

Title: Parent-child connectedness and communication in relation to alcohol, tobacco and drug use in adolescence: an integrative review of the literature

Short title: Parent-child connectedness, communication and adolescent substance use

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Parent-child connectedness and communication in relation to alcohol, tobacco and drug use in adolescence: an integrative review of the literature

Previous reviews have highlighted parent-child connectedness and communication as important protective factors against adolescent substance use. However, these reviews focus on single substances such as alcohol. An integrative review of the literature was conducted to examine which elements of parent-child connectedness and substance-use specific communication are effective across adolescent alcohol, tobacco and drug use. Forty-two English language, peer reviewed articles were reviewed. Open communication occurs within the context of high connectedness between parents and their children. Conversations about health risks are associated with lower levels of substance use while more frequent conversations, those about parents' own use, permissive messages and consequences of use are associated with higher levels of use. There are disparities regarding conversations about use of each substance: alcohol and tobacco are easier topics of conversation while drug use is rarely discussed. Parental alcohol and tobacco use can influence the credibility of their communication with their child. Parents should be encouraged to have open, constructive, credible, two-sided conversations with their adolescents about substance use. Interventions to improve parents' communication skills around substance use, particularly drug use, should include the types of approaches and messages highlighted in this review, and, where possible, these interventions should include all family members.

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Introduction

Alcohol, tobacco and drug use tends to begin in adolescence (Bonomo & Proimos, 2005; Howlett et al., 2012; Mirza & Mirza, 2008). Early initiation is associated with greater likelihood of more frequent use and substance misuse problems (Bremner et al., 2011; Feinstein et al., 2012). Many factors have been identified which influence the likelihood that adolescents will use substances (Hawkins et al., 1992). Family and parenting factors receive a great deal of attention in this literature (Velleman et al., 2005; Velleman & Templeton, 2007; Velleman, 2009). Parent-child connectedness (PCC) and communication have been highlighted as potential protective factors against substance use and misuse in adolescence. They have recently received increased attention in social science; are highly relevant to current policy which prioritises early intervention within the context of the family (Jackson et al., 2011; Scottish Government, 2008); and have been promoted in prevention programmes (Mares et al., 2011; van der Vorst et al., 2010). While other parenting and non-parenting factors might be important, the purpose of this review was to examine PCC and communication as these factors are core elements of good parenting and are amenable to change via family based interventions (DeVore & Ginsburg, 2005; Jackson et al., 2011; Newman et al., 2008). Furthermore, gaining a greater understanding of these protective factors can influence future parenting interventions to delay or reduce adolescent substance use.

PCC has gained recognition in recent years due to its apparent protective effects in terms of adolescent health and development (Barber & Schluterman, 2008; Townsend & McWhirter, 2005). PCC has been described as feelings of closeness, warmth, love and satisfaction a child has with their parents; as relationships and bonds between parents and children (Barber & Schluterman, 2008; Markham et al., 2010; Resnick et al., 1997; Townsend & McWhirter, 2005). While there is no consistent definition, Lezin and colleagues' definition has been adopted for this paper: "by the *quality* of the emotional bond between parent and child and by the degree to which this bond is both *mutual* and *sustained* over time" (emphasis in original) (Lezin et al., 2004). Barber and Schluterman (2008) note that the concept of attachment is assessed in an entirely different manner to PCC, although there may be similarities. Attachment refers to a one-sided relationship between parent, often mother, and child, with the caregiver playing an active role; within PCC, both parents and children play active roles in the relationship (Lezin et al., 2004). Thus, there are significant differences between attachment and PCC in the literature.

Parent-child communication is a key part of connectedness (Lezin et al., 2004) and refers to whether adolescents and parents feel they can talk to each other about a range of topics, including general areas of interest and more sensitive issues such as substance use and sex (Markham et al., 2010; Ryan et al., 2010). The extent to which adolescents can talk to their parents about broad issues, such as their activities, feelings and topics which interest them, is often referred to as general communication (Ryan et al., 2010, 2011). Such communication has been measured in terms of satisfaction, frequency and quality, and in a number of studies, the views of both parents and adolescents have been sought. Specific communication refers to

targeted conversations about alcohol, tobacco and drug use that parents have with their children, covering a range of topics, such as depictions in the media, negative effects and risks of using substances (Ryan et al., 2010). These types of conversations are regularly promoted in prevention campaigns (Miller-Day & Dodd, 2004).

Previous reviews of the literature have suggested that both PCC and communication are protective against substance use during adolescence (Kington & O'Sullivan, 2001; Ryan et al., 2010). There is also evidence that interventions involving parenting sessions, including strengthening relationships and communication, may be effective in reducing and preventing alcohol (Foxcroft & Tsertsvadze, 2011) and tobacco use (Thomas et al., 2015); there is limited evidence in terms of drug use (Gates et al., 2009). However, the findings of these reviews are somewhat limited. Firstly, PCC and communication tend to be considered separately, despite an important interaction between the two (Lezin et al., 2004). Secondly, alcohol, tobacco and drug use have been examined separately. In their systematic review, Ryan et al. (2010) only considered alcohol use. Although it is understandable that substances are examined separately, given their differing legal frameworks and social acceptability of use, we argue that it is crucial to examine alcohol, tobacco and drug use together in one review. Adolescents tend to use more than one substance at a time (Fraga et al., 2011; Torabi et al., 1993) so focusing on one substance, such as alcohol, does not necessarily reflect the reality of their use. Also, given that the legal status of each substance is different, parents may have different views on smoking and alcohol compared to drugs. For example, Mallick (2003) found that communication about drug use is incredibly challenging for parents, particularly due

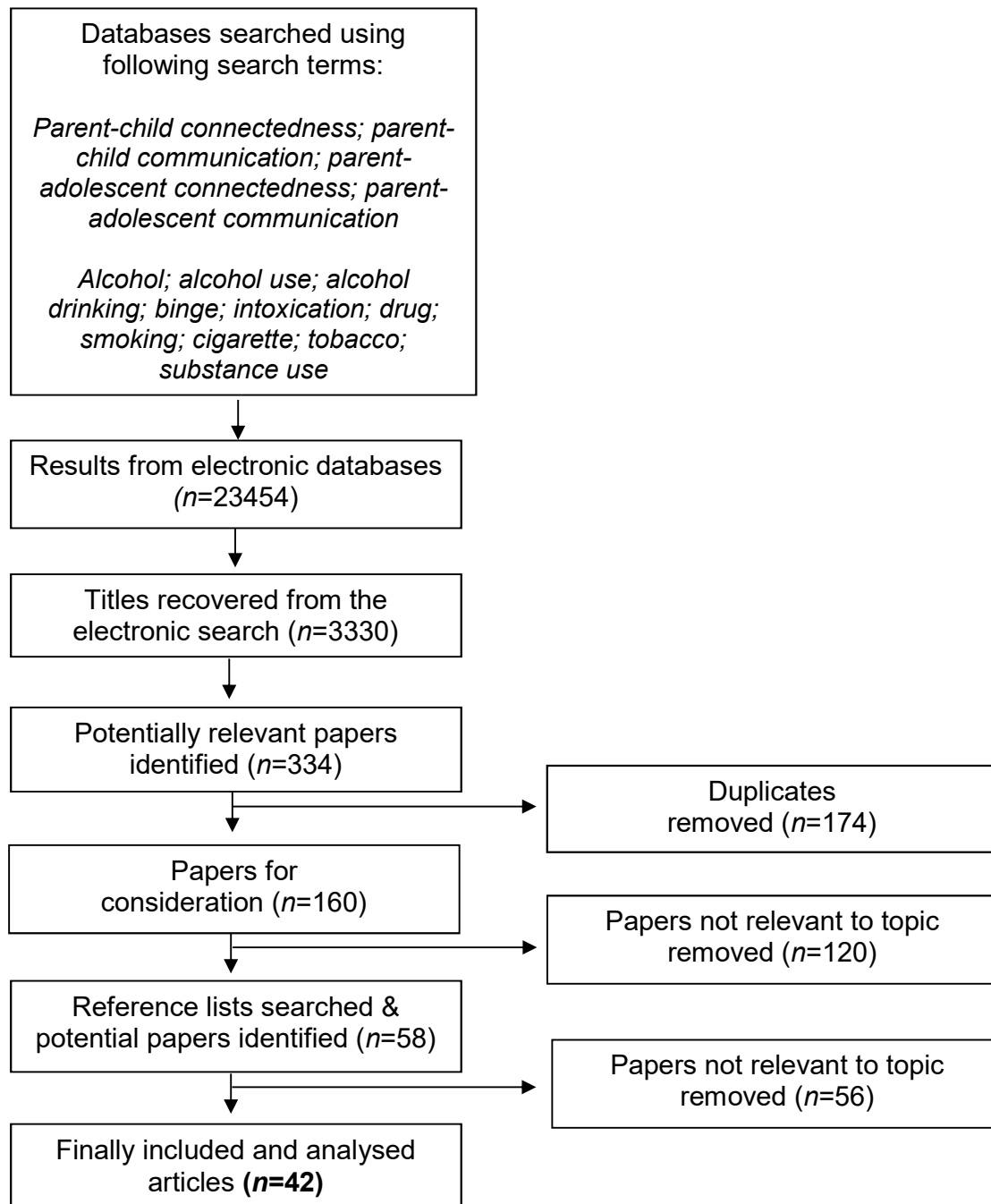
to the stigma attached to use. Finally, while communication has been shown to be protective, there is little information regarding which specific elements are effective, and should therefore be promoted. It may be that there are specific types of communication that are more effective than others. Thus, in order to address the gaps in the literature, an integrative review of the literature was conducted. This review aimed to answer the following question: What elements of connectedness and communication are important in delaying and reducing adolescent alcohol, tobacco and drug use?

Methods

Using the method outlined by Whitemore and Knafl (2005) for conducting integrative literature reviews, a comprehensive and rigorous search of the literature was conducted. Six health and social science databases were searched for papers published between January 2004 and March 2016; this time period was chosen to ensure that the literature being reviewed was contemporary. The databases searched were PsycINFO, Psychology and Behavioral Sciences Collection (PBSC), Applied Social Sciences Index and Abstracts (ASSIA), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE) and Web of Science. The inclusion criteria were (i) adolescents (aged 10-19 years of age; reflecting the World Health Organisation (2015) definition of adolescence); (ii) English language; (iii) peer-reviewed; (iv) original research, using any study design; (v) related to smoking or alcohol or drug use; and (vi) related to parent-child communication and/or connectedness. As there is a lack of universal definition of PCC, a decision was made to include studies which

involved research into emotional bonds and relationships with parents. Reference lists of relevant papers were also searched by hand for potentially useful studies, eliciting ten papers. In total, 42 articles were included in the review. The details of the literature search process are presented in Figure 1. Of these studies, 21 used a longitudinal survey design; 14 used a cross-sectional survey design; and seven were qualitative, utilising mostly individual interviews, with either adolescents or parents. Including both qualitative and quantitative studies, despite their different approaches and analyses, should provide a deeper and more comprehensive understanding of the topic (Whittemore & Knafl, 2005). Sixteen studies were conducted with adolescents only, 24 with both parents and adolescents and two studies with parents only. The follow-up period from the longitudinal studies ranged from one to 5 years. The vast majority of studies ($n=20$) were conducted in the United States of America (USA) and the Netherlands ($n=18$), with the remainder conducted in the United Kingdom (UK) ($n=2$), Canada ($n=1$) and New Zealand ($n=1$).

Figure 1: Flow chart of article selection



Papers were rejected if they did not meet the inclusion criteria. Papers were initially divided into three subject areas, PCC, general communication and substance use specific communication, and examined separately. Within these subgroups, papers were examined in terms of the methodology used; cross-sectional and longitudinal survey studies were considered independently of qualitative studies. The key

features of each paper, such as sample size, methods used and outcomes measured, were recorded in a database, to assess the quality of the literature. Whitemore and Knafl (2005) highlight the difficulty of quality appraisal in integrative reviews, as studies with different research designs are often included in one review. The quality of quantitative and qualitative studies were assessed separately using the tools developed by Crombie (1996) and Critical Appraisal Skills Programme (2013) respectively. Each paper was read a number of times to extract the key findings, which were coded and entered into a database to allow for comparison. These codes were then compared to identify patterns and similarities and differences were identified within these patterns. Finally, major themes were identified and then synthesised, to provide a “comprehensive portrayal of the topic of concern” (Whitemore & Knafl, 2005, p. 551).

A meta-analysis was not deemed appropriate for this review, due to the nature of the studies included. Meta-analyses are often performed using randomised controlled trials (RCTs) in which there are similar measureable outcomes (Crombie & Davies, 2009). The studies included in our review mostly used cross-sectional or longitudinal survey data, and the outcomes were somewhat diverse. For example, some studies examined initiation of substance use, others measured rates of use while some measured attitudes towards substance use. Thus, an integrative review was deemed a more appropriate choice. The details of each paper are presented in Table 1.

Findings

Importance of PCC and the influence of parents' behaviours

Communication is most effective within the context of high levels of PCC (Ackard et al., 2006; Bandi et al., 2008; Carter et al., 2007; Guilamo-Ramos et al., 2008; Horton & Gil, 2008; Kulbok et al., 2010; Razzino et al., 2004). Adolescents are more likely to display open communication with their parents about general topics when they have high PCC (Luk et al., 2010). Parents are more likely to have the opportunity to have frequent conversations and set rules effectively when PCC is high (Cleveland et al., 2005; Guilamo-Ramos et al., 2008; Harakeh et al., 2010; Koning et al., 2014; Maggi et al., 2014). In Chaplin and colleagues' (2014) observational study adolescents' physiological responses were measured during conversations with parents; when parents displayed behaviours suggestive of low PCC, such as criticism and sarcasm, adolescents tended to display higher cortisol levels, which were indicative of greater feelings of discomfort. In terms of smoking, when there are high levels of PCC, adolescents may not wish to disappoint their parents by using cigarettes (Kulbok et al., 2010; Levy et al., 2010). When PCC is low, smoking is viewed as an act of rebellion, which may increase their motivation to start (Maggi et al., 2014). High PCC is effective in reducing substance use behaviours and adolescents' fear of disappointment may be particularly motivating.

Parents' behaviour appears to have an influence within PCC. A moderate level of control, supervision and monitoring is viewed, by both parents and academics, as ideal, particularly around alcohol use, with attempts to ensure that adolescents have a sensible relationship with alcohol (Bourdeau et al., 2012; Guilamo-Ramos et al., 2005). Parents believe that role modelling behaviour around alcohol use, either through abstinence or low alcohol use, is important in delaying or preventing

adolescent alcohol use (Bourdeau et al., 2012). Such behaviours are unlikely to be taken on board when PCC is low. In their cross-sectional study, Tilson et al., (2004) found that the protective effect of PCC disappeared when parents smoked, suggesting an influence of parental behaviour regardless of relationship quality. Parents' own smoking and alcohol use were found to affect their communication with adolescents in four studies (Harakeh et al., 2010; Levy et al., 2010; Maggi et al., 2014; Mares et al., 2011). Communication was particularly affected by parental smoking, with parents and adolescents describing conversations about not smoking as inappropriate when parents smoked, with adolescents ignoring these messages (Guilamo-Ramos et al., 2008; Levy et al., 2010; Maggi et al., 2014). Thus, parents' behaviours towards their children and in terms of their own substance use are influenced by PCC and can affect adolescents' substance use. These findings highlight the importance of examining PCC and communication together, as the relationships between parents and teenagers can have a considerable impact on their conversations about substance use and subsequent behaviours.

Methods of communication

Parents and adolescents have highlighted the importance of clear messages and open communication when discussing substance use (Guilamo-Ramos et al., 2008; Highet, 2005; Kulbok et al., 2010; Sherriff, Cox, Coleman, & Roker, 2008). The way in which parents talk to their children about substance use is crucial; when they are perceived as lecturing them, adolescents are often unreceptive and do not assimilate these messages (Guilamo-Ramos et al., 2008; Levy et al., 2010; Maggi et al., 2014; Metzger et al., 2013; Sherriff et al., 2008). Having constructive conversations in

which parents and children participate equally appears to be more effective (Chaplin et al., 2014; Highet, 2005). When conversations are open and involve discussions rather than lectures, adolescents feel more comfortable and report lower rates of substance use (Chaplin et al., 2014). In terms of alcohol use, parents feel that it is necessary to negotiate boundaries around drinking behaviour, preferring to use a harm reduction than an abstinence based approach (Bourdeau et al., 2012; Highet, 2005; Sherriff et al., 2008). As might be expected, such an approach does not extend to smoking and drug use, when adolescents are specifically told not to engage in these behaviours (Highet, 2005; Levy et al., 2010; Maggi et al., 2014). In six studies, parents reported a range of issues when communicating with their children about substance use. Difficulties in starting conversations and concerns about providing inconsistent messages were highlighted by parents (Bourdeau et al., 2012; Sherriff et al., 2008). Parental worries about adolescent substance use often influenced how they communicated with their children, by avoiding having these discussions (Levy et al., 2010) and by providing lower quality communication (Koning et al., 2013). There are disparities in terms of parents' and adolescents' experiences of the frequency of communication. Parents think they are talking more frequently about substance use than their children do (Nonnemaker et al., 2012; van der Vorst et al., 2005), suggesting that either this communication is ineffective or adolescents fail to digest it. Parents appear to struggle to find a balance between discussing substance use with their children and lecturing them. When they lecture, adolescents are unlikely to take these messages on board. Open communication which is based on two-way conversations is crucial.

Frequency vs. quality

Sixteen studies highlighted the differences between frequent and high quality communication about substance use. More frequent communication is associated with higher rates, more positive attitudes towards and lower self-efficacy to refuse cigarette use (de Leeuw et al., 2008, 2010; Harakeh et al., 2005, 2009, 2010; Hiemstra et al., 2012; Huver et al., 2006; Otten et al., 2008); higher rates of alcohol use and associated problems (van den Eijnden et al., 2011; Koning et al., 2013; Spijkerman et al., 2008; van der Vorst et al., 2005, 2010); and higher rates of cannabis use initiation (Nonnemaker et al., 2012). It is unclear as to the direction of this relationship: parents' frequent communication may be ignored and adolescents start using substances; or parents communicate more frequently when they believe their adolescents are using substances. Authors have suggested that the latter may be the case but longitudinal studies are required to examine the direction of the relationship (Harakeh et al., 2005, 2009, 2010; Huver et al., 2006; van der Vorst et al., 2005). High quality communication, conversely, is associated with lower rates of smoking, more negative attitudes and higher self-efficacy to refuse cigarette use (de Leeuw et al., 2008, 2010; Harakeh et al., 2005, 2010; Otten et al., 2008; Ringlever et al., 2011); lower rates of alcohol use and higher self-efficacy to refuse (van den Eijnden et al., 2011; Koning et al., 2013; Mares et al., 2013; Spijkerman et al., 2008). While Koning et al. (2014) found no association between quality of communication and alcohol use, they still promote the use high quality conversations. Three studies found that frequent communication was indirectly protective against alcohol, tobacco and cannabis use, only when combined with high quality communication and high PCC (Cleveland et al., 2005; Huansuriya et al., 2014; Huver et al., 2007). Thus, having frequent conversations with adolescents about substance use is not enough;

these conversations must also be of high quality, in which communication is reciprocal and adolescents feel they are participating equally. When adolescents are frequently told not to drink alcohol, smoke or take drugs, they may ignore the information from their parents. However, when these conversations are of high quality and are based on high PCC and open communication, the messages are more effective. Mares et al. (2011) found that when parents had more alcohol related problems, they talked more to their children, with more frequent communication associated with lower rates of alcohol use and fewer alcohol related problems. For those living in environments in which alcohol use is problematic, more frequent conversations may have a positive effect, by encouraging adolescents to drink less. However, generally, more frequent communication without high quality messages and high PCC can be detrimental.

Harder vs. softer communication

Parents report using a wide range of messages when communicating with their children about substance use, including rules, health risks, consequences, moderation and the law (Bourdeau et al., 2012; Sherriff et al., 2008). Ennett et al. (2001) made the distinction between 'harder' and 'softer' communication. Harder communication are conversations in which parents specifically tell their children not to use substances and present them with particular rules around use, while softer communication involves conversations about the possible consequences and harms (Ennett et al., 2001). When parents only talk to their children about rules and tell them not to use substances, adolescents feel threatened and report increased rates of alcohol, tobacco and drug use (Chaplin et al., 2014; Huver et al., 2006; Kam,

2011), although in one study the results were positive but not statistically significant (Nonnemaker et al., 2012). In a qualitative study, adolescents reported that when their parents use such communication, they tend to ignore what is said (Maggi et al., 2014). Conversely, younger, but not older, adolescent smokers reported higher readiness to quit when told by their parents not to smoke (Bandi et al., 2008). For young smokers, being told not to smoke may be beneficial. It is apparent that harder communication leads to feelings of discomfort by adolescents, they ignore these messages and may use alcohol, tobacco and drugs regardless of what their parents have told them. Softer communication, however, is viewed more positively (Guilamo-Ramos et al., 2008; Kulbok et al., 2010; Maggi et al., 2014). When parents include messages about health risks and potential consequences of use, adolescents are less likely to use substances (Chaplin et al., 2014; Huver et al., 2006). However, in one study, discussion of consequences had no effect on alcohol use (Reimuller, Hussong, & Ennett, 2013) and in another had a detrimental effect on cannabis use initiation (Nonnemaker et al., 2012). Talking about consequences of use has a detrimental effect unless these conversations involve discussions of health risks. Overall, harder communication is only effective when communication is of high quality; and softer communication is beneficial when adolescents are informed about health risks and when these messages are educational and informative (Chaplin et al., 2014; Maggi et al., 2014).

Disclosures

Parents often talk about their own or others' substance use as a way of initiating conversations and to convey messages about health risks (Guilamo-Ramos et al.,

2008; Kulbok et al., 2010; Sherriff et al., 2008). However, such an approach may be detrimental, increasing substance use. When mothers reported high levels of alcohol use, they were more likely to talk about their own negative experiences of alcohol use and when they did so, adolescents were more likely to consume greater amounts of alcohol (Handley & Chassin, 2013). Parental disclosures are also associated with more favourable beliefs towards substance use behaviour (Kam & Middleton, 2013). One study, however, found that parental disclosures were associated with higher self-efficacy to refuse alcohol (Mares et al., 2013). Thus, parents should exercise caution when discussing their own negative experiences, particularly around alcohol use, as they may normalise these behaviours for their children, leading to increased use.

Alcohol is acceptable but tobacco and drugs are not

A common theme throughout the literature was that parents deal with alcohol, tobacco and drug use differently. Alcohol is viewed as a normal, acceptable behaviour for adults, and to some extent adolescents, particularly in the UK. In the study by Bourdeau et al. (2012) most parents stated that alcohol use by their adolescent was either forbidden or limited to particular drinks or occasions. However, a number of parents reported both types of rules, suggesting a lack of consistency in their messages around alcohol use. One of the central messages promoted by parents in another study was that alcohol, when used in moderation, is a normal part of life; parents reported trying to limit the types of alcohol their adolescents could drink and the occasions and locations in which alcohol use was allowed (Sherriff et al., 2008). Parents attempt to negotiate boundaries around alcohol use and ensure

that adolescents drink safely and in moderation, as well as providing information about the risks and harms (Highet, 2005). However, inconsistent rules around alcohol use may be confusing for young people and therefore increase use (Koning et al., 2013). Smoking is often forbidden or opposed, even when parents themselves smoke (Kulbok et al., 2010; Levy et al., 2010), possibly due to the perceived health risks associated with smoking. Drugs are viewed as particularly harmful and, as a result, are often difficult to discuss. In one study, adolescents noted that their parents frequently discussed alcohol use, but rarely discussed cannabis use, with discussions only occurring after they had been caught using (Highet, 2005).

Permissive messages and inconsistent rules around alcohol use can be confusing and increase use (Koning et al., 2013; Reimuller et al., 2013), while forbidding the use of tobacco and drugs can also increase use (Chaplin et al., 2014; Huver et al., 2006; Kam, 2011). More research is required to examine communication around drug use, with Highet (2005) stressing that parents need to talk to young people about drugs before problematic use occurs.

Thus, alcohol use is viewed as normal and inevitable, tobacco use is discouraged and drug use is forbidden and hidden. This is reflected in the focus of the studies included in this review, with 14 examining alcohol use, 17 smoking and 9 examining a range of substances; only two studies focused specifically on cannabis use. The stronger focus on alcohol and tobacco than drug use may be due to drugs being less acceptable to consume, more difficult to talk about and therefore study. Examining alcohol, tobacco and drug use together in one review provides a greater understanding of the complexities of communication about substance use.

Discussion

As far as we are aware, this is the first integrative review to examine the specific elements of parent-child connectedness and communication in the context of adolescents' alcohol, tobacco and drug use. Previous reviews suggested that good general communication is protective against alcohol use (Ryan et al., 2010); and that high levels of connectedness are protective against all three substances (Kington & O'Sullivan, 2001). This review adds to the evidence base in two ways: firstly, it encompassed a wider assessment of the literature, examining the three related factors across all substances. This is important as adolescents do not tend to view alcohol, tobacco and drugs as distinct substances, both legally and in terms of use, so it seems illogical for such substances to be examined separately in the literature. Secondly, it provides an enhanced understanding of the key elements of the interaction between PCC and communication and how these influence adolescent substance use.

Despite some conflicting findings, the findings of this review suggest that high levels of PCC and good quality general and substance use specific communication are protective against adolescent alcohol, tobacco and drug use. By examining PCC and communication together, this review provides new insight by highlighting the importance of PCC on communication practices. When PCC is high, communication is open, frequent and adolescents feel comfortable; when PCC is low, communication is stilted. Darling and Steinberg's (1993) model contextualises and provides a theoretical understanding for our findings, that communication is effective

only when PCC is high. This model highlights the moderating relationship between parenting behaviours, such as PCC, and communication about substance use. Others have used this model to contextualise their findings, that general and substance use specific parenting practices influence adolescent substance use, suggesting the importance of considering the theoretical foundation of future studies within the context of parenting practices (de Leeuw et al., 2010; Handley & Chassin, 2013; Harakeh et al., 2010; Huver et al., 2006, 2007; Koning et al., 2014).

Conversations about substance use must be two-sided, involving explanations around the health implications of using substances. Parents and adolescents endorse the use of substance-use specific communication but face challenges in initiating these conversations, particularly when discussing drug use. More frequent conversations, discussing rules and consequences of use and permissive messages should be discouraged. There appears to be a difference between enforcing rules and simply talking about them: when parents enforce rules around substance use, young people report lower use, but when they just talk to them about rules, without actually making an attempt to enforce the rules, they are more likely to drink alcohol, smoke or use drugs. It may be that talking about rules makes young people feel uncomfortable, as suggested by Chaplin et al. (2014); or that rules are dismissed when they are discussed but not enforced by parents. The findings of Huver et al. (2006) highlight this distinction: enforcing rules is associated with lower rates of smoking, but communication about rules is associated with higher rates. Future studies should examine whether disclosures of parental use are associated with negative outcomes when PCC is high, as the evidence is mixed in terms of the effects of these conversations. The most crucial message of the literature, by far, is that simply having frequent conversations is not enough; these conversations must

be of high quality in order to be protective. When communication is two-sided and young people feel they are being listened to and contributing, rather than being lectured, it is viewed as high quality. By examining alcohol, tobacco and drug use together, this review provides new insight by highlighting the different experiences in terms of talking about alcohol compared to tobacco and drug use. Alcohol appears to be much easier to talk about and parents often attempt to negotiate boundaries and monitor use. Tobacco and drug use, conversely, are much more difficult topics to address. Their use is forbidden and discouraged, making the topic much more hidden. Drug use, in particular, is a virtually hidden topic and parents and young people may be afraid to address it. Combining all three substances provides a deeper understanding of the complexity of substance use communication than would be gained studying each substance alone.

Limitations

Despite these generally consistent and comprehensive findings, a number of limitations were observed. The sample size of included studies varied greatly, ranging from 116 (Chaplin et al., 2014) to 11,728 (Nonnemaker et al., 2012) participants. Studies varied in terms of how the concepts of PCC and communication were defined and measured, as well as how substance use was measured. The findings may also be limited by the majority of studies using cross-sectional designs, in that causal inferences cannot be made. There are also a number of caveats of this integrative review. Firstly, only English language papers were included, which may bias the results. Secondly, it is important to recognise that 20 studies were conducted in the USA and 18 in the Netherlands. While the findings of these studies

may be applicable to other populations, there are cultural and policy differences. For example, the legal drinking age in the Netherlands, like the majority of European countries, is 18 years, compared to 21 years in the USA (Jernigan, n.d.). The law in the Netherlands has recently changed, so that when these studies were conducted, the legal drinking age was 16 years (Dutch Institute for Alcohol Policy (STAP), 2013). Thus, future research is required in other countries to examine whether such findings are replicable, as well as to explore differences in parenting styles in countries with more liberal views and laws, and how such practices might affect communication about substance use. Finally, the aim of this review was to examine the diverse literature on three key potentially protective factors across a range of substance use behaviours; meta-analysis was not possible. While integrative reviews may be viewed as the lacking rigour and objectivity of systematic reviews and meta-analysis, the methods used in this review were comprehensive and rigorous, using the approaches specified by Whitemore & Knafl (2005).

Conclusion and implications

The current integrative review of the literature provides important evidence that PCC, general communication and particular types of substance-use specific communication can be protective against alcohol, tobacco and drug use in adolescence. Parents should be encouraged to have open, credible, high quality conversations with their adolescents about substance use, which are facilitated by high quality general communication and high levels of PCC. High quality conversations should be “constructive and respectful” (de Leeuw et al., 2010, p. 1003), in which parents and adolescents feel comfortable and understood and that

their opinions matter and are being taken seriously. Parents should be encouraged to talk about health risks and potential consequences of use when communicating about substance use. Having frequent conversations, involving discussions of their own use and about rules is not enough. Parents should also be provided with support to ensure that they have high levels of connectedness with their children are good and consequently, that the conversations they have are informative, of high quality and effective. This review highlights the importance of PCC and substance use specific communication on adolescent substance use; future research should examine the effect of both these factors, as currently, they are being studied separately. Future studies should also examine the nature of communication, in which adolescents and parents discuss the benefits and harms of substance use within the context of parental rule setting.

The findings suggest that family setting is important within the context of PCC and communication, with the majority of studies being conducted with two-parent families. Therefore, more research is required with single parents, particularly fathers, and with children who are not living with their biological parents, such as those looked after by the state. Further research is required to evaluate the effectiveness of interventions which include the specified elements of PCC and communication. Three Cochrane reviews have examined family-based interventions, showing positive effects for alcohol and tobacco use (Foxcroft & Tsertsvadze, 2011; Thomas et al., 2015), but not drug use (Gates et al., 2009). Thus, interventions can improve PCC and substance use communication between parents and children, although further research is required in terms of young people's drug use. In light of these findings, we recommend that interventions, similar to those included in the

above reviews, which aim to improve PCC and encourage parents to include the specific elements of communication identified as protective, are made available to parents.

Acknowledgements

The authors report no conflicts of interest and received no funding to conduct this review.

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Table 1: included studies (n=42)

Authors	Country	Recruitment site	Research focus	Design	Participants	Key findings	Implications
Ackard et al. (2006)	USA	Schools (n=31)	Connectedness	Cross-sectional survey data (n=4734)	Adolescents (age range 12-18 years; grades 7-12; 50.2% female; 46% girls, 51% boys were white)	Valuing friends' opinions over parents' and being unable to talk to parents (connectedness) associated with higher rates of alcohol and cannabis use.	PCC may be protective against alcohol and cannabis use in adolescence.
Bandi et al. (2008)	USA	School (n=1)	Substance use specific communication	Cross-sectional survey data (n=1629)	Adolescents (age range 11-18 years; all were smokers)	Being told not to smoke by parents increased adolescents' readiness to quit in those aged 11-16 years; no effect for 17-18 years.	Specific communication about smoking may facilitate young, but not older, adolescents to stop smoking.
Bourdeau et al. (2012)	USA	General households	Substance use specific communication	Qualitative – individual interviews (n=173)	Parents (of 15-18 year olds; mean age 51.5 years; 81% white; most mother/father pairs)	Parents used explicit and implicit rules about alcohol use; most frequently used conversations to convey rules, as well as teaching behaviour, modelling, monitoring	Parents use a range of strategies to communicate alcohol use rules to adolescents; conversations most frequently used.
Carter et al. (2007)	NZ	Schools (n=12)	Connectedness	Cross-sectional survey (n=643)	Adolescents (age range 14-17 years, median age 15 years; 51% male; 91% white)	High family connectedness associated with lower tobacco use; medium connectedness associated with more binge drinking.	High, but not medium, connectedness may be protective against adolescent substance use. PCC measured when upset, not generally.

Chaplin et al. (2014)	USA	General households	Substance use specific communication	Cross-sectional survey and observational task (n=116)	Adolescents (age range 12-17 years, mean 15.12 years; 55% female; 69% white, 14% Hispanic) Parents (90% female; 13% substance misuse problem)	Discussions about rules associated with physical associations of stress and higher substance use; discussions about scenarios/learning associated with lower blood pressure and lower substance use.	Engaging in drug use discussions which involve scenarios/ things learned at school may be more protective than discussions about rules. More open communication associated with less discomfort and risk.
Cleveland et al. (2005)	USA	General households	Substance use specific communication	Longitudinal survey, 5 year follow up (n=714 dyads)	Adolescents (age range 10-12 years; 54% female; all African American) Parents (age range 23-80, mean age 37 years at baseline; 84% female; 91% African American)	More communication with parents associated with more negative risk images and less susceptibility to use alcohol, cigarettes and cannabis, suggesting an indirect effect on substance use.	Communication with parents may have an indirect effect on adolescent substance use, by influencing their perceptions of substance users, which affects susceptibility to use substances.
De Leeuw et al. (2008)	NL	General households	Substance use specific communication	Longitudinal survey, 3 year follow up (n=428 families, 2 parents, 2 adolescents)	Adolescents (mean age 13.4 and 15.2 years at baseline; 52% and 47% female) Parents (no information provided)	Parents who smoke communicate more poorly than non-smokers; high quality communication was associated with less smoking; more frequent communication associated with more smoking.	High quality communication with parents may be protective against smoking, while more frequent communication may be detrimental.
De Leeuw et al. (2010)	NL	General households	Substance use specific communication	Longitudinal survey, 4 year follow up (n=428 families, 2 parents, 2 adolescents)	Adolescents (mean age 13.4 and 15.2 years at baseline; 52% and 47% female) Parents (no information provided)	High quality communication associated with lower rates of smoking; frequent communication with more smoking; quality of communication declines when young people increase tobacco use	High quality communication with parents may be protective against smoking while more frequent communication may be detrimental.

van den Eijnden et al. (2011)	NL	Schools (n=16)	Substance use specific communication	Longitudinal survey, 2 year follow up (n=537 adolescents, 368 parents)	Adolescents (age range 12-15 years, mean age 13.4 years at baseline; 56% female; 76% white) Parents (no information provided)	Quality of communication and rules about alcohol use were associated with lower alcohol use; more frequent communication associated with more alcohol use and more problems.	High quality communication with parents may be protective against alcohol use and related problems, while more frequent communication may be detrimental.
Guilamo-Ramos et al. (2005)	USA	Schools (n=86)	General communication	Longitudinal survey data, 1 year follow up (n=5313)	Adolescents (age range 12-14 years; 51% female; 58% white)	Better communication with parent (more satisfaction, more reasoning and explanation by parent) associated with lower levels of binge drinking.	Better communication with parents may be protective against binge drinking during adolescence.
Guilamo-Ramos et al. (2008)	USA	School (n=1)	Substance use specific communication	Qualitative – focus groups (n=12)	Adolescents (age range 11-14 years; 50% female; 70% Dominican, 30% Puerto Rican) Mothers (mean age 39 years; 63% completed high school; 80% born outside USA)	Parents and adolescents viewed communication as important in preventing tobacco use; number of barriers, including lack of knowledge, parental smoking, fear of punishment, lecturing. Talking about health consequences as important.	Parents and adolescents view communication as important in preventing smoking but acknowledge there are a number of barriers to having such conversations.
Handley & Chassin (2013)	USA	General households	Substance use specific communication	Longitudinal survey data, 4 year follow up (n=454; 246 with alcoholic parent, 208 matched controls)	Adolescents (age range 11-17 years, mean age 12.6 years; 50.5% male) Parents (mean age 35.4 (mothers), 36.9 (fathers); 70% mothers and 73% fathers were white; most had some college/college degree; 54% were alcoholics)	Parental drinking was associated with more disclosure of negative alcohol experiences, which was associated with higher rates of initiation.	Parental disclosure of negative alcohol experiences may be detrimental to adolescent alcohol use initiation; parents may use disclosures as warnings against alcohol use but instead normalise use and increase use.

Harakeh et al. (2005)	NL	General households	Substance use specific communication	Cross-sectional survey (n=428 families, 2 parents, 2 adolescents)	Adolescents (age range 13-17 years, mean 13.36 and 15.22, 50% male, majority of Dutch origin) Parents (majority Dutch origin)	More frequent communication associated with higher rates of smoking, while higher quality communication associated with lower likelihood.	High quality, rather than frequent, communication about smoking may be protective against adolescent cigarette use.
Harakeh et al. (2009)	NL	General households	Substance use specific communication	Longitudinal survey, 2 year follow up (n=428 families of 2 parents, 2 adolescents)	Adolescents (age range 13-17 years; 98% white; 53% male (older) and 48% male (younger)) Parents (age range 35-62 years; majority white; 36% mothers and 50% fathers had college/university education)	More frequent communication with parents associated with more smoking over time, particularly among younger adolescents. Quality of communication did not moderate these effects.	More frequent communication with parents about cigarette use may be detrimental in terms of adolescents' smoking behaviour.
Harakeh et al. (2010)	NL	General households	Substance use specific communication	Cross-sectional survey data (n=428 families of 2 parents, 2 adolescents)	Adolescents (age range 13-17 years, mean age 13.36 (younger) and 15.22 (older); 53% male (older) and 48% male (younger) 98% white) Parents (majority white; 36% mothers and 50% fathers had college/university education)	High quality communication with smoking associated with lower rates of smoking; more frequent communication associated with higher rates of smoking; parents' smoking associated with poorer quality communication	High quality communication with parents may be protective against adolescent smoking behaviour, while more frequent communication may have a detrimental effect.
Hiemstra et al. (2012)	NL	General households	Substance use specific communication	Longitudinal survey, 5 year follow up (n=272)	Adolescents (age range 13-15 years, mean age 13.3 years at baseline; 52% female)	More frequent communication with mother and father associated with onset of smoking; no significant effects found for quality of communication; quality of communication reduced when adolescent started smoking	More frequent communication may increase adolescents' likelihood of starting smoking. When young people start to smoke, quality of communication may reduce.

Highet (2005)	UK	Youth clubs and community centres	Substance use specific communication	Qualitative – individual/dyad/triad interviews (n=59)	Adolescents (age range 13-15 years; 54% male)	Open communication about alcohol can help young people develop sensible relationship; alcohol frequently discussed but cannabis often unmentioned.	Communication about alcohol use appears to occur frequently and help adolescents develop a sensible relationship with it; communication about cannabis use more hidden, more difficult to talk about.
Horton & Gil (2008)	USA	School (n=1)	General communication	Longitudinal survey, 2.5 year follow up (n=451)	Adolescents (age range 11-13 years, mean age 11.7 years at baseline; all males; 55% white, 45% African American)	Communication with parents predicted levels of alcohol use during adolescence, but was weaker predictor than familism; impact explained by early alcohol use experimentation.	Communication with parents may be protective against alcohol use during adolescence, but less so as get older. Familism (loyalty/trust in family) as stronger predictor.
Huansuriya et al. (2013)	USA	General households	Substance use specific communication	Longitudinal survey data, 5 year follow up (n=1349 (T1), 1276 (T2) dyads)	Adolescents (age range 12-18 years) Parents (no information provided)	Frequency of communication associated with less positive attitudes toward cannabis use, which was strongest predictor intentions to use cannabis.	More frequent communication with parents may have an indirect protective effect on adolescent cannabis use, by influencing their attitudes towards cannabis.
Huver et al. (2006)	NL	Schools (n=30)	Substance use specific communication	Longitudinal survey, 2 year follow up (n=1072)	(Adolescents (mean age 12.71 years at baseline; 51% male; 82% white)	Communication with parents about health risks of smoking associated with lower rates of smoking; more frequent communication and permissive messages associated with higher rates of smoking.	Communication about health risks may be more protective than others messages; more frequent communication may be detrimental and increase cigarette use among adolescents.

Huver et al. (2007)	NL	General households	Substance use specific communication	Cross-sectional survey data (n=482)	Adolescents (age range 12-19 years, mean age 15.35 years; 56% female; 91% white)	More communication with parents associated with less positive attitudes about smoking; older adolescents reported less communication than younger.	Communication about smoking have an indirect protective effect by lowering adolescents' pro-smoking attitudes.
Kam (2011)	USA	General households	Substance use specific communication	Longitudinal survey data, 4 year follow up (n=5874)	Adolescents (age range 9-18 years, mean age 12.59 years at baseline; 51% male; 67% white)	Parent-only communicators reported the lowest rates of substance use over time, while friends-only and consequence-focused reported highest rates.	More comprehensive communication with parents about substance use may be protective against alcohol, cigarette and drug use among adolescents.
Kam & Middleton (2013)	USA	Schools (n=3)	Substance use specific communication	Cross-sectional survey data (n=561)	Adolescents (age range 11-14 years. Latino - mean age 12.4 years; 56% male; 84% low income. White – mean age 12.4 years; 51% female; 51% low income)	Communication with parents associated with more anti-substance use norms, while parents' disclosure of own past substance use was associated with lower levels of anti-substance use norms.	Communication with parents about substance use may have an indirect protective effect; parents' disclosure of their past substance use may normalise these behaviours and increase use.
Koning et al. (2013)	NL	Schools (n=19)	Substance use specific communication	Longitudinal survey, 4 year follow up (n=703 dyads)	Adolescents (age range 12-16 years, mean age 12.19 years; 53% male) Parents (82% female; 79% mothers and 74% fathers had low education levels)	When parents worried about adolescent substance use, quality of communication was lower and there was less restrictive rule setting, which were associated with higher rates of alcohol use.	Parents' worries about substance use has a detrimental effect on the quality of their communication, which increases adolescent alcohol use.

Koning et al. (2014)	NL	Schools (n=19)	Substance use specific communication	Longitudinal survey, 2 year follow up (n=874)	Adolescents (mean age 12.9 years at baseline; 52% male)	No direct association between quality of communication and alcohol use, but strict rules associated with lower rates of alcohol use.	While quality of communication was not associated with lower alcohol use, the authors recommend a combination of strict rules and high quality communication to protect against alcohol use during adolescence.
Kulbok et al. (2010)	USA	Community (schools, churches etc)	Substance use specific communication	Qualitative – group interviews (n=18)	Adolescents (age range 16-17 years; all female; 66% white, 33% African American)	Open communication about smoking viewed as protective factor; received clear, direct messages from parents, in form of explicit verbal statements and implicit behavioural messages, such as parental non-smoking.	Open communication about smoking viewed as protective against smoking initiation by adolescents and parents.
Levy et al. (2010)	USA	Primary care/ community mental health centres	Substance use specific communication	Qualitative – individual interviews (n=30)	Adolescents (14-18 years, mean 16.27 years; 80% female; 40% black, 20% white, 20% Hispanic; all smoked; all met criteria for DSM-IV for depressive disorder) Parents (73% mothers)	Parents felt that conversations about smoking did not go well, due to adolescents not being receptive; adolescents reported parents lectured rather than discussed topic; parental smoking as barrier to effective communication.	Adolescents appear to be more receptive to communication about smoking when they have a discussion with parents, rather than when they are lectured. Parental smoking as a barrier to effective communication.

Luk et al. (2010)	USA	School (n=1)	General communication	Cross-sectional survey (n=1308)	Adolescents (mean age 16.04 years; 50% male; 48.5% white, 24.4% Hispanic; 78% two-parent households)	Communication with mothers was protective against smoking and communication with fathers was protective against cannabis for boys but not girls; no effects of communication on substance use for girls.	Easy communication with parents may be protective against substance use for adolescent males, but not females; differences in communication for males as perceived as higher risk.
Maggi et al. (2012)	CAN	Adverts, schools, community centres	Substance use specific communication	Qualitative – individual interviews (n=35)	Adolescents (age range 14-18 years, mean age 16 years; 51% male; all had smoked in the past)	Parents had negative and positive influences on smoking; influence due to relationships; authoritarian vs. educational communication; having good relationships influenced abstinence; importance of feeling at ease with parents when communicating	PCC can negatively and positively influence adolescents' likelihood of smoking, as well as communication about smoking. Adolescents prefer educational messages, rather than being lectured.
Mares et al. (2011)	NL	General households	Substance use specific communication	Longitudinal survey, 5 year follow up (n=428 families of 2 parents, 2 adolescents)	Adolescents (mean age 13.36 (younger) and 15.22 (older) years at baseline) Parents (age range 35-62 years; majority white)	The more alcohol problems parents had, the more they communicated, which was related to less excessive alcohol use and fewer problems in adolescents.	Communication with parents who are experiencing alcohol related problems may be protective against adolescent alcohol use; but unknown regarding content and quality of these conversations.

Mares et al. (2013)	NL	School (n=1)	Substance use specific communication	Cross-sectional survey (n=1349 dyads)	Adolescents (age range 11-12 years, mean age 11.62 years; 51% male; majority white) Parents (age range 30-64 years, mean age 42.87; all female)	High quality communication marginally associated with lower rates of alcohol use and higher self-efficacy; more disclosures associated with higher self-efficacy; less frequent communication associated more positive expectancies.	Frequent high quality communication may have an indirect protective effect on alcohol use, in terms of self-efficacy to refuse alcohol and +negative expectancies of alcohol use.
Metzger et al. (2013)	USA	Schools (n=16)	Substance use specific communication	Longitudinal survey data, 2 year follow up; observational task (n=344 families of 1 or 2 parents and 1 adolescent)	Adolescents (age range 14-16 years, mean age 15.61 years; 58% female; 56% white; all had experience of smoking) Parents (most female; 76% married; 77% post-high school education)	Adolescents were less likely to initiate conversations with parents when they reported more problem communication; when mothers initiated conversations and when adolescents were secretive, adolescents were more likely to smoke.	Good quality communication with parents may be protective against smoking behaviour during adolescence.
Nonnemaker et al. (2012)	USA	General households	Substance use specific communication	Longitudinal survey data, 4 year follow up (n=5864 dyads)	Adolescents (age range 9-18 years, mean 11.9 years at baseline; 64% white) Parents (57% had high school degree)	More parents than adolescents reported communication; communication with parents in last 6 months or about potential consequences associated with higher likelihood of cannabis initiation.	Communication about consequences of substance use may be detrimental in terms of adolescent cannabis use.

Otten et al. (2007)	NL	General households	Substance use specific communication	Longitudinal survey , 1 year follow up (n=428 families of 2 parents, 2 adolescents)	Adolescents (age range 13-16 years, mean age 15.22 (older), 13.36 (younger); 50% female; majority white) Parents (majority white)	Frequent communication with mothers associated with lower self-efficacy, perceived parental norms, and more positive attitude towards smoking; high quality communication associated with more negative attitudes, higher self-efficacy, with effect stronger for younger siblings; also similar effects for father, but no significant differences between older/younger.	High quality communication about smoking with parents may have an indirect protective effect, while more frequent communication may have an indirect detrimental effect.
Razzino et al. (2004)	USA	School (n=1)	General communication	Cross-sectional survey (n=527)	Adolescents (age range 12-19 years, mean age 15.1 years; 55% female; 91% white; 76% from intact families)	Communication (self-expression) with parents did not predict alcohol or drug use, but was associated with academic motivation and peers, which were associated with substance use.	Communication with parents may have indirect role in alcohol and drug use, by influencing adolescents' academic motivation and choice of friends.
Reimuller et al. (2011)	USA	Schools (n=13)	Substance use specific communication	Longitudinal survey, 3 year follow up (n=1511 dyads)	Adolescents (age range 11-14 years, mean age 13 years at baseline; 52% female; 56% white, 36% African American) Parents (no information provided)	Permissive messages associated with higher rates of alcohol use and more negative consequences, with strongest association for those with higher alcohol use at baseline.	Permissive messages in communication with parents may be detrimental to adolescents' alcohol use, while negative alcohol messages had no effect on use.
Ringlever et al. (2011)	NL	General households	Substance use specific communication	Longitudinal survey, 3 year follow up (n=428 families, 2 parents, 2 adolescents)	Adolescents (mean age 15.22 years, 52% male) Parents (no information provided)	Higher quality communication with mother associated with lower likelihood of smoking initiation	High quality communication with mothers may be protective against smoking initiation.

Sherriff et al. (2008)	UK	Community (newsletters, parenting groups, university, council)	Substance use specific communication	Qualitative – individual interviews (n=40) and secondary analysis of qualitative data	Parents (of 13-17 year olds; 88% white; aged 30-64 years)	Parents use range of communication strategies, used own/ others' experiences to initiate conversations; also reported concerns about communicating about alcohol use	Parents use a range of strategies to communicate with adolescents about alcohol use; also report concerns/barriers to this communication.
Spijkerman et al. (2008)	NL	Schools (n=16)	Substance use specific communication	Cross-sectional survey (n=1344 dyads)	Adolescents (age range 12-17 years, 42% aged 14-15 years; 54% female; 88% white) Parents (75% female; most living with partner)	High quality communication with parents associated with lower alcohol use; more frequent communication with mother associated with higher rates of alcohol use and more frequent communication with father associated with more binge drinking and problems.	High quality communication with parents may be protective against alcohol use during adolescence, while more frequent communication with parents may be detrimental.
Tilson et al. (2004)	USA	Schools (n=4)	Connectedness	Cross-sectional survey data (n=428 dyads)	Adolescents (age range 11-15 years, mean age 13 years; 54% female; 37% Asian, 35% multi-ethnic, 28% African American) Parents (mean age 41 years; 79% female)	High connectedness associated with lower likelihood of smoking, only when parents were non-smokers; no effect of connectedness on smoking when parents smoked.	High PCC may be protective against smoking only in non-smoking families; more complex interactions at play when parents are smokers.
van der Vorst et al. (2005)	NL	General households	Substance use specific communication	Cross-sectional survey (n=428 families of 2 parents, 2 adolescents)	Adolescents (age range 13-17 years, mean age 13.36 (younger), 15.22 years; 53% male (older), 52% female (younger). Parents (fathers mean age 46 years, mothers 44 years; majority white)	Parents thought they talked more often and were less permissive than adolescents thought; more frequent communication about alcohol use was associated with higher rates of alcohol use in younger and older adolescents.	More frequent communication with parents about alcohol use may be detrimental in terms of adolescents' alcohol consumption.

van der Vorst et al. (2010)	NL	General households	Substance use specific communication	Longitudinal survey data, 3 year follow up (n=428 families of 2 parents, 2 adolescents)	Adolescents (age range 13-16 years, mean age 13.36 years; 48% male; majority white) Parents (36% mothers and 50% fathers had completed university/college)	More frequent communication predicted increased alcohol use, particularly for males and those who drink moderately/heavily; males reported more communication than girls.	More frequent communication may be detrimental in terms of adolescents' alcohol use, particularly in moderate and heavy drinking males, who had the highest levels of communication.
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