommended standards exist for each statistic (i.e., CFI and TLI  $\geq$  .90, RMSEA  $\leq$  .08; Bentler, 1990; Browne & Cudeck, 1993); these statistics and standards were used to guide analyses and interpretation. In addition, the resulting factor loading of each item on the hypothesized latent factor was investigated to determine the fit of each item to the proposed model.

**CAM reliability and validity.** In order to assess the internal consistency of the CAM, Cronbach's alpha was calculated for each of the factors of the Content dimension. Estimated internal consistency of the measure was assessed by examining correlations among the factors. The sample was divided into two random groups in order to assess split-half reliability with Pearson correlation coefficients. Correlations were computed between the CAM Content factors and the Parent-adolescent Communication about Alcohol and Tobacco measure to investigate preliminary evidence of the construct and convergent validity of the CAM. Discriminant validity was assessed by calculating correlations between the CAM and the each of attachment subscales.

## **Study 1: Results**

### **Factor Analyses**

**Content factor.** First a 6-factor model of 15 items was specified, identifying different content topic areas. The six topic area factors comprised Examples (3 items), Encouraged Abstinence (2 items), Rules (3 items), Advice (2 items), Consequences (2 items), and Monitoring Use (3 items). The model was a poor fit to the data, with a significant Chi-square test of model fit ( $\chi^2(75) = 525.30, p < 0.001$ ). Other indices of model fit supported this conclusion, with an RMSEA of 0.12, CFI of 0.83 and TLI of 0.76. Factor loadings were variable, ranging from 0.20

to 0.87, with the Example factor items' loadings estimated at 999.00. A warning indicated that there was a problem involving the Examples factor and that the latent variable covariance matrix was not positive definite.

Thus, after consideration of the topic factors theoretically and the initial model results, a new model was specified. Given that the Examples factors caused problems with model fit and that this topic has been much less frequently published in the literature (Zaharakis et al., 2015), the new model was revised to exclude the Examples factor items. This model terminated normally, but was a poor fit to the data. The Chi-square test of model fit was significant at 499.96,  $p < 0.001$ . The RMSEA was 0.16 and the CFI and TLI were 0.83 and 0.74, respectively. Examination of the model suggested that the Encouraged Abstinence factor did not correlate well with three of the four other content factors. Associations were poor with Rules (0.18), Advice (0.10), and Consequences (0.15). Encouraged Abstinence was only significantly related to Monitoring Use, with a correlation of 0.60. In addition, one item on the Rules factor (rules about use) loaded poorly onto that factor, with a loading of only 0.20. All other factors loaded onto their respective factors well, with loadings ranging from 0.51 to 0.88.

The above results were considered and revisions to the model were implemented. A final model with 4 content factors was then specified, removing the Encouraged Abstinence factor and the rules-about-use item from the Rules factor. Model indices suggested that this model fit the data adequately. The Chi-square test of model fit was significant ( $p < 0.001$ ), with a  $\chi^2$  value of 91.74. However, other model indices suggested that the model fit the data adequately, with an RMSEA of 0.08 with a 90% confidence interval of 0.07 to 0.11. CFI and TLI were also good, with values of 0.97 and 0.94 respectively. Examination of the factor loadings revealed good fit of

the items to their respective factors, with coefficients ranging from 0.50 to 0.87. See Table 1 for all factor loadings.

Table 1.

*Communication about Marijuana (CAM) Content Factor Item Loadings.*

	Rules	Peers	Consequences	Monitoring Use
My parent. . .				
Has told me that I am not allowed to use.	0.83			
Has told me that I would be punished if I used marijuana.	0.87			
Has told me how to resist peer pressure or offers to use marijuana.		0.68		
Has encouraged me to choose friends who do not use marijuana.		0.87		
Has told me about the health risks of using marijuana.			0.81	
Has told me about the negative effects of using marijuana.			0.83	
Has asked me if I have tried / used marijuana.				0.82
Has asked me if my friends have tried / used marijuana.				0.50
Has asked me if I will use marijuana in the future.				0.60

*Note.* RMSEA = 0.08, (0.07-0.11); CFI = 0.97; TLI = 0.94;  $\chi^2$  (21) = 91.74,  $p < .001$ .

**Context factor.** An initial model was fit including all seven context items loading onto one factor. Model fit indices suggested this model was a poor fit to the data. The Chi-square test of model fit was significant,  $\chi^2(14) = 156.36, p < 0.001$ , with an RMSEA of 0.15, a CFI of 0.58, and a TLI of 0.37. Factor loadings evidenced further proof of the poor model fit, with four items showing negative associations with the latent factor, with loadings ranging from -0.37 to -0.78, and 3 items showing a positive association with the factor, with loadings ranging from 0.002 to 0.25.

Theoretical assertions were taken into account and the individual items and factor loadings were examined. A revised context factor was then specified with 4 items (openness, shared opinion, conversational-ness, and comfortability). The shared opinion item was reversed coded, so that higher scores reflected more sharing of the parent's opinion. This model exceeded the maximum number of iterations and resulted in no convergence.

A final model was specified testing a 3-item factor structure, following the set-up of the 4-item model but dropping the shared opinion item. This model did not evidence a good fit of the data to the model. The chi-square test of model fit was significant,  $\chi^2(0) = 0, p < 0.001$ . The RMSEA was 0, with a CFI and TLI of 1.0. None of the items significantly loaded on the model, with factor loadings of 0.10, -0.90 and -0.13, respectively. As it did not make sense theoretically to continue to winnow items from the model, investigation into the context factor was terminated.

**Frequency factor.** A model consisting of the five frequency factor items was tested. Model results indicated a poor fit of the data to the model. The Chi-square test of model fit was significant, with a  $\chi^2$  value of 184.71,  $p < 0.001$ . The RMSEA was 0.29, CFI was 0.72, and TLI was 0.45. Factors loadings indicated that two items (frequency of communication in high school,

overall frequency of communication) loaded poorly onto the latent factor, with loadings of 0.08 and 0.22 respectively. Factor loadings for the elementary school, middle school, and college items were good, being estimated at 0.78, 0.97, and 0.57

A second model was then specified, excluding the overall frequency of communication item, as the high school frequency item was believed to be important for theoretical reasons. The second model was a better fit to the data. The Chi-square test of the model fit was still significant but with a much smaller Chi-square value,  $\chi^2(2) = 7.55, p = 0.02$ . Other indices suggested an adequate fit of the model to the data, with an RMSEA of 0.08, a CFI of 0.99, and a TLI of 0.96. Factor loadings, however, indicated some problems with the model. The items querying the frequency of communication in elementary school, middle school, and high school showed good loadings at 0.76, 0.99, and 0.55. However, the item querying frequency of communication in college did not load onto the Frequency factor, with a loading of only 0.06. As further winnowing of items did not make sense theoretically, investigation into the Frequency factor was terminated.

## **Descriptives**

Sum scores were computed for each of the factors of the CAM content dimension in order to describe the distributional qualities of the measure. Examination of means and standard deviations revealed somewhat similar levels of conversation of each topic factor. Participants reported fairly similar levels of communication about Monitoring Use ( $M=3.27$ ), Rules ( $M=2.96$ ) and Advice ( $M=2.86$ ). Communication about consequences was reported least, with a mean of 2.36. Skewness and kurtosis values suggested acceptable normality for each of the factors. See Table 2 for a summary of descriptive statistics for each of the CAM content factors, as well as the variables included in the psychometric analyses.

Table 2.

*Descriptive Statistics of CAM Subscale Scores and Validity Measures.*

	Mean	SD	Range	Skewness	Kurtosis	$\alpha$	$\rho$
CAM Content Subscales							
Rules	2.96	3.02	0-6	0.54	-1.22	0.92	0.92
Advice	2.86	2.74	0-6	0.59	-0.95	0.80	0.80
Consequences	2.36	2.58	0-6	0.86	-0.51	0.93	0.90
Monitoring Use	3.27	3.35	0-9	0.95	0.10	0.85	0.84
PCCAT Subscales							
Rules	3.22	4.00	0-15	1.40	1.09	0.84	--
Consequences	4.77	4.74	0-15	0.78	-0.58	0.88	--
Media	0.80	1.48	0-6	1.97	3.12	0.70	--
ECR-R Subscales							
Anxious Attachment	2.56	0.99	0-6	0.66	-0.28	0.91	--
Avoidant Attachment	3.22	0.92	0-6	0.59	-0.66	0.89	--

*Note.* PCCAT = Parent-Child Communication about Alcohol and Tobacco Measure; ECR-R = Experiences in Close Relationships-Revised Measure.

Individual items from the Context dimension were examined to gather basic descriptive information about the level of comfort and openness during marijuana communication. Results revealed that marijuana communication generally was perceived as being open ( $M=63.77$ ) and comfortable ( $M=61.91$ ). Parents were seen as sharing their opinions more than engaging discussion around their son or daughter's opinions ( $M=37.72$ ). Interestingly, communication was seen as generally equally balanced between being lecture-oriented as compared to conversation-oriented ( $M=51.58$ ). Similarly, communication was fairly balanced between occurring in response to a specific event as compared with just being a part of daily conversation ( $M=48.90$ ). Most of the time, communication involved only talking, without incorporating any print or multimedia resources, such as TV or internet ( $M=27.67$ ). Somewhat more often than not, marijuana communication occurred in the context of conversation about 'drugs in general' ( $M=60.91$ ).

Descriptive analyses on items from the Frequency dimension suggested a small percentage of participants had never communicated with their parents about marijuana (8.5%). In general, about a third (32.1%) of participants had spoken about marijuana only a little, while another third (34.9%) had communicated about marijuana some. The frequency of marijuana communication during different school ages varied by educational level. The majority of participants did not communicate with their parents about marijuana until high school, with 88.6% of participants reporting at least a little communication during high school, as compared with 54.9% of participants who reported no marijuana communication during the middle school years.

Descriptive analyses also were conducted on the Timing dimension items. Most participants first communicated with their parent about marijuana in high school (51.7%),

followed by middle school (33.8%). Smaller percentages of participants remembered their first conversation with their parents about marijuana as occurring during elementary school (7.6%) and college (6.6%). The majority of these first conversations lasted 10 minutes or less (58.8%), with another 19.2% of conversations lasting between 10 and 15 minutes. Similarly, most conversations averaged 10 minutes or less (68.5%) as did the most recent conversation about marijuana (69.3%).

### **Psychometric Analyses**

**Estimated internal consistency and reliability.** Estimated internal consistency of each of the CAM content factors was assessed with Cronbach's alpha. Alphas for each of the factors were excellent, with an alpha of 0.92 for the Rules factor, 0.80 for the Advice factor, 0.93 for the Consequences factor, and 0.85 for the Monitoring Use factor. Split-half reliability was assessed by calculating the Spearman-Brown coefficient. Coefficients for each of the factors of the CAM content dimension were excellent, ranging from 0.80 to 0.92. See Table 2 for additional reliability information.

**Convergent validity.** Convergent validity of each of the factors was assessed by testing associations with another measure of parent-offspring communication about substances. Zero-order correlations were calculated between each of the content topic factors of the CAM with each of the subscales of Ennett and colleagues' (2001) Parent-adolescent Communication about Alcohol and Tobacco (PCCAT) measure. In support of the hypotheses, each of the CAM factors positively correlated with each of the factors of the PCCAT. The CAM Rules factor was positively and significantly correlated with the Rules subscale of the PCCAT, as well as the Consequences subscale and Media subscale. The CAM Advice factor was positively and significantly correlated with the Rules subscale of the PCCAT, with the Consequences subscale

and the Media subscale. Similarly, the CAM Consequences factor was positively and significantly correlated with the Consequences subscale of the PCCAT, as well as with the Rules subscale and the Media subscale. Finally, the Monitoring Use factor was significantly positively correlated with the Rules subscale of the PCCAT, with the Consequences subscale, and with the Media subscale. See Table 3 for additional information on psychometric results.

**Discriminant validity.** Discriminant validity was tested by examining associations between each of the content factors of the CAM with scales that were hypothesized to be conceptually distinct. Each of the factors of the CAM was hypothesized to be conceptually distinct from the measures of attachment related patterns of behavior (anxious and avoidant). As expected, almost all of the factors of the CAM were not correlated with either of the subscales of the attachment measure. See Table 3 for additional information on psychometric results. The one exception was between the CAM Monitoring Use factor and the Anxious Attachment subscale, which were positively correlated, though the strength of the relationship was small ( $r=-0.14$ ,  $p=.004$ ).

Table 3.

*Zero-Order Correlations Between CAM Content Subscale Scores and Measures of Validity.*

	Monitoring			
	Rules	Advice	Consequences	Use
PCCAT Rules	0.41**	0.42**	0.41**	0.24**
PCCAT Consequences	0.34**	0.43**	0.42**	0.24**
PCCAT Media	0.20**	0.31**	0.37**	0.26**
Avoidant Attachment	0.07	0.04	-0.02	-0.14**
Anxious Attachment	0.09	0.10	0.08	0.01

*Note.* \*\* indicates correlation is significant at the 0.01 level (2-tailed); PCCAT= Parent-Child Communication about Alcohol and Tobacco measure.

## Study 2: Method

### Participants

Participants ( $N=432$ ) were mostly female (69%) undergraduate students at Virginia Commonwealth University who were between 18 and 25 years old ( $M=20.40$ ,  $SD=1.88$ ). About half (52%) of the sample was White, with another 20% identifying as Black/African American, 17% Asian, and 11% Other. Ten percent identified as being of Latino ethnicity. More freshman students (32%) completed the survey than sophomores (20%), juniors (19%), seniors (22%) or students of other class standings (advanced senior or non-matriculated student; 8%). Forty percent lived on campus, 42% lived off campus without family, and 18% lived with family.

### Procedures

Participants were recruited through the SONA system – VCU Department of Psychology’s online research matching system from February through July 2015. Procedures were identical to those in study 1. Briefly, eligible participants received an individualized link to

complete an anonymous 45 to 60 minute survey online and were compensated with 1 hour of course research participation credit for completing the survey. See Study 1 Procedures for more details.

## **Measures**

**Demographics.** Participants reported on gender, age, race, ethnicity, class standing, and housing status.

**Primary parent.** Participants identified the parent more likely to discuss substance use with them with the item “Which of your parents is most likely to talk with you about alcohol, tobacco, marijuana, or other drugs?”

**Parent-Offspring Communication about Marijuana.** Based on the results of Study 1, as discussed above, the Communication about Marijuana (CAM) Scale was revised Twelve items from the original measure were included. Nine items were directed at the content of messages about marijuana, with two items each focused on rules about marijuana, advice on how to deal with peer pressure, and warnings about the negative consequences of marijuana use; three additional items pertained to whether the parent had asked the participant questions about their own use, their friend’s use, and future use plans. Three final items were aimed at the style of communication, asking participants to rate the degree of openness in the conversations, the degree to which the parent and participant shared their opinions on marijuana, and whether the discussions were more conversational or more lecture-based.

**Modifications from the original CAM.** For this study, participants were asked to think about the parent identified as the primary parent who would communicate with them about substance use (see Primary Parent above). The survey was programmed to automatically reword items to query communication with the participant’s mother or father, dependent on the response

to the parent item. Responses to the content items were modified to parallel Ennett and colleagues' (2001) Parent-adolescent Communication about Alcohol and Tobacco (PCCAT) measure and were designed to measure frequency; the response choices were *0 times*, *1 time*, *2 times*, and *3 or more times*. This modification was made to consider frequency without constructing a separate factor. The timeframe chosen (past 6 months) also paralleled the PCCAT. The timeframe was modified to capture timing of conversations and to create a timeframe more relevant to the research questions being addressed. In addition, response choices to the three communication style items were modified from the first study. For this study, each item included a 7-point scale specific to the aspect of style being queried, with qualitative anchors at each end, as follows: *Not at all open to Very open*, *Only shared his/her opinion to Only asked about my opinions*, *Mostly lecture-based to Mostly conversation-based*. Please see appendix A for a list of items.

**Parent-adolescent Communication about Alcohol and Tobacco** (Ennett et al., 2001).

As in Study 1, Ennett and colleagues' (2001) Parent-adolescent Communication about Alcohol and Tobacco (PCCAT) measure was used to assess the frequency of communication about alcohol and tobacco regarding 8 different topics, including the negative consequences of alcohol and tobacco use, peer pressure to use, media portrayals of use, directives and rules not to use and discipline. See Study 1: Method section for additional information regarding the measure. In this sample, internal consistency was good (Rules:  $\alpha = .85$ , Consequences:  $\alpha = .90$ , Media:  $\alpha = .77$ ).

**Attachment.** As in Study 1, parent-offspring attachment was measured with a modified version of The Experiences in Close Relationships-Revised (ECR-R) questionnaire (Fraley, Waller, & Brennan, 2000). For the present study, items were edited to query the participant's attachment relationship to the parent they identified as their primary parent for the CAM

measure. See Study 1: Method section for additional details on the measure. In this sample, each subscale demonstrated excellent estimated internal consistency reliability, with a Cronbach's alpha of .91 for the Anxious Attachment subscale and .88 on the Avoidant Attachment subscale.

**Parenting.** Parenting was measured using the nine-item Parent Knowledge subscale of Stattin and Kerr's (2000) Parenting Practices Scale. The measure tapped how much the participant's parents' know about their whereabouts and leisure activities. A sample item is "Do your parents know where you go when you go out with friends at night?" Responses were chosen from *Never, Seldom, It Depends, Usually, and Almost Always*. Mean scores were calculated, with higher scores indicating more knowledge. The Parent Knowledge subscale has shown good reliability in previous research ( $\alpha = .83$ ; Kerr & Stattin, 2000). In this study, the subscale demonstrated excellent estimated internal consistency (Knowledge:  $\alpha = .91$ ).

**Parental support.** The Network of Relationships Inventory – Revised (NRI-R; Furman & Buhrmester, 1985) was used to assess support from the parent. For the current study, only eight of the original 30 items were employed. Students' were directed to answer these questions about the primary parent who would speak with them about alcohol and other drugs, as identified earlier in the survey. The respondents indicate on a standard 5-point Likert scale how strongly each attribute was experienced in the relationship (*Little or none to the most possible*). An example item is "How much can you count on your parent to be there when you need him or her no matter what?" Higher scores indicate more parental support. The estimated internal consistency of the complete NRI in previous samples is satisfactory ( $\alpha = .80$ ) (Furman & Buhrmester, 1985). A shortened version of the NRI utilized by Plybon and Klierer's (2001) demonstrated satisfactory estimated internal consistency ( $\alpha = .77$ ).

**Marijuana use.** Marijuana use was assessed with the item “Over the past year, how often have you used marijuana or hashish (weed, pot)?”, adapted from the Adolescent Alcohol and Drug Involvement (AADI) Survey (Moberg, 2005). Response choices fell on a 7-point scale, ranging from *Never used* to *Several times a day*. Higher scores indicated more frequent use of cannabis. The full AADI measure has demonstrated good internal consistency across adolescents of different racial backgrounds, with alphas ranging from .92 to .95 (Winters, Botzet, Anderson, Bellehumeur, & Egan, 2001).

**Problematic marijuana use.** Problems associated with participants' drug use were assessed using the Reduce Annoyed Guilty Start (RAGS) measure (Levin et al., 1999). The RAGS consists of four items and taps differing aspects of problem use. For this study, items were modified to query about problems related to marijuana use in the past year. Items were (1) Have you felt that you should reduce or stop your marijuana use?, (2) Have people annoyed you by criticizing your use of marijuana?, (3) Have you felt guilty about using marijuana?, and (4) Have you needed marijuana to start your daily activities? Participants answered yes or no to each item; responses were summed to create an index score of the degree of problems related to drug use and misuse, with scores ranging from 0 to 4. Previous researchers have demonstrated good internal consistency estimates for the RAGS ( $\alpha = 0.78$ ) and excellent test-retest reliability ( $r = 0.64$ ) with college samples (Levin et al., 1999).

### **Analysis Plan**

**CAM factor structure.** Confirmatory factor analyses using maximum likelihood estimation were conducted using MPlus to test the fit of the data to the proposed factor models. Fit indices were examined to evaluate the fit of each model to the data, with statistics that included a chi-square test, the comparative fit index (CFI), the Tucker Lewis index (TLI), and

the root mean squared error of approximation (RMSEA) as previous researchers (DeVellis, 2004; Hu & Bentler, 1998, 1999) have demonstrated the sensitivity of these statistics. Recommended standards exist for each statistic (i.e., CFI and TLI  $\geq$  .90, RMSEA  $\leq$  .08); these statistics and standards guided analyses and interpretation. In addition, I investigated the resulting factor loading of each item on the hypothesized latent factor to determine the fit of each item to the proposed model.

**CAM validity and reliability.** In order to address aim 2 of this study, the psychometric properties of the CAM were investigated. Statistics were computed to assess the split-half reliability and internal consistency of the CAM, as well as to provide initial evidence of construct, convergent, and divergent validity. Specifically, correlations were computed between each of the factors of the CAM and the three factors of the Parent-adolescent Communication about Alcohol and Tobacco measure to investigate preliminary evidence of the construct and convergent validity of the CAM. Discriminant validity was assessed by calculating correlations between the CAM and the Avoidant and Anxious Attachment subscales of the Experiences in Close Relationships-Revised measure. The sample was divided into two random groups in order to assess split-half reliability with Pearson correlation coefficients. Cronbach's coefficient alphas were computed to examine internal consistency for each of the factors of the CAM.

**Structural equation models.** Structural equation models were proposed to model parent influence on marijuana use and problematic use, as hypothesized according to primary socialization theory. The proposed models comprised a latent variable of the parent-adolescent bond, represented by parental support and parent knowledge. A latent variable was specified to represent the parent-adolescent bond, as described in PST. Measures of the parent-adolescent relationship (parental support) and parenting (parent knowledge) were loaded onto the latent

bond variable. Paths were specified from the latent variable, parent-adolescent bond, and from each of the latent factors of marijuana communication (encouraging abstinence, advice, consequences, and monitoring of use) to past year marijuana use and problematic marijuana use, in separate models. Models were tested in MPlus 7.0 (Muthén & Muthén, 2012) using maximum likelihood estimation.

## **Study 2: Results**

### **Descriptive Analyses**

Descriptive analyses were performed on all variables included in the analyses. The attachment scales used to examine the divergent validity questions showed a normal distribution. The alcohol and tobacco communication scales used in the convergent validity analyses, conversely, showed some deviation from a normal distribution. Specifically, the Rules and Media subscales evidenced positive skew, while the Media subscale also evidenced positive kurtosis. Participants' endorsed more communication about Rules and Consequences than about Media. The majority (66%) identified their mother as the parent most likely to speak to them about substance use. Parent support and parent knowledge evidenced a normal distribution. See Table 5 for descriptive statistics on each measure.

Participant past year marijuana use was somewhat skewed ( $skew=1.27$ ). As this was expected given the nature of the phenomena being measured, it was not transformed to correct the positive skewness. The mean past year marijuana use was 1.34 ( $SD=1.73$ ). More than half of the participants (53.3%) reported using marijuana at least "less than once a month" in the past year as opposed to 46.7% that reported never using the past year. More than a fifth (22%) endorsed using "Most weekends" or more frequently in the past year, including 8% that reported daily use. Participant past year marijuana problems showed evidence of normal distribution, with

good skewness and kurtosis statistics. The mean number of problems was 1.09 ( $SD = 1.25$ ). Most participants (64.8%) did not meet the cutoff for marijuana abuse problems. However, more than half of participants who had used marijuana in the past year reported at least one problem associated with using marijuana in the past year (53.3%). Almost twenty percent (18.1%) endorsed one problem in the past year related to marijuana use. Another 20.3% reported experiencing two problems related to marijuana use in the past year. Smaller percentages of students reported three problems (9.3%) and four problems (5.7%). Participants endorsed problems related to needing to reduce their marijuana use (40.2%) and feeling guilty about their use (34.8%) more frequently than feeling annoyed about criticisms by others about their use (22.6%) or needing marijuana to start their daily activities (12.3%).

One-way analysis of variance (ANOVA) tests were performed to investigate the influence of sex and race on marijuana use and marijuana use problems. Results were significant for sex on both marijuana use ( $F(1) = 9.34, p < .01$ ) and marijuana use problems ( $F(1) = 7.64, p < .01$ ). Males used marijuana more frequently ( $M=1.73, SD=2.04$ ) than females ( $M=1.18, SD=1.54$ ) and experienced more self-reported marijuana use problems ( $M=1.41, SD=1.37$ ) than females ( $M=0.93, SD=1.15$ ). In the ANOVA on marijuana use, race (coded as Black, White, Asian, and Other) was significant ( $F(3) = 7.42, p < .001$ ). Tukey's post hoc test showed that the Asian participants ( $M=0.64$ ) reported significantly less marijuana use than participants identifying as White ( $M=1.67$ ). The ANOVA on marijuana use problems indicated no significant differences between racial groups ( $F(3) = 1.21, p=.27$ ). Given these results, sex was included as a covariate on marijuana use outcomes in all models.

## Psychometric Analyses on CAM Measure

**Factor analysis.** A confirmatory factor analysis was conducted in MPlus 7.0 (Muthén & Muthén, 2012) software using maximum likelihood estimation. The CAM measure was hypothesized to have four content factors, as demonstrated in study 1. A model was specified as follows: Encouraged Abstinence (disappointed in use, encouraged not to use), Advice (how to resist peer pressure, encouragement to choose friends that do not use), Consequences (negative effects of use, health risks of use), and Monitoring of Use (asked if I tried/used, asked if my friends have tried/used, asked if I will use in future). Evaluation of model statistics showed excellent fit of the data to the model. Indices of fit examined included the RMSEA (0.04, 90% CI: 0.01 - 0.06), CFI (0.99), and TLI (0.99). In addition, Chi-squared statistic for the baseline model was adequate,  $\chi^2(21) = 33.78, p < .04$ . Furthermore, factor loadings for each of the items on their respective factor were excellent, ranging from .80 to .91. See Table 4 for factor loadings for each specific item.

Table 4.

*Communication about Marijuana-Revised (CAM-R) Content Factor Item Loadings.*

	Encouraging Abstinence	Advice	Consequences	Monitoring Use
My parent. . .				
Has told me he or she would be disappointed in me if I used marijuana.	0.82			
Has encouraged me not to use marijuana.	0.91			
Has told me how to resist peer pressure or offers to use marijuana.		0.90		
Has encouraged me to choose friends who do not use marijuana.		0.80		
Has told me about the health risks of using marijuana.			0.88	
Has told me about the negative effects of using marijuana.			0.90	
Has asked me if I have tried / use(d) marijuana.				0.90
Has asked me if my friends have tried / use(d) marijuana.				0.85
Has asked me if I will use marijuana in the future.				0.83

**Descriptive analysis.** Examination of the individual items of the CAM content factors revealed more information about parent-offspring communication about marijuana. For all items, the majority of participants reported never communicating about marijuana with their parent in the prior six months, with percentages ranging from 58 to 80% of responses to each item being answered as '0 times'. The most frequently endorsed item was communication encouraging the student not to use, with 42% of respondents indicating having been told this in the prior six months at least one time. Results of sum scores created for each factor suggested that the most communication occurred about advice (46.6% endorsed advice communication at least 1 time), followed by communication that encouraged abstinence (43.5% endorsed being encouraged to abstain at least once). Communication about monitoring use and about consequences occurred slightly less frequently, with 37.7% and 40.6% of students indicating communication about each of these topics at least once in the prior six months, respectively. The items tapping context of marijuana communication generally evidenced a normal distribution also. The mean on the item querying openness of communication was 4.11 ( $SD=2.05$ ), on a scale of 0 to 6, indicating most respondents felt their parent was fairly open when talking about marijuana. The mean on the item relating to sharing opinions was 2.34 ( $SD=1.47$ ), indicating parents were slightly more likely to share their opinion than ask about their child's opinion. Finally, the mean on the item tapping the degree to which the communication was conversational as compared to lecture-based was 3.45 ( $SD=2.19$ ). This suggested communication was slightly more conversational in style than characterized by lecture.

Table 5.

*Descriptive Statistics of CAM-R Subscale Scores and Validity Measures.*

	Mean	SD	Range	Skewness	Kurtosis	$\alpha$	$\rho$
<b>CAM Content Subscales</b>							
Encouraging Abstinence	1.49	2.09	0-6	1.17	-0.08	0.84	0.85
Advice	1.59	2.17	0-6	1.09	-0.31	0.84	0.84
Consequences	1.26	2.01	0-6	1.44	0.64	0.88	0.88
Monitoring Use	1.44	2.43	0-9	1.94	2.99	0.90	0.87
<b>PCCAT Subscales</b>							
Rules	3.61	4.35	0-15	1.29	0.76	0.84	--
Consequences	4.75	4.97	0-15	0.80	-0.69	0.90	--
Media	0.52	0.89	0-3	1.67	1.63	0.77	--
<b>ECR-R Subscales</b>							
Anxious Attachment	2.73	1.06		0.55	-0.39	0.90	--
Avoidant Attachment	3.18	1.05		0.48	-0.67	0.88	--

*Note.* PCCAT = Parent-Child Communication about Alcohol and Tobacco Measure; ECR-R = Experiences in Close Relationships-Revised Measure.

**Estimated reliability and internal consistency.** Cronbach's alpha was calculated to assess estimated internal consistency was of each of the factors of the CAM content domain. Estimated reliability for each of the factors was excellent, with alphas ranging from .84 to .90. Spearman-Brown coefficients were calculated to assess split-half reliability. Coefficients for each of the factors of the CAM content dimension were excellent, ranging from .84 to .88. See Table 5 for individual alpha and rho values.

**Convergent validity.** Convergent validity of each of the factors was assessed by testing associations with another measure of parent-offspring communication about substances. These associations were tested by computing zero-order correlations between each of the factors of the CAM with each of the subscales of Ennett and colleagues' (2001) Parent-adolescent Communication about Alcohol and Tobacco (PCCAT) measure. Each of the CAM factors was hypothesized to be positively correlated with each of the factors of the PCCAT. As hypothesized, each of the factors of the CAM was significantly positively correlated with each of the subscales of the PCCAT. Correlations ranged from .45 to .61, and all were significant at  $p < .001$ . See Table 5 for all correlations.

**Discriminant validity.** Discriminant validity was tested by examining associations between each of the factors of the CAM with scales that were hypothesized to be conceptually distinct. Each of the factors of the CAM was hypothesized to be conceptually distinct from the measures of attachment-related patterns of behavior (anxious and avoidant attachment). As hypothesized, the factors of the CAM were not correlated with either of the subscales of the attachment measure with one exception. The one exception was between the CAM Personal/Peer Use factor and the Anxious Attachment subscale, which were positively correlated, though the strength of the relationship was small ( $r = .13, p < .01$ ). See Table 5 for all correlations.

Table 6.

*Zero-Order Correlations Between CAM-R Content Subscale Scores and Validity Measures.*

	Encouraging Abstinence	Advice	Consequences	Monitoring Use
PCCAT Rules	.56**	.60**	.54**	.49**
PCCAT Consequences	.53**	.59**	.49**	.47**
PCCAT Media	.45**	.52**	.54**	.45**
Avoidant Attachment	.02	.01	.01	-.02
Anxious Attachment	.06	.03	.02	.13**

*Note.* PCCAT = Parent-Child Communication about Alcohol and Tobacco Communication Measure.

**Summary.** In summary, these results suggest that the CAM measure fits the proposed 4-factor content structure. Correlational analyses show evidence of good internal consistency and reliability. Further, positive correlations with the PCCAT and limited small correlations with the measures of anxious and avoidant attachment provide evidence of convergent and divergent validity, respectively.

### **Test of Parent Influence on Marijuana Use and Problematic Use**

Two structural equation models were then constructed to model parental influence on marijuana use outcomes, according to primary socialization theory (PST). The SEM analysis was broken down into two steps, and each outcome (past year marijuana use and problematic marijuana use) was examined separately due to concerns regarding power. First, a measurement model was specified to examine how parental support and parent knowledge loaded onto a latent factor, the parent-adolescent bond, as described by PST. Parent and youth sex were included as covariates on the latent factor. Next, two SEM models were constructed – one predicting past year marijuana use and one predicting problematic marijuana use – from the parent-offspring bond and parent-offspring marijuana communication content. The model controlled for parent sex on the latent variable parent-offspring bond and on each of the communication content factors, and for youth sex on the communication content factors as well as on marijuana use. An identical model was specified, replacing marijuana use frequency with problematic marijuana use. All analyses were carried out with MPlus version 7.1 (Muthén & Muthén, 2012). Model fit indices – as described in the Factor Analysis section above – were assessed to determine how well the data fit the model. Descriptive statistics for all variables included in the models are listed in Table 7.

Table 7.

*Descriptive Statistics on Variables Included in Structural Equation Models.*

	<i>M</i>	<i>SD</i>	Range	Skewness	Kurtosis	$\alpha$
Parental Support	28.02	3.99	8-40	-0.52	-0.39	0.87
Parent Knowledge	28.68	8.11	9-45	0.12	-0.47	0.91
Past Year Marijuana Use Frequency	1.34	1.73	0-6	1.27	0.63	--
Past Year Marijuana Use Problems	1.09	1.25	0-4	0.83	-0.42	0.69

**Measurement model – parent-child bond.** First, I constructed a measurement model to examine the structure of the latent variable, parent-adolescent bond. Parental support and parent knowledge were loaded onto the latent variable, parent-adolescent bond. Parent (Mother coded as ‘0’) and youth (Female coded as ‘0’) sex were included as covariates on the latent variable. Model results suggested an excellent fit of the model to the data, with an RMSEA of zero (90% CI: 0 – 0.78). Other indices were also very good, with a CFI of 1.0 and TLI of 1.04. The chi-square test of model fit was not significant, ( $\chi^2 = 0.51, p = .90$ ), indicating excellent fit of the data to the model. Parental support loaded at 0.92, while parent knowledge loaded at 0.53; both were significant ( $p < .001$ ). Parent and youth sex were significant on the parent-adolescent bond, with parent ( $\beta = -0.37, p < .01$ ) and youth ( $\beta = -0.30, p = .01$ ) sex were significantly negatively related to the parent-adolescent bond.

**PST and marijuana use.** Fit indices suggested that the model predicting marijuana use from the parent-child bond and marijuana communication content did not fit the data well, RMSEA = 0.19 with a 90% confidence interval of 0.18 to 0.20, CFI = 0.65, and TLI = 0.53. In addition, the chi-square test of model fit was significant,  $\chi^2 (67) = 1155.67, p = <.001$ . Examination of the resulting model estimates indicated that all predictors were significantly associated with marijuana use, except for communication about consequences. I then specified a

revised model, removing the CAM consequences factor. Model fit remained poor, with an RMSEA of 0.18, CFI = .71, TLF = .59. The chi-square test of model fit was significant and large ( $\chi^2 (46) = 703.85, p < .001$ ). Results mirrored those of the previous model, with all predictors significantly associated with marijuana use. The parent-offspring bond and communication about advice were negatively associated with marijuana use, as hypothesized. Unexpectedly, communication that encouraged abstinence and sought to monitor use was associated with more frequent marijuana use. See Table 6 for additional information on model results.

Table 8.

*Results of Models Testing Parent-Adolescent Bond and Marijuana Communication Content on Past Year Marijuana Use Frequency.*

	$\beta$	$p$
Model 1		
Parent-Adolescent Bond	-0.14	0.02
CAM Encouraged Abstinence	0.28	<.001
CAM Advice	-0.18	0.02
CAM Consequences	-0.9	0.19
CAM Monitoring	0.15	0.01
Model 2		
Parent-Adolescent Bond	-0.15	0.02
CAM Encouraged Abstinence	0.24	<.001
CAM Advice	-0.2	<.01
CAM Monitoring	0.13	0.02

Given concerns related to power and to further model the influence of marijuana communication on marijuana use frequency, I constructed additional SEM models, examining each marijuana communication content topic individually. First, a model was tested that included the latent parent-offspring bond variable and the CAM encouraged abstinence topic factor and controlled for the same covariates as the more complex model. Indices of model fit indicated excellent fit of the data to the model (RMSEA = 0.02, 90% CI: 0-0.06; CFI = 0.99, TLI = 0.99). The Chi-square test of model fit was not significant, suggesting an excellent fit of the data to the model,  $\chi^2(10) = 12.18, p = .27$ . Results indicated that the parent-offspring bond and communication that encouraged abstinence were both significantly related to marijuana use, though in opposite directions.

Next, I constructed a model testing the latent parent-offspring bond variable and the CAM advice topic factor, including the same covariates as the larger model. This model also was an excellent fit to the data, with an RMSEA of 0.04 within a 90% confidence interval of 0 to 0.05. Other indices also were good (CFI = 0.99, TLI = 0.97). The Chi-square test of model fit was only marginally significant,  $\chi^2(10) = 16.50, p = 0.09$ , indicating good fit of the data to the model. Results paralleled those of the previous model; the parent-offspring bond was significantly negatively associated with marijuana use, while communication about advice was associated with more frequent marijuana use. However, there was a problem with model due to the Advice latent variable and the covariance matrix was not positive definite. Most of the variance was due to only one of the items, with the advice on offers/peer pressure to use item loading at 1.22 ( $p < .001$ ), while the item regarding encouragement to choose non-marijuana using peers loaded at 0.59 ( $p < .001$ ). In order to address the non-positive definite covariance matrix problem, a final revised model was constructed removing the Advice latent factor and

instead including the advice on offers/peer pressure item as a manifest variable of communication about advice. Fit indices suggested this model was an excellent fit to the data, with an RMSEA of 0.05 (90% CI: 0.01-0.09), a CFI of 0.96, and a TLI of 0.89. The Chi-square test of model fit approached non-significance,  $\chi^2(6) = 13.15, p = 0.04$ , suggesting adequate fit of the data to the model. The parent-adolescent bond was negatively associated with marijuana use frequency, while communication conveying advice on offers and peer pressure to use was positively associated with use. See Figure 2 for all model estimates.

Finally, a third model was specified, as the previous two, but including communication about monitoring. As with the previous models, this model was a good fit to the data. Fit indices were excellent (RMSEA = 0.03, 90% CI: 0 - 0.05; CFI=0.99; TLI = 0.99). The chi-square test of model fit was non-significant, indicating excellent model fit to the data ( $\chi^2(16) = 20.21, p = .21$ ). Results again indicated that a stronger parent-offspring bond was associated with less frequent marijuana use, while communication about monitoring was associated with more frequent use. See Figures 1 to 3 for the factor structure and estimates for each model.

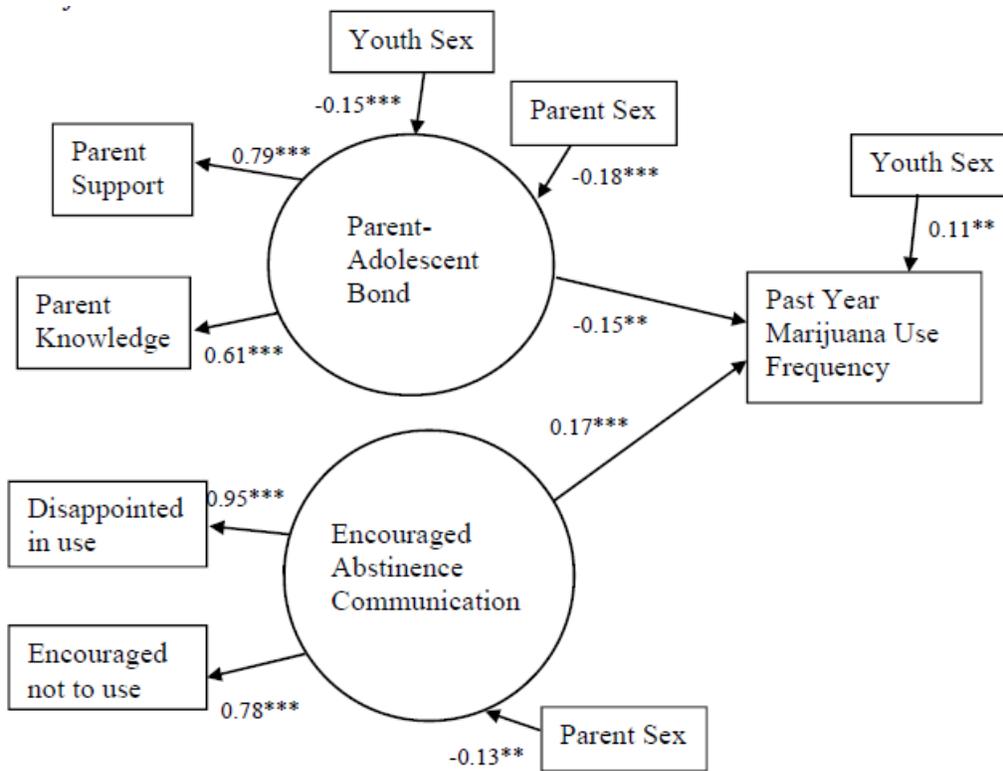


Figure 1. Parent-Adolescent Bond and Encouraged Abstinence Communication on Past Year Frequency of Marijuana Use.

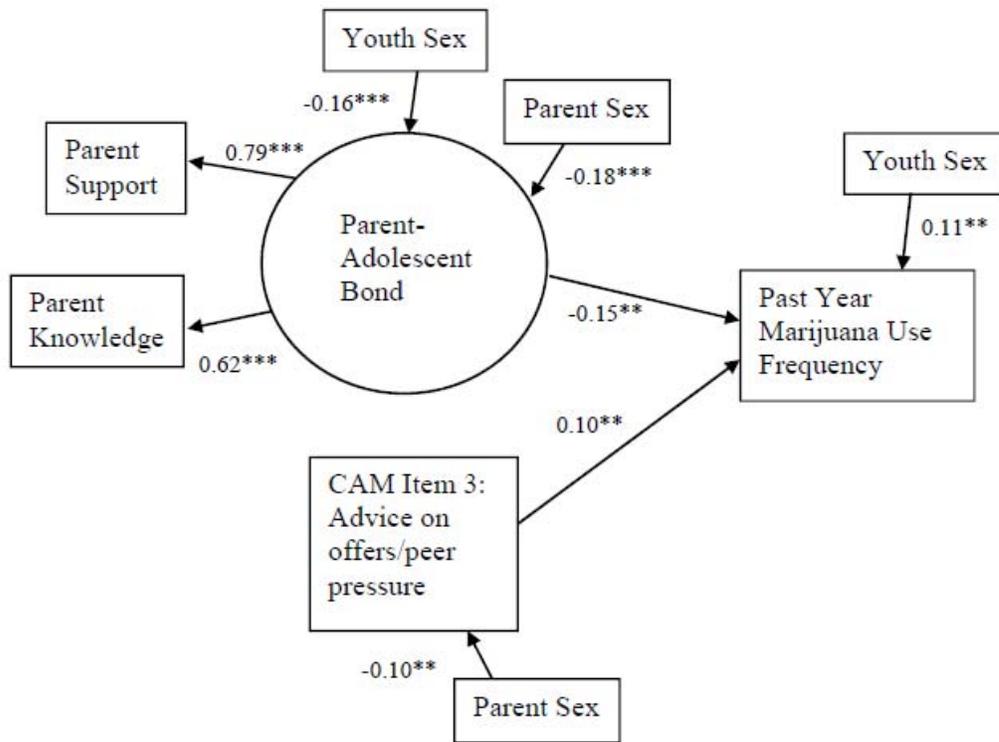


Figure 2. Parent-Adolescent Bond and Advice about Peer Pressure Communication on Past Year Frequency of Marijuana Use.

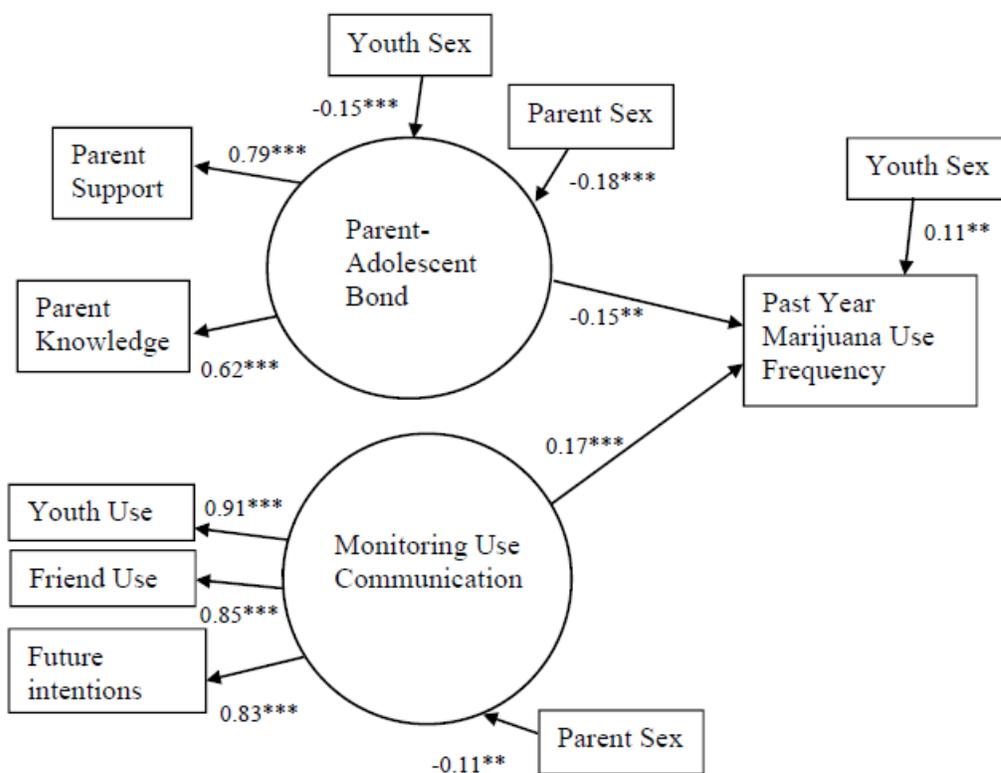


Figure 3. Parent-Adolescent Bond and Monitoring Use Communication on Past Year Frequency of Marijuana Use.

**PST and problematic marijuana use.** Fit indices suggested that the model predicting problematic marijuana use from the parent-adolescent bond and marijuana communication did not fit the data well, RMSEA = 0.19 with a 90% confidence interval of 0.18 to 0.20, CFI = 0.65, and TLI = 0.53. In addition, the Chi-square test of model fit was significant,  $\chi^2(67) = 1154.70, p = <001$ . Examination of the resulting model estimates indicated that the parent-offspring bond and communication that encouraged abstinence from marijuana were significantly associated with marijuana use, while communication about advice was marginally related to use. Contrary to hypothesis, communication about consequences and about monitoring was unrelated to problematic marijuana use. I then specified a revised model, removing the CAM consequences

and monitoring factors. Model fit remained poor, with an RMSEA of 0.23 (90% CI: .22-.25), CFI = .62, TLF = .36. The Chi-square test of model fit was significant and large,  $\chi^2(21) = 517.06, p < .001$ . Results mirrored those of the previous model, with the parent-offspring bond associated with more frequent use, communication encouraging abstinence related to more frequent use, and communication about advice marginally negatively related to use. See Table 7 for additional model results.

Table 9.

*Results of Models Testing Parent-Adolescent Bond and Marijuana Communication on Marijuana Use Problems.*

	$\beta$	$p$
Model 1		
Parent-Adolescent Bond	-0.16	0.01
CAM Encouraged Abstinence	0.31	<.001
CAM Advice	-0.14	0.09
CAM Consequences	-0.07	0.52
CAM Monitoring	0.03	0.64
Model 2		
Parent-Adolescent Bond	-0.17	<.01
CAM Encouraged Abstinence	0.3	<.001
CAM Advice	-0.15	0.06

As with the analyses on marijuana use, two additional SEM models were constructed, examining each marijuana communication content topic individually on problematic use. First, a model was tested that included the latent parent-offspring bond variable and the CAM encouraged abstinence topic factor and controlled for the same covariates as the more complex

model. Indices of model fit indicated excellent model fit (RMSEA = 0.01, 90% CI: 0-0.05; CFI = 1.0, TLI = 0.99). The Chi-square test of model fit was not significant, suggesting an excellent fit of the model to the data,  $\chi^2(10) = 10.24, p = .42$ . Results indicated that the parent-offspring bond and communication that encouraged abstinence were both significantly related to marijuana use, though in opposite directions. However, there was a problem with the model and the covariance matrix was not positive definite. Model output indicated a problem with both the parent-adolescent bond latent factor and the encouraged abstinence latent factor. For both, one indicator loaded much higher onto the latent factor than the other. Parent support loaded onto the bond latent factor at 1.03 ( $p < .001$ ), while parent knowledge loaded at 0.47 ( $p < .001$ ). Similarly, the disappointed in use item of the encouraged abstinence communication latent factor loaded onto the factor at 1.02 ( $p < .001$ ), while the encouraged not to use item loaded at 0.73 ( $p < .001$ ). A revised model then was constructed to address the problems associated with the non-positive definite matrix. In the revised model, both the parent-adolescent bond and encouraged abstinence marijuana communication latent variables were removed. Instead, single manifest indicators of parental support and communication conveying disappointment in use were included, as these indicators loaded most highly in the earlier analyses. Model indices suggested an excellent fit of the data to the model (RMSEA = 0, 90% CI: 0-0.08; CFI=1, TLI=1.02). The Chi-square test of model fit was non-significant, suggesting an excellent fit of the model to the data,  $\chi^2(3) = 2.76, p = .43$ . Parental support was negatively associated with marijuana use problems, while the disappointment about use item was positively related to marijuana use problems. See Figure 4 for model structure and estimates.

Next, I constructed a model testing the latent parent-offspring bond variable and the CAM advice topic factor, including the same covariates as the larger model. This model also was

an excellent fit to the data, with an RMSEA of 0.02 within a 90% confidence interval of 0 to 0.06. Other indices also were good (CFI = 0.99, TLI = 0.99). The chi-square test of model fit was not significant ( $\chi^2(10) = 11.55, p = 0.32$ ). The parent-adolescent bond and communication about advice were related to problematic marijuana use, though in opposite directions. The parent-adolescent bond was negatively related to problematic use, while communication about advice was positively associated with problematic use. Model output indicated a problem with both the parent-adolescent bond latent factor. Parent support loaded onto the bond latent factor at 1.01 ( $p < .001$ ), while parent knowledge loaded at 0.48 ( $p < .001$ ). A revised model then was constructed to address the problems associated with the non-positive definite matrix. The parent-adolescent bond latent variable was removed, and parental support was instead included as a single manifest indicator of the parent-adolescent relationship. Model indices suggested good fit of the data to the model (RMSEA = 0.04, 90% CI: 0 - .08; CFI = 0.99; TLI = 0.97). The Chi-square test of model fit was non-significant, indicating excellent model fit,  $\chi^2(6) = 9.97, p = 0.13$ . See Figure 5 for additional model information.

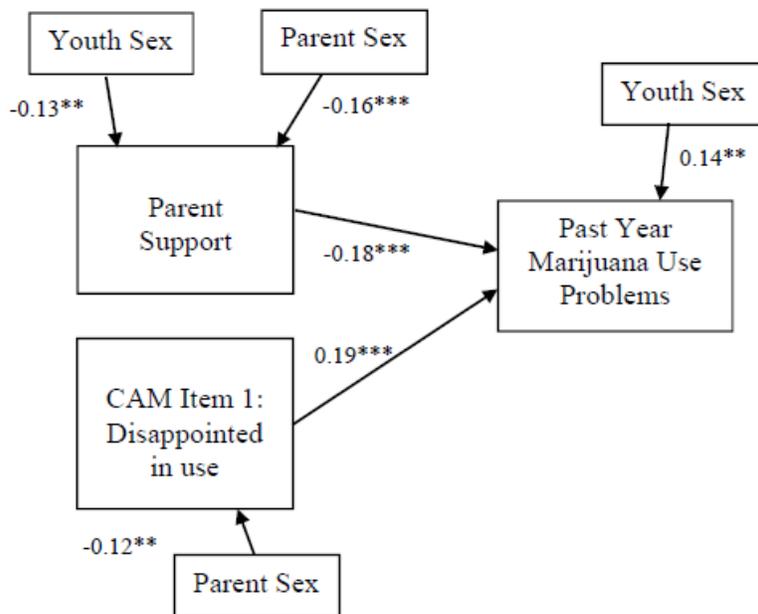


Figure 4. Parental Support and Communication about Disappointment about Use on Past Year Marijuana Use Problems.

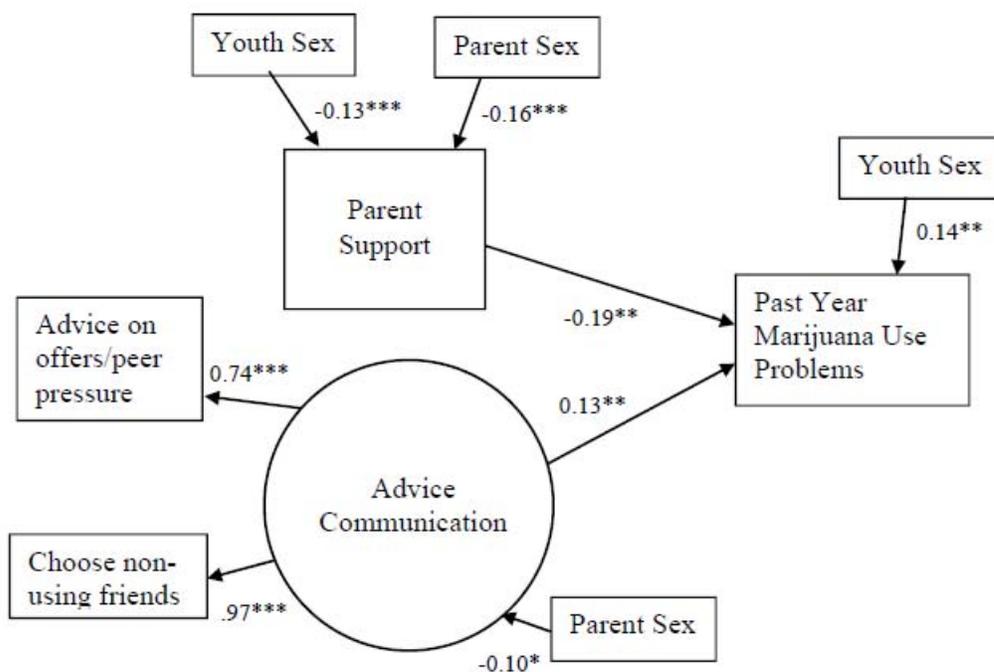


Figure 5. Parental Support and Advice Communication on Past Year Marijuana Use Problems.

**Summary.** As hypothesized according to primary socialization theory, the parent-adolescent bond, comprising parental support and parent knowledge, and parent-offspring communication about marijuana were both associated with marijuana use and problematic use. However, some relations between marijuana communication and marijuana use and problematic use differed by the content of communication.

### Discussion

This series of studies had several aims. The first aim was to develop and test a new measure of parent-offspring communication about marijuana. I tested the factor structure of the measure to a proposed model and assessed the psychometric properties of the measure. Per the second aim of the study, I examined structural equation models that tested parental influences

(parent-adolescent bond and parent-offspring marijuana communication) on marijuana use outcomes, according to primary socialization theory.

The results indicate good preliminary psychometrics for a measure of marijuana communication that comprises four subscales capturing the frequency of communication about four content topics, and three descriptive items that tap the context of communication. When modeled on marijuana use outcomes according to PST, communication that encouraged abstinence, offered advice on how to deal with peer pressure and peers who use, and inquired about the participant's use, their friends' use, and their future use intentions was related to more frequent marijuana use. Communication that encouraged abstinence also was related to more marijuana use problems, while communication offering advice was marginally related to more problem use. Conversely and in support of the hypotheses, the parent-adolescent bond was related to less marijuana use and problems related to use. These results are discussed in more detail below.

The final Communication about Marijuana measure was guided by the four dimensions originally proposed; however, some were represented in forms much different than originally hypothesized. The content dimension included four topic factors: Encouraged Abstinence, Advice, Consequences, and Monitoring. These topics of communication are similar to those found in previous research on communication about alcohol and other drugs (e.g., Ennett et al., 2001; Huver et al., 2006; Zaharakis et al., 2015) and suggest that parents are communicating similar messages about marijuana as about alcohol and other drugs. Emerging adult college students in this study reported receiving messages from their parents that offered advice on how to navigate peer pressure to use marijuana as well as recommendations to choose friends that do not use marijuana, and warned of the negative effects and health risks of use. They also endorsed

communication that encouraged them not to use and conveyed that their parent would be disappointed if the he or she used. Finally, participants in this sample reported that their parents inquired as to their own use, that of their friends, and their intentions to use in the future.

The finding that Providing Examples of Use did not fit with the other content factors was surprising and contrary to the proposed model. This may reflect the potentially less frequent occurrence of this communication, as this topic has been cited less often in previous research (e.g., Miller-Day & Kam, 2010; Zaharakis et al., 2015). These stories may represent a mechanism by which parents communicate some of the other content topics, such as warning about the health risks of marijuana by sharing the story of a family member who suffered health problems due to marijuana use. Thus, examples might be better conceptualized as a mechanism by which communication content is conveyed. Future research might consider examining these items as part of the context dimension to determine the potential influence of this type of communication.

The decision to remove the Rules factor and include the Encouraging Abstinence factor in the final measure tested in Study 2 was made in light of the extant literature. Some prior researchers have found that Rules about alcohol and other drug use may be a separate concept from communication about substances (e.g., Engels & Willemsen, 2004; Harakeh et al., 2005). Communication about alcohol use appears to be stable over time, while rules about use decrease over time as an adolescent progresses toward emerging adulthood (Koning et al., 2012). Some researchers have found that parents communicate messages that aim to encourage abstinence to their youth, particularly to older youth (e.g., Zaharakis, Taylor, & Kliewer, 2015). Given the focus on emerging adults, messages encouraging abstinence were hypothesized to be more

relevant to this developmental period than rules for use, as many participants did not live at home.

Given the results of Study 1, I reconsidered my conceptualization of the context factor. In the final measure, the context items were included to gather descriptive information about the comfort, shared opinion, and degree of conversational nature of communication about marijuana. These items may help to answer important future research questions concerning whether the context of communication moderates the influence of communication content on marijuana use outcomes. The dimension of frequency was re-conceptualized as an aspect of the content dimension, measuring how often communication about different topics occurred. Given the poor results of the frequency factor in Study 1, frequency was amended in this way to parallel Ennett and colleagues' (2001) measure of parent-adolescent communication about alcohol and tobacco. Similarly, the conceptualization of the timing factor was revised in study 2. Items tapping timing were not included in Study 2, as it was deemed impossible to capture timing in a cross-sectional study. The timeframe for the measure was revised to focus on the prior 6 months, in order to again parallel Ennett and colleagues' (2001) measure.

The initial reliability and validity on the measure is promising. Each of the four content topic factors evidenced good internal consistency and reliability. Positive correlations between the topic factors of the CAM content dimension and Ennett and colleagues' (2001) measure of parent-adolescent communication about alcohol and tobacco offer preliminary evidence of convergent validity. In general, the lack of correlations between the topic factors of the CAM content dimension and the anxious and avoidant attachment subscales offered preliminary evidence of divergent validity. Descriptive information from the measure offer insight into the content, context, and frequency of marijuana communication among emerging adult-aged college

students and their parents. The results suggest communication about marijuana is somewhat rare at this age, with the majority of participants reporting never communicating about each of the content topics in the prior six months. This finding is similar to the work of previous researchers, who have demonstrated that fewer than 50% of youth report having discussed alcohol or other drugs with their parents (e.g., Barnett & Miller, 2001; Miller-Day & Kam, 2010). When communication did occur, parents most often provided advice on how to handle peer pressure and offers to use as well as encouragement to abstain from use, while seeking to monitor use or warn of the consequences of use somewhat less frequently. This communication was perceived by students as fairly open, generally balanced in terms of discussion about their parent's opinions about marijuana as compared to their own, and somewhat more conversational than lecture-based.

The second aim of the study was to examine associations between marijuana communication and marijuana outcomes according to primary socialization theory. While the influence of the parent-adolescent bond was generally as expected, the results regarding marijuana communication were not. The parent-adolescent bond was negatively associated with marijuana use, as hypothesized. In this study, students who had a stronger bond with their parent, through a warm supportive relationship and a high degree of parent knowledge of their free time activities used marijuana less frequently in the past year. These findings support those of previous studies demonstrating that the relationship between parent and child and how the parent manages the youth's behavior are related to less substance use (Lac et al., 2009; Napper et al., 2015; Ralston et al., 2012). Interestingly, only one aspect of the parent-adolescent bond – parental support – was related to marijuana use problems. This may in part have been due to multicollinearity between parental support and parent knowledge, as researchers have shown that

these two parenting behaviors are positively related (e.g., Lac et al., 2009). The zero-order correlation between parent support and parent knowledge was 0.49,  $p < .001$  and is similar to that found in other samples (Lac et al., 2009). Still, the differential results suggest support may be more important in preventing marijuana use problems among emerging adults than knowledge. Low parental warmth, a construct related to parental support, has been shown to be associated with psychological maladjustment (Suchman, Rounsaille, Decoste, & Luthar, 2007) and emotional distress (Operario, Tschann, Flores, & Bridges, 2006). Thus, support may be an aspect of parenting more important to preventing problems related to engagement in risk behavior, perhaps through better emotional adjustment, which leads to better psychosocial outcomes and less problematic substance use. As a whole, these results suggest that the parent-adolescent bond is an important aspect of how parents influence substance use outcomes in their offspring.

The influence of parent-offspring marijuana communication was less clear and did not fully support the hypotheses. Communication about consequences was unrelated to marijuana use or problematic use. Contrary to expectation, communication that encouraged abstinence, offered advice, and sought to monitor use was related to more frequent marijuana use in the past year. Similarly, participants' whose parent encouraged abstinence and offered advice reported more marijuana problems in the past year. These results replicate some findings of previous researchers who found more tobacco communication related to more tobacco use (de Leeuw et al., 2008) and more alcohol communication related to more adolescent alcohol use (van der Vorst et al., 2005, 2010). These findings may reflect the cross-sectional nature of the data and the poor timing of the variables included. Participants answered all questions at one time point. In addition, while participants' reported on marijuana use and problems experienced in the past year, they answered items about marijuana communication only regarding the past six months.

Thus, the study design precludes drawing conclusions about the directionality of the relationships between communication and marijuana outcomes. The positive relationships between marijuana communication and marijuana outcomes may reflect parents' reactive communication after learning of or becoming suspicious of the student's use, as has been suggested by previous researchers (Otten et al., 2007).

The finding that communication about consequences was not related to either marijuana outcome was unexpected. This finding also might be understood in light of the study design. Perhaps parents are less likely to communicate about consequences when they believe use has already occurred. Parents may reason that warning their youth of the consequences of use after the youth has used may be less likely to deter repeated use if the youth did not experience negative consequences from previous use episodes. Instead, they may focus on communicating to encourage abstinence in the future and offering advice for how to deal with future potential use situations. Alternatively, parents may be monitoring use and may believe that their son or daughter is not using. Thus, they may expect that their communication encouraging abstinence and offering advice for how to deal with peer pressure and peers who use will cause the youth to maintain the parent's perception of abstinence. This also may explain why communication around consequences and monitoring use was not related to problematic use. If parents are unaware of their youth's use, they may be less concerned about educating the youth on the consequences of use.

The final model predicting the influence of advice communication on marijuana use frequency indicated that advice around navigating offers and peer pressure to use was a better predictor of more frequent marijuana use in the past year than communication encouraging youth to choose non-marijuana using friends. This finding might be understood in the context of the

developmental stage of the sample included. Perhaps, parents of emerging adults offer more practical advice for how to manage difficult situations, expecting that their college student youth is more likely to encounter offers to use at this age. Parents also may realize they exert less influence on friendship selection over their emerging adult-aged youth, as youth explore their autonomy, many living outside the parents' home, and may believe their parents have little authority over their friend choices (Smetana & Asquith, 1994). Similarly, the final model predicting communication that generally encouraged abstinence on marijuana use problems was a better fit when only the item tapping discussions conveying disappointment related to use was included, and excluding the item querying encouragement to abstain. Conveying disappointment was related to more marijuana use problems in this study. Given the cross-sectional nature of these results, this may reflect communication occurring after the youth has suffered problems related to marijuana use and the parent has become aware of the youth's use.

These results must be viewed in light of the sample that emerged. More than half of the participants in this study reported at least "less than once a month" use (53.5%) as opposed to "never" used in the past year (46.7%). Annual prevalence of marijuana use among college students in the Monitoring the Future sample in 2014 was 34.4%. While these rates are not directly comparable due to differences in response choices, they suggest some differences between the current sample and other college student samples. The higher rates of marijuana use in this sample suggest this may be a higher risk group for whom many other factors may be at play. For example, participants were undergraduates at a large, urban university in a mid-Atlantic city. Emerging adults in more densely populated, urban areas use marijuana more frequently, than their peers in more rural areas (Johnston et al., 2015b).

These results extend the extant literature in several ways. This study adds to the growing literature on parent-offspring communication about substance use, and specifically offers insight into marijuana communication. The study expands the definition of marijuana communication, to comprise communication content, frequency, and context within one measure. The findings provide descriptive data that characterize marijuana communication between parents and emerging adult college students – an area that has just begin to be examined in the extant literature. Further, this study offers preliminary data on the relationship between marijuana communication and marijuana outcomes, suggesting that parents may be communicating with their emerging adults about marijuana use after use has occurred.

Given the current legal and social context of marijuana in the United States, these results offer important, timely information regarding the influence of parents on emerging adult marijuana use. As laws continue to become more lenient regarding marijuana use and as public opinions persist in leaning ever more favorably toward marijuana use, parents are in an increasingly important position to guide their youth regarding responsible marijuana use decisions. Interventions that can guide parents in the best messages to convey to their youth regarding marijuana use before actual use is suspected may be able to at least reduce the harms associated with use and prevent chronic use and its' more severe consequences. These results also could inform state policies around the legalization of marijuana use. States may benefit from including educational programs in their plans to enact legal changes around marijuana. Campaigns to raise parents' awareness of the changes and promote communication between parents and youth before youth have begun experimenting with use may improve the utility of parent-adolescent marijuana communication as a harm reduction prevention strategy.

### **Study Limitations and Strengths**

Several limitations must be considered in the context of these results. First, the cross-sectional study design precludes conclusions around the direction of the associations uncovered between marijuana communication and marijuana outcomes. All measures were self-reported by the participant, without considering the parent's perspective and recall of marijuana communication. Gathering information on parent-reported marijuana communication may yield different results, as some researchers have shown that parents remember more communication about alcohol and other drugs than youth do (e.g., Engels & Willemsen, 2004). Further, participants retrospectively recalled their marijuana use and associated problems over a one-year period. Collecting biological measures of substance use may provide reports of marijuana use that are more accurate. This study also did not control for prior marijuana use, an important covariate of current use. Finally, the sample size in this study limited power to detect relationships in more complex models.

Despite these limitations, there are several important strengths of the current study. First, this study is the first to develop a measure of parent-offspring communication about marijuana and to examine this communication within an emerging adult sample. The study adds to the available basic descriptive data on marijuana communication, providing preliminary evidence of the frequency, content, and context of communication. Furthermore, study results provide preliminary evidence of the association of parent-offspring marijuana communication and marijuana use outcomes and suggest that parents may reactively talk with their youth about a variety of topics regarding marijuana use after suspecting or learning of use.

### **Future Directions**

The two studies presented above are among the first to examine marijuana communication in emerging adults. Much more research is needed to determine whether and

how parent-offspring communication should be considered an important target to include in parent-based intervention programs. Future research could provide additional information about parent-offspring communication about marijuana in two ways. First, additional work on the CAM measure could confirm its' psychometric properties. Future studies may benefit from testing additional relevant content topics, such as communication regarding changes in marijuana laws and cultural beliefs about marijuana. Qualitative methodologies, such as focus groups or interviews, could further elucidate relevant topics to explore further, such as discussion around current changes in state laws regarding marijuana. These data also could further explore other aspects of the context of communication – such as the quality of communication and degree of comfort when discussing marijuana. Samples of different ages and backgrounds also should be considered, such as younger adolescents and youth from a variety of cultural and socioeconomic statuses. Researchers might choose relevant communication topics in light of the population being studied. For example, communication about rules and providing examples of people who have used may be more relevant for lower SES families or those with a family history of substance use where the youth may be likely to encounter adults using or be able to access substances.

Research also should focus on elucidating the processes through which parent-offspring communication about marijuana influences marijuana use outcomes. Future researchers should collect longitudinal data to determine whether communication more often is reactive to suspicions or evidence of use, or whether talks prior to use delay initiation or escalation. Longitudinal research also could help to identify whether the content and context of communication vary by developmental stage, and whether this potential dynamic feature of communication affects use outcomes. For example, surveying college students regarding their

marijuana use and communication about marijuana with their parents over time could lend insight into the direction of the relationship between these variables.

Future studies also may benefit from examining latent profiles of marijuana communication, as a few studies have begun to explore differential patterns of alcohol-specific parenting and communication (e.g., Abar, 2012; Abar, Fernandez, & Wood, 2011; Koning et al., 2012; Varvil-Weld, Mallett, Turrisi, & Abar, 2012). These latent profiles could be modeled over time using latent transition analyses to identify which patterns of communication may be most protective of marijuana outcomes. For example, Abar (2012) examined indicators of parental influence, comprising parental trust and support, access, alcohol communication, and parent-adolescent conflict, finding evidence of four different latent profiles of parenting. Only one of these latent profiles was related to alcohol use (Pro-Alcohol group – characterized by less monitoring, knowledge, trust, and support and high levels of parent modeling of substance use and parent-adolescent conflict). The other three groups varied in levels of parenting, warmth, and communication, yet produced similar associations with alcohol use. This may indicate equifinality with regard to parenting around substance use – that different parenting practices may lead to the same final result. However, these data were cross-sectional, limiting the conclusions that can be drawn. Future longitudinal research could extend this investigation to marijuana, and help to deduce whether the interactive influence of communication with other aspects of parenting, such as monitoring and warmth, create latent parenting classes that are more predictive of youth marijuana use than when aspects are considered separately. These results could ultimately inform whether there are “good enough” parenting profiles as has been suggested by Scarr (1992) that may not be characterized by highest levels of all parenting behaviors, but that effectively protect against youth risk behavior anyway. Evidence of such

minimally acceptable parenting could be extremely helpful in the development of parent-based prevention programs, as this would suggest that smaller gains in parenting practices could result in similar effects on risk behavior outcomes. Researchers might further add to the field by examining moderators of the relationship of communication on use outcomes. For example, future studies might consider whether the relationship between communication and use varies as a function of the context of communication or the strength of the parent-adolescent relationship.

This research was an important first step in further understanding parent-offspring marijuana communication and its relationship with marijuana use outcomes. As marijuana use continues to rise and attitudes about marijuana increasingly become more favorable among emerging adults in the United States, additional research into potential harm reduction and intervention strategies will be critical to preventing large increases in marijuana use related problems and consequences. Further understanding the influence of parents on marijuana use could provide valuable information for use in developing effective prevention strategies.

## Appendix A

### Communication About Marijuana (CAM) Measure List of Items

#### Content Items

My parent. . .

1. Has told me stories of other people (not family members) who tried or use (d) marijuana.
2. Has told me about when s/he tried or use(d) marijuana.
3. Has told me stories of family members who tried or use(d) marijuana.
4. Has told me he or she would be disappointed in me if I used marijuana.
5. Has encouraged me not to use marijuana
6. Has given me rules about marijuana use.
7. Has told me that I am not allowed to use marijuana.
8. Has told me that I would be punished if I used marijuana.
9. Has told me how to resist peer pressure or offers to use marijuana.
10. Has encouraged me to choose friends who do not use marijuana.
11. Has told me about the health risks of using marijuana.
12. Has told me about the negative effects of using marijuana.
13. Has asked me if I have tried / use(d) marijuana.
14. Has asked me if my friends have tried / use(d) marijuana.
15. Has asked me if I will use marijuana in the future.

#### Context Items

1. Most of the time when we have talked about marijuana, my parent usually has been [not at all open / very open] about his/her opinions about marijuana.
2. Most of the time when we have talked about marijuana, my parent usually has [only shared his/her opinion / only asked about my opinion].
3. Most of the time when we have talked about marijuana, the talks were usually [all lecture / all conversation].
4. Most of the time when we have talked about marijuana, the talks usually occurred [In response to a specific event / just part of daily conversation].
5. Most of the time when we have talked about marijuana, the talks have usually involved [just talking / looking at information on the web, TV, news, etc.]
6. Most of the time when we have talked about marijuana, the talks have usually been [Only about marijuana / about drugs in general].
7. Most of the time when we have talked about marijuana, I usually feel [not at all comfortable / very comfortable].

#### Frequency Items

1. My parent has talked with me about marijuana. . .
2. My parent talked with me about marijuana when I was in elementary school.
3. My parent talked with me about marijuana when I was in middle school.
4. My parent talked with me about marijuana when I was in high school.
5. My parent talked with me about marijuana since I started college.

#### Timing Items

1. The first time my parent talked with me about marijuana, the talk lasted . . .
2. The last time my parent talked with me about marijuana, the talk lasted . . .
3. Most of the time my parent talked with me about marijuana, the talk lasted . . .
4. The first time my parent talked with me about marijuana, I was in . . .

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## List of References

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## **VITA**

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