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Best friends' interactions and substance use: The role of friend pressure and unsupervised co-deviancy



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ABSTRACT

Best friends exert a substantial influence on rising alcohol and marijuana use during adolescence. Two mechanisms occurring within friendship - friend pressure and unsupervised co-deviancy - may partially capture the way friends influence one another. The current study aims to: (1) examine the psychometric properties of a new instrument designed to assess pressure from a youth's best friend and unsupervised co-deviancy; (2) investigate the relative contribution of these processes to alcohol and marijuana use; and (3) determine whether gender moderates these associations. Data were collected through self-report questionnaires completed by 294 Canadian youths (62% female) across two time points (ages 15–16). Principal component analysis yielded a two-factor solution corresponding to friend pressure and unsupervised co-deviancy. Logistic regressions subsequently showed that unsupervised co-deviancy was predictive of an increase in marijuana use one year later. Neither process predicted an increase in alcohol use. Results did not differ as a function of gender.

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Initiation into alcohol and marijuana use often takes place during adolescence (Faulkner, Latulippe, Paquette, & Paré, 2011; Lanctôt, Bernard, & Le Blanc, 2002). From a prevention perspective, understanding the proximal factors associated with substance use initiation, maintenance and growth is crucial (Van Ryzin, Fosco & Dishion, 2012). Among these factors, the influence of friends is of primary concern for most researchers (Fujimoto & Valente, 2012; Urberg, Değirmencioglu, & Pilgrim, 1997). The main line of inquiry that remains underinvestigated in this field has to do with identifying the mechanisms through which this influence process operates within friendships. The current study addresses this specific issue by examining two potential mechanisms that have never been considered simultaneously in previous research, that is, friend pressure and unsupervised co-deviancy.

1. Friendship and substance use

Adolescents who use alcohol and marijuana tend to have friends who also use these substances (Gaughan, 2006; Poulin, Kiesner, Pedersen, & Dishion, 2011). This can be explained by at least two processes: (1) selection, wherein an adolescent chooses to form a friendship with a peer who already displays similar behaviours; and (2) influence (or socialization), referring to the tendency of adolescents to adopt the behaviours of those with whom they frequently interact (Kandel, 1978).

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Importantly, these two processes can only be disentangled using a longitudinal design whereby youths' behaviour and friendships are measured at multiple time points. Research suggests that both processes are at play; adolescents who use substances choose friends who also engage in substance use and, over the course of their friendship, these two friends will come to adopt increasingly similar behaviours, thus suggesting a mutual behavioural influence (Laursen et al., 2008). Moreover, longitudinal studies have shown that having a best friend who uses substances is one of the strongest predictors of adolescents' own subsequent use months and even years later (e.g., Fujimoto & Valente, 2012; Urberg et al., 1997). While these studies are very informative, they do not tell us much about the interactions that take place between these friends. In other words, what is going on in these friendships that can push adolescents to change their behaviour and increase their use of alcohol and/or marijuana?

Stemming from Bandura's (1980) social learning theory, the interactionist perspective mainly involves the study of the potential mechanisms at work within friendships. Bandura's theory deals with the substantial influence exerted by surrounding social agents on one's own behaviour. The interactionist perspective thus focuses on the development of antisocial and risky behaviour in the context of friendship. Moreover, according to this perspective, internal psychological processes are thought to be the result of a set of social processes operating between social partners (Vitaro, Boivin, & Bukowski, 2009). Bandura's main mechanisms of social learning (i.e., vicarious learning – observational learning of a target behaviour and its consequences – and modeling) exert a significant influence within dyadic peer relationships. Two microprocesses embedded in the interactionist perspective, referred to here as friend pressure and unsupervised co-deviancy, may be at play.

2. Friend pressure

Friend pressure is a subcategory of peer pressure referring to pressure to adopt a given behaviour exerted on a youth by a friend. For instance, some adolescents promote alcohol and drug use and pressure their friends into using these substances as well (Urberg, 1992). Such pressure within the friendship may be increased by loyalty to the friend (Warr, 2002) prompting the adolescent to adopt or maintain a deviant behaviour. Moreover, adolescents who are more concerned about the opinion of others have a greater tendency to engage in deviant behaviours (Young & Weerman, 2013) out of fear of ridicule (rejection) or to maintain their status within the group (Costello & Hope, 2016; Warr, 2002). Friends thus actively influence one another's behaviour (Santor, Messervey, & Kusumakar, 2000).

Pressure effects have predominantly been studied within the larger peer group. Berndt (1979) studied individuals' differential susceptibility to peer influence as well as how they perceive peer pressure. His work revealed that perceived constraint toward peer group conformity reaches a peak in mid-adolescence, from ages 15 to 16. Interestingly, this peak also corresponds to a documented rise in the frequency of minor deviant behaviour among youths (Berndt, 1979). Brown and colleagues (Brown, Clasen, & Eicher, 1986; Clasen & Brown, 1985) later developed a well-known and frequently employed instrument used to assess peer pressure: the *Peer Pressure Inventory* (PPI; 53 items). These researchers also observed that peer pressure to engage in antisocial behaviour increases between the ages of 12 and 16 before levelling off between the ages of 16 and 18. Finally, a study by Santor et al. (2000) using a shorter questionnaire (10 items) found peer pressure to be significantly associated with both risky behaviour and psychosocial issues during the adolescent years.

The phenomenon of peer pressure has mostly been examined within the larger peer group, without specifying which peer(s) were considered. Given the prominent role of a youth's best friend within the peer network during the adolescent years, we find it surprising that the effect of pressure from best friends on youths' own behaviour has rarely been investigated – with the exception of, for example, Allen, Porter, & McFarland, 2006; Laursen, Hafen, Kerr, & Stattin, 2012; McGloin, 2009.

3. Unsupervised co-deviancy

The adolescent years are marked by a growing need for autonomy, expressed through both a decrease in time shared with parents and an increase in time spent with peers (Brown & Larson, 2009). Youths also tend to consider this transitional period a favourable time to initiate substance use. This initiation mainly occurs within the friendship network (Reed & Rountree, 1997). Thus, parental monitoring of adolescent behaviour remains essential, although parents must also adapt to the growing need for autonomy expressed by youths. Previous studies have shown low parental monitoring to be associated with higher frequency of substance use during adolescence (Chilcoat & Anthony, 1996; Dishion, Nelson, & Bullock, 2004; Steinberg, Fletcher, & Darling, 1994). This relationship is partially explained by the increased risks of affiliation with substance-using peers when youths experience weak/no parental monitoring (Brown, Mounts, Lamborn, & Steinberg, 1993; Dishion et al., 2004). It has often been reported that the initiation of marijuana use usually occurs with friends, when no adults are present (Reed & Rountree, 1997). Moreover, youths who are characterized as “deviant” are more likely to both seek and find themselves in unstructured and unsupervised contexts with their friends (Dishion et al., 2004; Hoeben & Weerman, 2016; Osgood, Wilson, O'malley, Bachman, & Johnston, 1996). Osgood et al. (1996) found this type of environment to be associated with higher levels of heavy alcohol and marijuana use.

Within dyadic friendships, deviant behaviour may occur on a voluntary basis, with both friends prompting one another to engage in rule-breaking actions such as delinquency, drinking alcohol or smoking marijuana. This dynamic has been captured in previous studies and has been referred to as “deviancy training.” Deviancy training occurs when two friends mutually prompt one another to engage in rule-breaking behaviours by providing mutual positive reinforcement (Dishion, Spracklen, Andrews, & Patterson, 1996). This influence process within the friendship increases the risk of substance use (Dishion &

Owen, 2002). Given that the deviancy training process is more likely to occur when no adults are monitoring or present, the concepts of “parental monitoring avoidance” and “rule-breaking” are theorized in the current study to form a single construct. This construct is referred to here as “unsupervised co-deviancy.”

Two conclusions can be drawn from the literature reviewed above. The first relates to measurement. Peer pressure is typically measured while considering the peer group as a whole. There are few specific measures targeting the pressure exerted within close dyadic friendships (e.g. Allen et al., 2006), none of them consisting in self-report questionnaires. Therefore, the mechanism involving direct pressure from a youth's best friend has rarely been investigated. Moreover, given that the specific construct of unsupervised co-deviancy within dyadic friendships has rarely been investigated (Siennick & Osgood, 2012), no specific self-reported measure of this construct has ever been used before. Second, these two constructs have never been investigated simultaneously with regard to their relative effects on alcohol and marijuana use. Although previous studies have suggested that substance use may be associated with both peer pressure (Santor et al., 2000) and unsupervised co-deviancy processes (Dishion, Andrews, & Crosby, 1995; Dishion, Capaldi, Spracklen, & Li, 1995, 2004), it is not yet known which of these processes might have a greater effect on substance use, particularly within the context of dyadic friendships.

3.1. The current study

The aims of the current study were threefold. The first aim was to examine the psychometric properties of a new questionnaire measuring friend pressure and unsupervised co-deviancy within the best friend relationship. The factorial structure and internal consistency of this instrument were tested. Two distinct factors corresponding to friend pressure and unsupervised co-deviancy, respectively, were expected to emerge.

The second aim was to examine the relative contribution of friend pressure and unsupervised co-deviancy, measured at age 15, to predicting the participants' alcohol and marijuana use one year later at age 16, over and beyond their use of these substances at age 15. This specific period was selected given the peak in peer group conformity previously reported in middle adolescence (Berndt, 1979) and given that peer pressure to engage in deviant behaviour is known to increase until age 16 (Brown et al., 1986). Since the specific circumstances related to the initiation and maintenance of substance use may differ from one substance to another (Kosterman, Hawkins, Guo, Catalano, & Abbott, 2000), alcohol use and marijuana use were accounted for separately. Furthermore, given the previously reported predictive power of the best friend's own substance use, this variable, measured at age 15, was also included in the model (Knecht, Burk, Weesie, & Steglich, 2011).

The third aim was to investigate gender as a potential moderator of the relationship between these two mechanisms and substance use. Previous studies have shown that substance use frequency is typically higher for boys, starting in mid-adolescence (Chen & Jacobson, 2012). Moreover, boys are more likely to affiliate with deviant peers (van Lier, Vitaro, Wanner, Vuijk, & Crijnen, 2005) and to be influenced by deviant peer pressure (Berndt, 1979). Accordingly, we expected the effects of friend pressure and unsupervised co-deviancy on substance use to be stronger for boys. The model is illustrated in Fig. 1.

4. Methodology

4.1. Participants

The current research project is part of a longitudinal study that began in 2001 involving 390 sixth-graders (58% females; mean age = 12.38) recruited from eight French-speaking elementary schools in a large school board in Québec, Canada. The participants were predominately Caucasian (90%), French-speaking (100%), and from intact families (72%). Mean annual family income before taxation was between CAN\$45 000 and CAN\$55 000. Educational attainment was quite similar for mothers ($M = 13.08$ years) and fathers ($M = 13.20$ years). The data used in the current study were collected at two time points during high school: (1) when participants were in Grade 9 (mean age = 15.38 years old); and (2) when participants were in Grade 10 (mean age = 16.38 years old). A total of 302 youths participated in the data collection in Grade 9; of these, 294 also participated in the data collection in Grade 10. The subsample used in the current study included those who took part in both

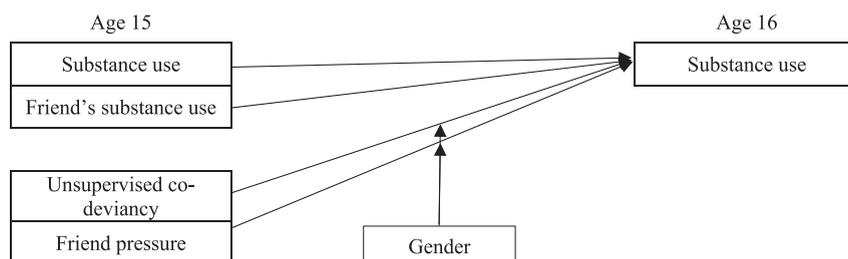


Fig. 1. Regression model tested separately for alcohol and marijuana use.

waves of data collection (N = 294; 62% females). Chi-square tests revealed that this subsample (N = 294), compared to the unretained participants who were initially recruited in Grade 6 (N = 96), included significantly more youths from intact two-parent families ($p < 0.01$) but did not differ with regard to gender.

4.2. Procedure

Parents were asked to sign a written consent form allowing the youths to participate in the study. In Grade 9 (May), participants took part in a brief phone interview and completed a questionnaire in the school setting under the supervision of trained research assistants. In Grade 10 (May), they completed a questionnaire in the school setting. Participants received a \$20 gift certificate each year to reward them for their time and commitment to the study.

4.3. Measures

4.3.1. Friend pressure and unsupervised co-deviancy at age 15

A two-step assessment procedure was used. First, during the phone interview, participants were asked to name their best friend. Second, approximately two weeks later, the participants completed a questionnaire tapping the influence processes occurring within this friendship. The best friend's name was automatically inserted within each item of the questionnaire, using a word-processing application. More specifically, the participants were asked to rate the extent to which each item was true for them on a 5-point Likert scale ranging from 1 = *not at all true* to 5 = *entirely true*. In the current study, six items assessing friend pressure were developed based on instruments used in previous studies (Brown et al., 1986; Santor et al., 2000). These items were adapted to better target the dyadic friendship context (i.e., "Sometimes, I do certain things because Paul won't quit bothering me until I do them."). Six items were used to assess unsupervised co-deviancy. These items targeted both the rule-breaking/deviancy training dimension (i.e. "I like Paul because he's not afraid to break adults' rules or use drugs.") and the adult monitoring avoidance dimension (i.e. "Paul and I try to spend time in places where there are no adults.") of the construct. Items are displayed in Table 1.

4.3.2. Youth's alcohol and marijuana use at age 15 and age 16

Participants were asked to indicate how often they used alcohol ("How many alcoholic beverages [e.g., beer, wine, shots, etc.] have you consumed in the past month?") and marijuana ("How many times have you used marijuana or hashish in the past month?"). The youths responded using the following scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11–20, 21–40, over 41 times. The same items were used at age 15 and again at age 16.

4.3.3. Best friend's alcohol and marijuana use at age 15

Participants were asked to indicate whether their best friend used alcohol ("Does Paul drink alcohol?" yes/no) and marijuana ("Does Paul use marijuana?" yes/no).

4.4. Data analysis strategy

The factor structure of the questionnaire measuring these friendship influence processes was examined using principal component analyses, with a varimax rotation to facilitate the interpretation of the matrix. The subscales' internal consistency was also measured. Correlations among all the variables in the regression models were computed. A hierarchical multiple regression predicting alcohol use at age 16 was then performed, with the variables entered in the following sequence: (1)

Table 1

Rotated Solution Matrix (including factor loadings).

Item	3-factor solution			2-factor solution	
	1	2	3	1	2
Paul and I try to spend time in places where there are no adults.	0.09	0.22	0.84	0.68	0.16
Paul and I enjoy breaking adults' rules for fun.	0.48	0.15	0.42	0.78	0.22
I like Paul because he's not afraid to break adults' rules or use drugs.	0.19	0.62	0.51	0.61	0.21
Paul and I enjoy being with other youths who do not follow the rules.	0.53	–0.12	0.42	0.77	0.1
Paul and I do not enjoy being with adults who monitor our behaviour.	0.22	0.78	0.02	0.6	0.12
Paul and I try to find ways to meet without our parents knowing about it.	0.08	0.72	0.34	0.59	–0.02
Sometimes I do certain things so that Paul won't think I'm afraid.	–0.02	0.64	0.13	0.23	0.8
Sometimes I do certain things not to lose Paul's respect.	0.8	0.35	–0.02	0.10	0.76
Sometimes I do certain things so that Paul won't think I act like a baby.	0.75	0.06	0.14	0.11	0.8
Sometimes I do certain things to show off in front of Paul.	0.82	0.29	–0.14	0.07	0.67
Sometimes I do certain things because Paul does them too.	0.08	0.27	0.65	0.36	0.51
Sometimes I do certain things because Paul won't quit bothering me until I do them.	0.65	–0.1	0.29	0.14	0.56
Eigenvalues	4.23	1.8	1.18	4.38	1.8

youth's alcohol use at age 15; (2) best friend's alcohol use at age 15; and (3) friend pressure and unsupervised co-deviancy at age 15. Finally, to account for the potential moderating effect of gender ($1 = \text{girl}$; $2 = \text{boy}$), the scores obtained for friend pressure and unsupervised co-deviancy were normalized and two interaction terms (gender by friend pressure; gender by unsupervised co-deviancy) were computed and included in the regression model. In the event of a significant interaction effect, the hierarchical regression model was tested separately for boys and girls. This model was also tested for marijuana use through logistic regression.

5. Results

5.1. Factorial structure

Three factors emerged from the first principal component analysis (see Table 1). The eigenvalues for the first, second and third factors were 4.23 and 1.80 and 1.18, respectively. The rotated solution matrix indicated that three of the 12 items had loadings higher than 0.40 on two factors. Moreover, interpreting these three factors using the remaining nine items appeared difficult because the second and third factors included a mix of friend pressure and unsupervised co-deviancy items.

A second principal component analysis was conducted, forcing a two-factor solution to emerge. Following this second analysis, the two factors that emerged had eigenvalues of 4.38 and 1.80, respectively. The first factor accounted for 33.69% of the variance, while the second accounted for 13.87%. The rotated solution matrix (including the factor loading) is displayed in Table 1. This two-factor solution was preferred because all items displayed higher loading on the factor they were meant to capture. Moreover, the parallel analysis (Horn, 1965) as well as the minimum average partial correlation (Velicer, 1976) and the scree test support the choice of a two-factor solution (Peres-Neto, Jackson, & Somers, 2005).

An examination of the internal consistency revealed a 0.75 Cronbach alpha for unsupervised co-deviancy and a 0.79 Cronbach alpha for friend pressure. In order to proceed with the correlation and regression analyses, mean scores were computed for all items corresponding to either subscale (e.g., unsupervised co-deviancy and friend pressure). The two resulting mean scores were moderately correlated ($r = 0.43$, $p < 0.01$), indicating that although both constructs were related, they indeed captured different processes of influence occurring within the friendship.

5.2. Regression analyses

Correlations between all the variables included in the current study as well as the means and standard deviations for each variable are displayed in Table 2. The correlation analyses revealed that unsupervised co-deviancy was positively associated with youth's substance (alcohol and marijuana) use at ages 15 and 16 as well as with best friend's substance use. However, friend pressure was not related to either youth's or best friend's substance use. Finally, youth's alcohol use at age 15 was positively associated with youth's alcohol use at age 16 and the same relationship was observed for marijuana use – which speaks of a certain stability over time when it comes to substance use in mid-adolescence.

The results of the regression analyses are displayed in Tables 3 and 4. All regression coefficients were standardized. The hierarchical regression aimed to predict youth's alcohol use at age 16. The first step in the model revealed that youth's alcohol use at age 15 explained a substantial portion of the variance in youth's alcohol use at age 16 – which speaks, once again, of a great stability in substance use behaviour. When included in the model, best friend's alcohol use at age 15 significantly increased the percentage of explained variance, suggesting that the use of alcohol by a youth's best friend at age 15 increases this youth's risk of using alcohol by age 16. The inclusion of friend pressure and unsupervised co-deviancy did not significantly improve the model. Finally, gender did not significantly moderate the reported associations.

The logistic regression aimed to predict youth's marijuana use at age 16 (see Table 4). Because youth's marijuana use at age 16 was not normally distributed, this variable was dichotomized as follows: 0 = no use (66% of the sample) and 1 = any use (34%). The first step in the model was significant: youth's marijuana use at age 15 was predictive of youth's subsequent marijuana use at age 16. Best friend's marijuana use did not significantly contribute to the improvement of the model. However, the third step in the test – including the two friendship influence processes in the model – significantly increased the percentage of explained variance in the model. Only unsupervised co-deviancy exerted a significant effect on youth's

Table 2
Descriptive Data and Bivariate Correlations among the Study Variables.

Variable	1	2	3	4	5	6	7	8	9	M	SD
1. Unsupervised co-deviancy, age 15	–									1.80	0.69
2. Friend pressure, age 15	0.42**	–								1.34	0.49
3. Friend's alcohol use, age 15	0.30**	0.04	–							0.50	0.87
4. Friend's marijuana use, age 15	0.18**	-0.06	0.30**	–						0.03	0.18
5. Youth's alcohol use, age 15	0.37**	0.08	0.40**	0.17**	–					2.67	3.32
6. Youth's marijuana use, age 15	0.42**	0.08	0.33**	0.23**	0.42**	–				1.55	0.46
7. Youth's alcohol use, age 16	0.29**	0.15*	0.34**	0.15*	0.56**	0.52**	–			3.77	3.94
8. Youth's marijuana use, age 16	0.41**	0.09	0.33**	0.21**	0.43**	0.61**	0.55**	–		2.13	0.47
9. Gender	0.02	0.16**	-0.13*	-0.11*	-0.05	0.02	0.06	0.00	–		

Note. * $p < 0.05$, ** $p < 0.01$.

Table 3
OSL Regressions Predicting Youth's Alcohol Use at Age 16.

	β	ΔR^2
Step 1		0.30**
Youth's alcohol use, age 15	0.48**	
Step 2		0.02**
Friend's alcohol use, age 15	0.14*	
Step 3		0.01*
Gender	0.10	
Step 4		0.01
Unsupervised co-deviancy, age 15	0.05	
Friend pressure, age 15	0.06	
Step 5		0.01
Gender x Unsupervised co-deviancy	-0.08	
Gender x Friend Pressure	0.08	

Note. * $p < 0.05$, ** $p < 0.01$.

Table 4
Logistic Regressions Predicting Youth's Marijuana Use at Age 16.

	β	W	OR
Youth's marijuana use, age 15	1.18**	49.63	3.27
Friend's marijuana use, age 15	0.15	0.90	1.16
Gender	0.09	0.28	1.09
Unsupervised co-deviancy, age 15	0.66**	10.69	1.95
Friend Pressure, age 15	-0.16	0.75	0.86
Gender x Unsupervised co-deviancy	0.02	0.01	1.02
Gender x Friend Pressure	0.16	0.80	1.17

Note. W Wald statistic, OR odds ratio.

* $p < 0.05$, ** $p < 0.01$.

marijuana use at age 16. In fact, an increase of one standard deviation in unsupervised co-deviancy practically doubles (odds ratio = 1.95) the chances to consume marijuana. Thus, the greater the extent to which youths engaged in unsupervised co-deviancy behaviours with their best friend at age 15, the more likely they were to use marijuana by age 16. Finally, gender did not significantly moderate the reported associations.¹

6. Discussion

The main goals of the current study were to: (1) examine the psychometric properties of a newly developed questionnaire aiming to capture both the friend pressure and unsupervised co-deviancy processes occurring within the best friend relationship during adolescence; (2) investigate the predictive effect of these two processes on youths' alcohol and marijuana use; and (3) explore the potential moderating effect of gender on these linkages. The main findings are highlighted and further discussed below.

6.1. The friend pressure and unsupervised co-deviancy measure

Two distinct factors were identified when examining the psychometric properties of our instrument tapping the influence processes occurring within the best friend relationship, namely: (1) friend pressure and (2) unsupervised co-deviancy. The internal consistency scores for both factors were also satisfactory. This two-factor model was also supported by correlation analyses revealing that the two processes were moderately correlated – which implies that for some youths, the experience of unsupervised co-deviancy was associated with higher friend pressure and vice versa. Such correlations are to be expected given that both of these influence mechanisms occur within friendship. Therefore, it appears that our instrument captures two related yet different friendship influence processes.

6.2. Linking friendship influence processes and substance use

Regression analyses revealed that when considering the effect exerted by both processes, only unsupervised co-deviancy was predictive of subsequent marijuana use (measured one year later). However, neither friend pressure nor unsupervised

¹ Similar regression analyses were conducted using only concurrent data. The findings were similar to those observed using the longitudinal data with unsupervised co-deviancy being the strongest predictor of marijuana use (odds ratio = 3.22; $p < 0.01$). Beyond the influence of the friend's use ($B = 0.34$; $p < 0.01$), it was also predictive of adolescent alcohol use ($B = 0.28$; $p < 0.01$). Because the notion of influence implies the idea that the interactions between the two friends impact their behavior over time, we believe that the longitudinal analyses provide a more appropriate (and more conservative) test of these ideas.

co-deviancy were predictive of subsequent alcohol use. These findings might be explained by the possibility that unsupervised co-deviancy could mainly refer to positive reinforcements between friends, whereas friend pressure usually concerns negative reinforcement (e.g. loss of status) – even if it can sometimes take a positive form when appealing on loyalty (Warr, 2002). Bandura (1980) states that behaviors followed by reinforcement are most likely to be repeated. Burgess and Akers (1966) also argue that delinquent behaviors are learned primarily through positive reinforcements. Thus, delinquent behavior would be more likely to be repeated in the context of unsupervised co-deviancy. In addition, unsupervised co-deviancy may be more common in rule breaking youth (Dishion et al., 1996). The relation between marijuana use and unsupervised co-deviancy can also be explained by an interaction between substance use and avoidance of parental supervision, a component of unsupervised co-deviancy. Parental monitoring has been identified as a key factor in the initiation and maintenance of substance use (Chilcoat & Anthony, 1996; Dishion et al., 2004; Steinberg et al., 1994). Authors found higher levels of substance use among youth who were less monitored and actively avoided parental monitoring (Dishion et al., 2004).

It was observed that friend pressure did not contribute to subsequent substance use in our sample. In previous studies, the concept of “friend pressure” has mainly been studied within the larger peer network, whereas we were specifically interested in pressure from the youth's best friend. The peer pressure phenomenon may exert more powerful effects within a group setting (e.g., the peer group may pressure the individual into engaging in a behaviour under the threat of exclusion) compared to a dyadic friendship setting. Future studies are however required to test this hypothesis as the current data does not provide information about the setting in which respondents meet their friends (i.e. together with or without other peers). Peer pressure may also be somewhat less prevalent within the context of a friendship, which is typically more voluntary and reciprocal. Within dyadic friendships, our results suggest that the influence processes may take the form of an unsupervised co-deviancy process – in particular, when it comes to marijuana use. Future studies examining friend pressure and unsupervised co-deviancy effects within both dyadic friendships and larger peer group settings are nonetheless crucial to properly test this hypothesis.

Our results also highlight the necessity to account for the best friend's characteristics when studying alcohol use habits in adolescence – as neither process predicted its subsequent use. More specifically, best friend's alcohol use was associated with an increase in youth's alcohol use from age 15 to 16. This last result is in line with previous research findings (Fujimoto & Valente, 2012; Urberg et al., 1997). Nonetheless, it is worth noting that the best friend's marijuana use was not predictive of a subsequent increase in youth's marijuana use from age 15 to 16. Analogous findings were also reported in previous studies (De la Haye, Green, Kennedy, Pollard, & Tucker, 2013; Poulin et al., 2011).

Moderation analyses showed no sign of gender differences related to peer influence (socialization) on adolescent alcohol and marijuana use. These findings coincide with the majority of empirical investigations (Burk, Van Der Vorst, Kerr, & Stattin, 2012; Poelen, Engels, Van Der Vorst, Scholte, & Vermulst, 2007; Urberg et al., 1997). As suggested in previous research (Gaughan, 2006; Mrug, Borch, & Cillessen, 2011; Poulin & Denault, 2012; Poulin et al., 2011), although boys and girls “may not differ on individual susceptibilities, socialization may differ in same- and opposite-sex relationships” (Burk et al., 2012). For example, girls may be using marijuana to impress other-sex peers as they typically have more other-sex friends who are users (Poulin & Denault, 2012). However, as most of the current study's participants identified a same-sex peer as their best friend (94%), comparative analyses (i.e., same-sex friend vs. other-sex friend) could not be performed.

7. Limitations, contributions and future research directions

The current study has several limitations. First, all variables were assessed using self-report questionnaires, which can give rise to the problem of shared-method variance. This could be especially problematic for the assessment of best friend's substance use, although some authors argue that youths' perceptions of their friends' behavior are also a reliable source of information (e.g., D'Amico & McCarthy, 2006). Second, the typical reciprocity characterizing the friendship nomination procedure (i.e., each member of the dyad must name the other as their best friend) was not applied in this study. However, applying this methodological procedure constitutes a significant challenge since many adolescent friendships do not originate in the school context, especially among high-risk youths (Kiesner, Kerr, & Stattin, 2004). Third, the measure of the friendship influence processes relied solely on the perception of one member of the friendship dyad. Since convergence is moderate at best when the perception of both dyad members are assessed (Brendgen, Vitaro, & Bukowski, 2000; Poulin, Dishion, & Haas, 1999), the second member's perspective should also be accounted for in future studies. Fourth, regarding the direction of the relationship between the two influence processes and substance use, it is also possible that frequency of substance use can lead to changes in these processes over time. This possibility could not be tested here because the processes were only measured at age 15 whereas substance use was measured at ages 15 and 16. Fifth, the current longitudinal design included only two waves; assuming that changes in substance use are not necessarily linear, a greater number of time points is recommended. Moreover, a one-year lapse between assessments may be too long given that the two friendship processes are theorized to affect adolescent substance use in the short-term and not necessarily in the long-term. Finally, the homogeneity of our sample is also considered a limitation, as most participants were Caucasian (90%) and from a middle class background.

The current study also has several strengths, including the use of a longitudinal design. Moreover, the best friend's name was always inserted into the questionnaire to ensure that the participants were referring to the same friend when answering all the items. Finally, this study is also innovative insofar as it is the very first to have simultaneously examined both the friend

pressure and unsupervised co-deviancy processes in the context of the best friend relationship. Furthermore, a new questionnaire was developed and tested in a sample of 302 adolescents. A factor analysis was then conducted. Further studies are however required to examine the validity of this instrument. Future studies should also aim to investigate the linkages between these two friendship processes and other features characterizing the best friend relationship, such as friendship quality. The potential effects of both friendship influence processes on other adjustment problems such as delinquency or internalized problems should also be examined.

8. Conclusion

The current study resulted in the development of a new questionnaire aiming to assess the friend pressure and unsupervised co-deviancy processes. Furthermore, linkages between these processes and youths' alcohol and marijuana use were highlighted. Our results revealed that unsupervised co-deviancy predicted a subsequent increase in marijuana use one year later. No such effect was observed for alcohol use – the only predictor being the best friend's alcohol use status. The lack of effect of friend pressure on the youths' substance use may indicate that this influence mechanism is more likely to exert an effect within the larger peer group than within dyadic friendship settings.

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