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# **Ecstasy use by young adults: The theory of planned behavior and the ecstasy use of friends**

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# **Ecstasy use by young adults: The theory of planned behavior and the ecstasy use of friends**

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## **Abstract**

This study investigated the theory of planned behavior (TPB) with a potential moderator interaction of the ecstasy use of friends, in relation to ecstasy use of the young adult. A cross-sectional survey was completed by 384 young adults (M age = 22.56 years, SD = 1.76) to measure components of the TPB and use of ecstasy by friends and the young adults themselves. Regression analyses showed that only attitudes towards ecstasy use (of the TPB) were significantly related to ecstasy use, and this relation was fully mediated by intentions to use ecstasy. There was a significant interaction between intentions and the ecstasy use of friends: the relation between intentions and ecstasy use was significantly stronger for young adults with more friends who use ecstasy. This interaction was not significant when the ecstasy use of friends was dichotomized to having or not having friends who use ecstasy. Having friends who use ecstasy does not directly affect the relation between intentions and ecstasy use by young adults. The findings provide some support that the ecstasy use of friends is an important determinant to explain why intention leads to actual ecstasy use of the young adult.

## **Introduction**

During the 90's experimentation with illegal recreational drugs started to increase among young adults (Boys, Marsden & Strang, 2002; Marsden et al., 2006; Sterk, Theall & Elifson, 2007; Mcmillan & Conner, 2003; Yu & Ko, 2006). Ecstasy is now known as one of the most commonly taken recreational drug by young adults aged 18 to 25 years (Conner, Sherlock & Orbell, 1998; Litchfield & White, 2006; Mcmillan & Conner, 2003; Umeh & Patel, 2004). The CBS (2003) reported that within this age group, 10% of the females and 16% of the males have used ecstasy at least once. The use of ecstasy is especially widespread in clubs and parties associated with dance music (Orbell, Blair, Sherlock & Conner, 2001; Ter Bogt, Engels, Hibbel, Van Wel, & Verhagen, 2002; Ter Bogt & Engels, 2005). Aside from the fact that ecstasy is a prohibited drug in the Netherlands, its use is also associated with several health risks. For example, it increases the probability of psychopathological symptoms and deficits in neurocognitive functions (Rogers et al., 2009; Mcmillan & Conner, 2003; Umeh & Patel, 2004). At present, most experimental interventions are not able to effectively reduce drug use by young adults (Larimer, Kilmer & Lee, 2005; Lichtfield & White, 2006; Marsden et al., 2006). It's necessary to understand the determinants of ecstasy use by young adults to create more effective educational interventions (Lichtfield & White, 2006; Umeh & Partel, 2004) that will reduce ecstasy related harm (Conner et al., 1998). The theory of planned behavior is a framework that can be used to predict, understand and explain social behavior (Ajzen, 1991). The present study examines the efficacy of the theory of planned behavior in explaining the actual use of ecstasy among young adults. Furthermore, it will expand on past research by extending the theory of planned behavior and take the use of ecstasy by friends of young adults into consideration.

### **The theory of planned behavior**

The theory of planned behavior (TPB) was developed by Ajzen (1991) and has been employed as a theoretical framework to predict and explain human cognitions and subsequent behavior in a specific context. The review of Armitage and Conner (2001) indicates that the TPB accounts for respectively 39% and 27% of the variance in intentions and behavior for a wide range of behaviors. The intention to perform a behavior is the most immediate and important determinant to show the actual behavior. Intention is defined as a person's motivation and effort to engage in a behavior and is determined by three types of cognitions: attitudes, subjective norms and perceived behavioral control. Attitudes refer to a person's overall approval or disapproval of a particular behavior. Subjective norm comprises the perceived social pressure from important others. Perceived behavioral control is

conceptualized as the perceived ease or difficulty that a person has with performing a certain behavior. According to the theory of planned behavior, attitudes, subjective norms, perceived behavioral control and intentions to use ecstasy can predict the actual use of the drug by young adults. The TPB has provided sufficient evidence for its use in predicting behavior regarding substance use (Armitage, Armitage, Conner, Loach & Willets, 1999) and has been specifically applied to predict ecstasy use by young adults (Conner et al., 1998; Mcmillan & Conner, 2003; Orbell et al., 2001; Peters, Kok & Abraham, 2007; Umeh & Partel, 2004). Across these studies, attitudes were the best predictor of intentions; a person with positive attitudes towards ecstasy use has stronger intentions to using it. Subjective norms are mostly considered to be the second best predictor of intentions; a person's experience of receiving high pressure from significant others to use ecstasy leads to stronger intentions to use ecstasy (Conner et al., 1998; Orbell et al., 2001; Peters et al., 2007; Umeh & Partel, 2004). The relation between perceived behavioral control and intentions depends on the specific situation and the type of behavior (Ajzen, 1991). With regard to ecstasy use this relation is negative. Young adults who perceive that they have little control over their use of ecstasy do have stronger intentions (Conner et al., 1998). This possibly reflects the inability to refuse or withstand the drug (Orbell et al., 2001). Intentions are generally being found to be the best predictor of ecstasy use, accounting for 18% to 39.9% of the variance (Conner et al., 1998; Mcmillan & Conner, 2003). The assumption is that intentions are the immediate determinant of the behavior; when the opportunity arises the intentions will actually lead to the particular behavior (Ajzen, 1991). The influence of intentions on ecstasy use, however, also depends on the presence of other factors which may impact this relation. Reviews presume that the ecstasy use of friends is an important factor that should be taken into account when explaining the ecstasy use of young adults (Peters et al., 2007; Peters & Kok, 2009). Yet, so far, no studies have investigated these factors concurrently in the study of ecstasy use among young adults.

### **Having friends who use ecstasy**

Ecstasy seems to be a social drug (Boys et al, 2002; Peter et al., 2007), that is specifically used in a social context, mainly formed by friends (Ramtekkar, Striley & Cottler, 2011). Young adults particularly use ecstasy in the presence of their friends and they can influence each other's actual use (Martins, Storr, Alexandre & Chilcoat, 2008; Sterk et al., 2007). That is, the frequency and intensity of ecstasy use by young adults is strongly related to the ecstasy use of friends (Mcmillan & Conner, 2003; Martins et al., 2008; Sterk et al., 2007; Ter Bogt & Engels, 2005). Boys et al. (2002) found the observed use of ecstasy by peers to be the only

significant predictor of ecstasy use by the young adults themselves, besides the potential functions of the drug and the experience with negative effects. This implies that young adults in a social context wherein ecstasy is being used, probably by their friends, are expected to have higher intentions to use ecstasy themselves (see Figure 1).

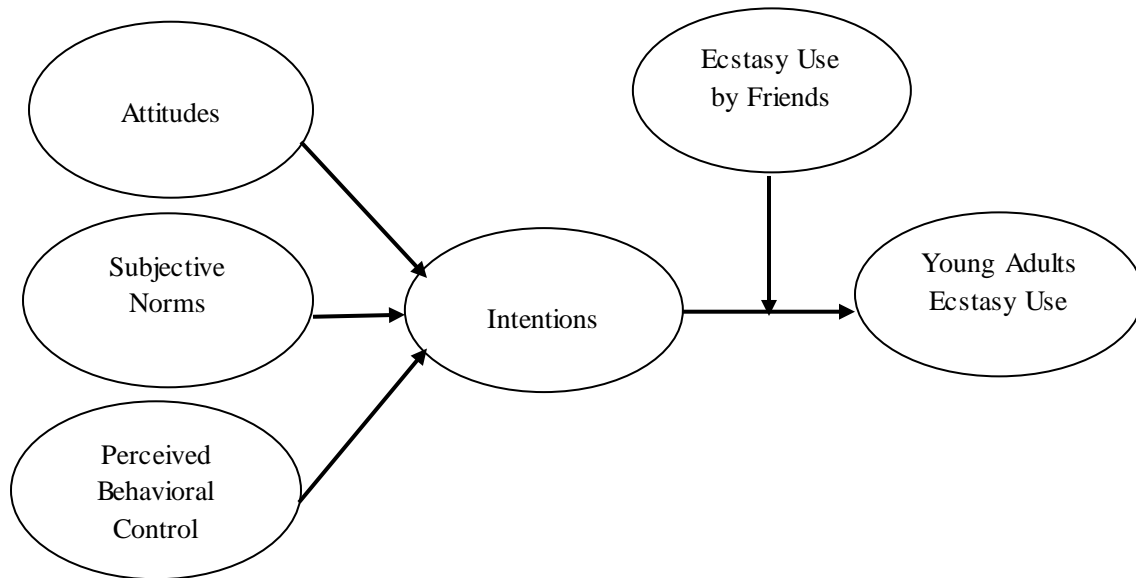


Figure 1. The theory of planned behavior to explain young adults ecstasy use with an interaction between intentions and ecstasy use by friends.

### The present study

This is the first study that examines the theory of planned behavior in combination with the influence of ecstasy using friends regarding the use of ecstasy by young adults. Intentions can be seen as immediate determinant of ecstasy use, but the ecstasy use of the young adult's friends may strengthen the impact of intentions on the actual possibility to perform the behavior.

The present study has two aims. The first aim is to assess the efficacy of the theory of planned behavior in explaining ecstasy use by young adults. In line with previous research, we expect that attitudes, subjective norms and perceived behavioral control regarding ecstasy use are fully mediated by intentions to use ecstasy. The second aim is to examine the possible interaction of intentions and the ecstasy use of friends in relation to the ecstasy use by the young adult. It is expected that the relation between intentions and ecstasy use is stronger when more friends of the young adult use ecstasy.

## Method

### Participants and procedure

A digital questionnaire was used to measure all the variables. The questionnaire was spread using social networking sites and e-mail during a one month period to reach enough young adults. This is a case of convenience sampling because the target population was readily available and convenient. Using a snowball-sampling technique ensured that an adequate amount of ecstasy users was included in the sample. This recruitment method was proven effective to generate samples from a hidden population when there is no sampling frame available (Van Meter, 1990). The target population was a minimum of 200 young adults aged between 18 and 25 years old. The aim was to create an equal number of non-ecstasy users and ecstasy users.

### Measures

The questionnaire assessed demographics, use of ecstasy by the young adult, the ecstasy use of friends and the cognitive constructs of the theory of planned behavior (TPB).

**Demographics.** The demographics were age (18-25), gender and education. Education was obtained via 8 categories: University, HBO, MBO/ROC, VWO, HAVO, VMBO, Primary education and Special education.

**Ecstasy use.** The frequency of ecstasy use was assessed with the following question: "How often have you used ecstasy?" The respondents could select answers on a scale from 0 to 40 or more<sup>1</sup>. High scores indicate frequent ecstasy use.

**Ecstasy use of friends.** Two questions for two different analyses were used to measure the ecstasy use of friends. The first question: "Do you have friends who have ever used or use ecstasy?" was limited to two answer categories, 'yes' or 'no' and is referred to as the ecstasy use of friends. The second question: "How many friends use ecstasy sometimes?" could be answered on a continuous scale from 0 to 40 or more<sup>1</sup>, and is called the amount of friends who use ecstasy.

The cognitive constructs of the TPB were operationalized with a manual explicitly designed to construct suitable questions (Francis et al., 2004) and by consulting similar studies (Mcmillan & Conner, 2003; Orbell et al., 2001; Umeh & Partel, 2004). The TPB constructs were measured in relation to expected ecstasy use over the upcoming 6 months (Mcmillan & Conner, 2003) and were rated on 8-point scales (1 = *very unlikely* or *strongly disagree* and 8 = *very likely* or *strongly agree*).

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<sup>1</sup> The scale range: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11-19, 20-39 and 40 or more. The answer possibilities have been recoded into 9 different categories for the final analyses.

**Attitudes.** Attitudes - the positive or negative evaluation of the young adult with respect to ecstasy use - were assessed with the question: "To what extent does the following value match your opinion about ecstasy use?" The 6 bipolar scales were: *good-bad*, *worthless-useful*, *enjoyable-unpleasant*, *safe-harmful*, *sociable-unsociable*, *uninteresting-interesting*. Four couples had to be reversed and all 6 items were combined and averaged to obtain an attitudes scale. The scale was reliable with an alpha coefficient of .92. A higher mean score indicates more positive attitudes towards ecstasy use.

**Subjective norms.** The subjective norms reflect the perceived pressure of important others about using ecstasy and were measured using 3 items: "Most people who are important to me approve of the use of ecstasy."; "Most people who are important to me think I should use ecstasy in the upcoming 6 months."; "I feel under social pressure to use ecstasy in the upcoming 6 months." These 3 items were combined and averaged to create the subjective norm scale ( $\alpha = .59$ ). A higher score reflects a higher perceived social pressure.

**Perceived behavioral control.** Perceived behavioral control was measured by assessing the young adult's confidence about their self-efficacy towards ecstasy use and their beliefs about their own controllability of the use of ecstasy (Francis et al., 2004). Both aspects were assessed with 4 items: "I am confident about not using ecstasy in the upcoming 6 months."; "The decision to use ecstasy is (*difficult-easy*)."; "The decision to use ecstasy is beyond my control."; "Not using ecstasy is difficult for me." The last item had to be reversed. The four items were averaged, but this resulted in a low alpha coefficient ( $\alpha = .48$ ). Removing the first item created a more reliable perceived behavioral control scale ( $\alpha = .60$ ). A higher score indicates a higher perceived behavioral control.

**Intentions.** One question and one item were used to assess the strength of intentions to use ecstasy: "How likely is it that you will be using ecstasy in the upcoming 6 months?"; "I have the intention to use ecstasy at least once in the upcoming 6 months." The two items were combined and averaged. A higher score reflects stronger intentions to use ecstasy the upcoming 6 months. The reliability of the two items was satisfactory ( $r = .93$ ).

### **Data analysis**

Three sets of hierarchical regression analyses were performed. The demographics age, gender and education were first added to the model and retained if they were significantly related to ecstasy use. The first analysis used a mediation model and tested the influence of the TPB on ecstasy use. At first, the direct relations between the cognitive constructs, attitudes, subjective norms, and perceived behavioral control on ecstasy use were tested. Subsequently, when intentions were included as a mediator variable, it may mediate the

relation between the cognitive constructs and ecstasy use (see figure 1). When this direct relation becomes less or none significant, it is a case of respectively partial or full mediation by intention. The second and third analyses examined the possible interaction between intentions and ecstasy use of friends in relation to the ecstasy use of the young adult (dichotomous and continuous). After the demographics, the two predictors were entered into the analysis followed by the interaction of these two. In the first of these two analyses the moderator was included continuously as the amount of friends who use ecstasy. In order to minimize multicollinearity between the two predictors and their interactive term, the predictors were centered and multiplied to create the interactive term. The second of the two analyses examined the dichotomized moderator.

## **Results**

### **Descriptive Analysis**

A total of 384 participants completed the questionnaire and the results of 379 participants were used in the analyses. Five participants were excluded from the analyses because they either hadn't completed the questionnaire or they had responded to all questions with extreme values. There was virtually no missing data, except for 1 participant who did not complete all the questions about attitudes with respect to ecstasy use. Ages ranged from 18 to 25 years ( $M = 22.56$ ,  $SD = 1.76$ ). A small majority of the sample was female (55.9%), had an academic background (61.5%) and had taken ecstasy at least once (52.5%). The means, standard deviations and bivariate correlations of all variables are reported in Table 1. The strongest significant positive correlation was obtained between attitudes and intentions ( $r = .77$ ,  $p < .01$ ).

### **The relation between the theory of planned behavior and the ecstasy use of young adults**

Hierarchical regression analysis was used to control for the demographics (gender, education and age). Gender ( $p < .00$ ) and education ( $p < .03$ ) were the only two demographics significantly related to ecstasy use and thereby included in further analyses. At first the cognitive constructs were regressed on ecstasy use. A significant beta value was obtained for attitudes ( $\beta = .42$ ;  $p < .00$ ), but not for subjective norms ( $\beta = .03$ ;  $p < .52$ ) and perceived behavioral control ( $\beta = -.08$ ;  $p < .09$ ) (see Figure 2). Young adults with more positive attitudes are more likely to use ecstasy.



Table 1

*Means, Standard Deviations, Bivariate Correlations of All Variables*

| Variables                         | M     | SD    | Age    | Gender | Education | Attitudes | Subjective Norms | Perceived Behavioral Control | Intentions | Young Adults Ecstasy Use | Ecstasy Use by Friends (%) | Amount of Friends Who Use Ecstasy |
|-----------------------------------|-------|-------|--------|--------|-----------|-----------|------------------|------------------------------|------------|--------------------------|----------------------------|-----------------------------------|
| Age                               | 22.56 | 1.76  | -      |        |           |           |                  |                              |            |                          |                            |                                   |
| Gender (% female)                 | 55.9% |       | -.13*  | -      |           |           |                  |                              |            |                          |                            |                                   |
| Education (%) <sup>a</sup>        | 61.5% |       | -.14** | -.11*  | -         |           |                  |                              |            |                          |                            |                                   |
| Attitudes <sup>b</sup>            | 4.40  | 1.92  | -.07   | -.32** | .09       | -         |                  |                              |            |                          |                            |                                   |
| Subjective Norms                  | 2.54  | 1.23  | .04    | -.24** | .03       | .48**     | -                |                              |            |                          |                            |                                   |
| Perceived Behavioral Control      | 7.29  | 1.03  | .03    | .08    | -.02      | -.37**    | -.39**           | -                            |            |                          |                            |                                   |
| Intentions                        | 3.81  | 2.89  | -.14** | -.19** | .03       | .77**     | .40**            | -.36**                       | -          |                          |                            |                                   |
| Young Adults Ecstasy Use          | 7.30  | 11.68 | .06    | -.29** | .13**     | .52**     | .30**            | -.26**                       | .58**      | -                        |                            |                                   |
| Ecstasy Use by Friends (%)        | 88.1% |       | -.01   | -.15** | -.04      | .41**     | .39**            | -.23**                       | .34**      | .23**                    | -                          |                                   |
| Amount of Friends Who Use Ecstasy | 12.92 | 12.65 | -.03   | -.30** | .04       | .48**     | .52**            | -.28**                       | .45**      | .55**                    | .38**                      | -                                 |

n=379, \* $p < .05$  \*\* $p < .01$ , <sup>a</sup>Total of the participants who had an academic background. <sup>b</sup>Attitudes are calculated by n=378.

Secondly, the cognitive constructs were regressed on intentions. Both attitudes ( $\beta = .74$ ;  $p < .00$ ) and perceived behavioral control ( $\beta = -.09$ ;  $p < .02$ ) contributed significantly to the prediction of intentions, with attitudes emerging as the strongest predictor. Subjective norms ( $\beta = .03$ ;  $p < .52$ ) were not significantly associated with ecstasy use. These results indicate that young adults with more positive attitudes and with a low perceived control of using ecstasy have higher intentions to use ecstasy. The cognitive constructs accounted for 59.8% of the variance in intentions to use ecstasy. Thirdly, the addition of intentions to the regression equation reduced the effect of attitudes to non-significance ( $\beta = .08$ ;  $p < .25$ ), while intentions were significantly associated with ecstasy use ( $\beta = .46$ ;  $p < .00$ ). These findings provide support for a full mediation of attitudes by intentions on ecstasy use of the young adult. All the components of the theory of planned behavior explained 38.4% of the variance in ecstasy use by young adults.

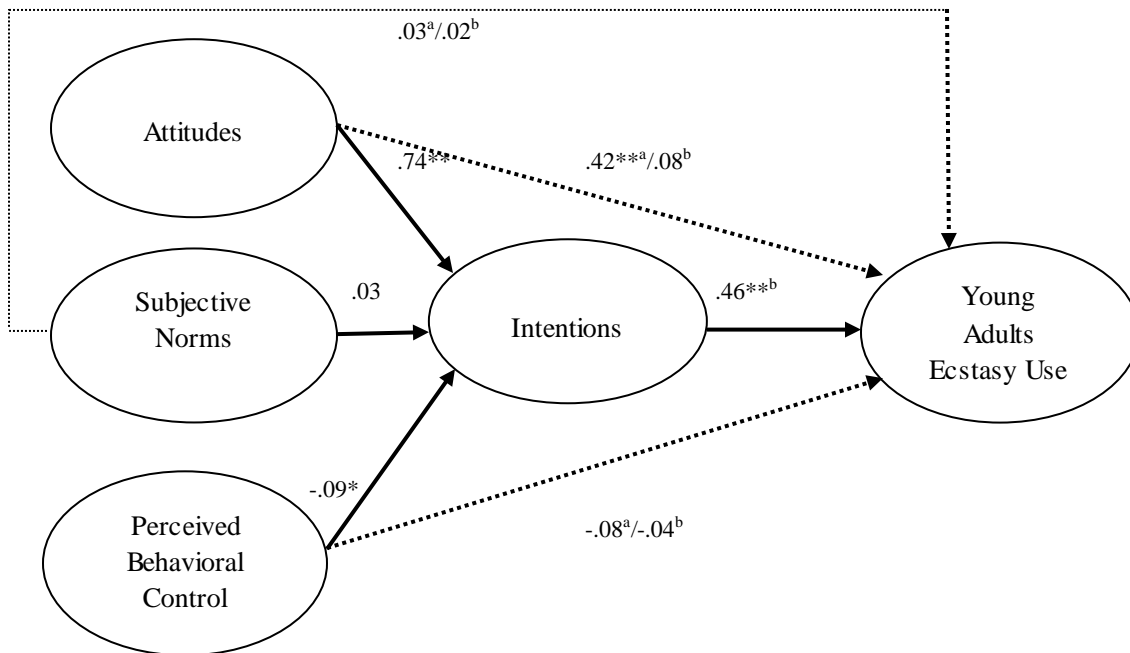


Figure 2. Mediation model with standardized regression coefficients of the TPB on ecstasy use.

<sup>a</sup> model 1 with only main effects <sup>b</sup> model 2 with mediation-effects.

\* $p < .05$ . \*\* $p < .01$ .

## The relation between intentions and ecstasy use: moderation by the ecstasy use of friends

### *Moderation by the amount of friends who use ecstasy*

A three-step hierarchical multiple regression analysis was performed to test the moderation model. As shown at step 2 in Table 2, intentions ( $\beta = .41$ ;  $p < .00$ ) and the amount of friends who use ecstasy ( $\beta = .33$ ;  $p < .00$ ) were each significantly associated with ecstasy use. These results indicate that when intentions and/or the number of friends who use ecstasy increases, young adults use ecstasy more frequently. The interactive term was entered at step 3 and was also significantly associated with ecstasy use ( $\beta = .15$ ;  $p < .00$ ). This indicates that the relation between intentions and ecstasy use is stronger for young adults who have more friends who use ecstasy.

Table 2

*Multiple Regression Analysis of Intentions and the Amount of Friends Who Use Ecstasy on Ecstasy Use by Young Adults*

| Variables                    | $\beta$ |        |        |
|------------------------------|---------|--------|--------|
|                              | Step 1  | Step 2 | Step 3 |
| Age                          | .04     |        |        |
| Gender                       | -.27*** | -.10*  | -.10*  |
| Education                    | .11*    | .10*   | .10*   |
| Intentions                   |         | .41*** | .40*** |
| Av <sup>a</sup>              |         | .33*** | .30*** |
| Intentions * Av <sup>a</sup> |         |        | .15*** |
| Model R <sup>2</sup>         | .09     | .46    | .48    |

<sup>a</sup> Av = Amount of friends who use ecstasy

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### *Moderation by having or not having friends who use ecstasy*

The moderator variable was dichotomized (no ecstasy using friends/ecstasy using friends) to perform another three-step hierarchical multiple regression analysis. At step 2, intentions ( $\beta = .56$ ;  $p < .00$ ) were significantly associated with ecstasy use, whereas the ecstasy use by friends was not ( $\beta = .02$ ;  $p < .61$ ). The interactive term (at step 3, see Table 3) was not significantly associated with ecstasy use and the inclusion of the interactive term in the model also reduced the beta value of intentions to non-significance. Having ecstasy using friends or not does not affect the relation between intentions and ecstasy use by young adults.

Table 3

*Multiple Regression Analysis of Intentions and the Ecstasy Use of Friends on Ecstasy Use by Young Adults*

| Variables                            | $\beta$ |        |        |
|--------------------------------------|---------|--------|--------|
|                                      | Step 1  | Step 2 | Step 3 |
| Age                                  | .04     |        |        |
| Gender <sup>a</sup>                  | -.27*** | -.15** | -.15** |
| Education                            | .11*    | .12**  | .12**  |
| Intentions                           |         | .56*** | .23    |
| Ecstasy Use by Friends <sup>b</sup>  |         | .02    | -.02   |
| Intentions*Ecstasy Use<br>by Friends |         |        | .35    |
| Model R <sup>2</sup>                 | .09     | .40    | .40    |

<sup>a</sup> 1 = male. <sup>b</sup> 1 = 1 or more.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

However, there is quite a big difference in the frequency of ecstasy use and size of the two defined groups. The entire group of young adults with no friends who use ecstasy ( $n=45$ ) aren't ecstasy users themselves (see Table 4). This group is fully homogeneous. The group of young adults with friends who use ecstasy is much larger in size and is split on the issue. A small minority (40.4%) in this group has never used ecstasy, but has friends who did. The mean score of intentions to use ecstasy also differs significantly between the two groups ( $t(259) = -15.78, p < .00$ ).

Table 4

*Frequencies and Rates of Ecstasy Use and Mean Scores of intention in Two Different Groups: Young Adults With and Without Friends Who Use Ecstasy.*

| Amount of<br>Friends Who Use<br>Ecstasy | Young Adults Ecstasy Use |                       |            | Intentions <sup>a</sup> |      |
|---|--------------------------|-----------------------|------------|-------------------------|------|
|   | Never<br>Used            | Used at least<br>once | Total      | M                       | SD   |
| 0                                       | 45 / 100%                | 0 / 0%                | 45 / 100%  | 1.12                    | .75  |
| $\geq 1$                                | 135 /<br>40,4%           | 199 / 59,6%           | 334 / 100% | 4.17                    | 2.88 |

$n=379$  <sup>a</sup> Likertscale of 1-8.

## Discussion

The purpose of this study was to assess the efficacy of the theory of planned behavior (TPB) concerning ecstasy use of young adults and to which extent the use of ecstasy by friends affects the relation between intentions and ecstasy use. The results partially support the TPB in predicting intentions and ecstasy use. Attitudes and perceived behavioral control (not subjective norms) contributed significantly to the prediction of intentions and only attitudes were also significantly associated with ecstasy use, but fully mediated by intentions. In addition to providing further support for the TPB, this study also shows that the relation between intentions and ecstasy use becomes stronger as the number of friends who use ecstasy increases. Having at least one friend who uses ecstasy does not affect this relation.

Consistent with past studies, intentions remain the strongest predictor of ecstasy use (Conner et al., 1998; Mcmillan & Conner, 2003). Moreover, the relation between attitudes and ecstasy use was fully mediated by intentions. In predictions of intentions, attitudes were the best predictor, with perceived behavioral control (negatively) also significantly contributing (Conner et al., 1998; Orbell et al., 2001; Peters et al., 2007; Umeh & Partel, 2004). However, in contrast with past studies, subjective norms were not significantly associated with intentions. This can be explained by the use of multiple-item measures of subjective norms, while generally a single item is used (for instance in: Lichtfield & White, 2000). The present findings suggest that the TPB is useful in explaining ecstasy use by young adults, with an important role for the attitudes and intentions to use ecstasy.

The moderating effect of the amount of friends who use ecstasy on the relation between intentions and ecstasy use indicates the importance of this determinant in predicting ecstasy use. Intentions were more strongly associated with ecstasy use among the young adults with a higher amount of friends who use ecstasy. This, and the fact that there was not one young adult in this study who used ecstasy but did not have any friends who used, confirms the assumption that ecstasy is most often used within a social context that specifically contains friends who use ecstasy (Martins et al., 2008; Ramtekka et al., 2011; Sterk et al., 2007). However, if a distinction is made between having no friends or at least one friend who uses ecstasy, the moderating effect was not significant. Having one or more friends who use ecstasy is not paramount in the decision of the young adult to use ecstasy. Hussong (2002) reported a similar result with adolescents and substance use. When adolescents experience substance use in different friend contexts they show a greater risk for substance use themselves. Adolescents with both substance-using best friends and other close friends who were less involved with substances showed a reduced risk for own substance use (Hussong,

2002). As more friends within the social network of the young adult use ecstasy, the risk of own use increases while retaining close friends who don't use ecstasy reduces this risk. Thus, the amount of friends who use ecstasy is an important determinant for ecstasy use of the young adult. But this influence can be reduced when close friends who don't use ecstasy remain important to the young adult.

Furthermore, it could be that having more friends that use ecstasy, in comparison to (the category of) having at least or only one friend that uses the drug, increases the possibility of the young adult's best friend being an ecstasy user. Previous studies show that for both adolescents (Hussong, 2002; Urberg, 1992, Urberg, Degirmencioglu & Pilgrim 1997) and young adults (Andrews, 2002) the substance or drug- use of best friends is a strong predictor of own substance or drug-use. Support for this assumption can be found in socialization or selection processes: socialization is characterized by mutually influencing one another within existing friendships, while selection reflects prior similarity as starting point to select each other as friends (Kandel, 1978, 1985). While, during adolescence, both socialization- and selection processes considering substance use form friendships, as well as influence them (Andrews, 2002; Ennett & Bauman, 1994; Kandel, 1985; Kiuru, 2010; Urberg et al., 1997), the present study suggests that these processes are less significant in young adulthood. Similarity in the use of ecstasy is not obvious in every friendship between young adults. The quality of the friendship may determine if socialization between friends considering the use of hard drugs takes place (Andrews, 2002).

When socialization in ecstasy use has occurred among best friends, selection processes may lead to an increase of ecstasy using friends. Ecstasy is generally used at dance parties (Orbell et al., 2001; Ter Bogt et al., 2002, Ter Bogt & Engels, 2005) and through social segregation processes substance users affiliate with each other (Kiuru, 2010). The social network of the young adult thus expands with ecstasy-using friends and it's reasonable to assume that this results in a stronger intention and more opportunities to use ecstasy. Differing from adolescents, young adults seem to first influence each other in the use of ecstasy through socialization after which selection may occur when the young adult becomes associated with the party scene where ecstasy is used.

In sum, socialization of ecstasy use in quality friendships may lead to the actual use of the drug by the young adult. The amount of ecstasy using friends then increases through selection. It depends on the quality of the friendship with friends who use ecstasy and friends who don't use ecstasy, whether or not the young adult decides to use the drug him- or herself.

## **Limitations**

Three limitations should be taken into consideration in interpreting the findings of this study. First, the results are cross-sectional and this limits the ability to presume causal relations. However, in previous studies the TPB in relation to ecstasy use by young adults has been longitudinally supported (McMillan & Conner, 2003; Orbell et al., 2001), so there is reason to assume that the mentioned relations between the variables are being interpreted correctly. Second, the results can't be generalized to all young adults in the Netherlands. The percentage of young adults having used ecstasy in the current study is much higher compared to the actual population, 52,5% versus 16% of the males and 10% of the females (CBS,2003). The high percentage of ecstasy users may have originated from the use of a snowball method. Most likely this caused a selection-effect. Considering the importance of including a sufficient number of ecstasy users, using the snowball method is proven effective when trying to reach a hidden population (Van Meter, 1990). Third, the measures employed were all self-report measures, which might have led to socially desirable answers. However, the constructs of the TPB predict 11% more of the variance in behavior when using self-report measures over objective or observed measures (Armitage & Conner, 2001).

## **Implications**

The results of the study clearly suggest that the ecstasy use of friends is an important determinant in predicting ecstasy use by young adults, especially when the number of friends who use ecstasy increases. It is important to examine if the ecstasy use of a best friend plays a significant role and to find out how it possibly stimulates or reduces the risk of using ecstasy by young adults. Further research is required to determine which aspects of the quality of the friendship are decisive for the young adult to perform and follow the behavior of using ecstasy.

Moreover, the study demonstrates that having friends who use ecstasy does not always predict the ecstasy use of the young adult. Some young adults may have strong personal considerations when deciding to use ecstasy. Previous studies mainly focused on the reasons of current or former ecstasy users (Boys et al, 1999, 2001, 2002; Conner et al., 1998; Peters et al., 2007; Sterk et al., 2007; Ter Bogt et al., 2005; Yu & Ko, 2006). Preventive interventions are commonly designed to create awareness of social and health risks associated with ecstasy use, because young adults who use ecstasy perceive this as the most negative effect of ecstasy (Kurtz, 2012; Lichtfield & White, 2006; Marsden et al., 2006; Peter et al.; 2007). But it's also necessary to examine why some young adults choose not to take ecstasy. Only a small number of studies investigated what motivates young adults in deciding not to use ecstasy.

Reasons mentioned in those studies ranged from rationality, lack of opportunity and fear of the effects of ecstasy (Vervaeke, Benschop & Korf, 2008) to a perceived lack of enjoyment (Rosenberg et al., 2008). However these studies failed to provide adequate evidence for these motivations when taking the effect of friends who either use or don't use into account. Further research therefore needs to combine the personal motivations and the ecstasy use of friends to create a complete overview of the reasons whether or not someone decides to use ecstasy. A clear understanding of the decisive factors to abstain from the use of ecstasy in combination with the ecstasy use of friends might lead to better methods of prevention regarding new generations of young adults with more exposure to ecstasy than is the case today.



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