Chapter 9 Determinants of ecstasy testing: informing evidence-based intervention development

Ecstasy use is prevalent [38; 39] and potentially damaging to health [20; 36; 37]. To minimize this damage, harm reduction interventions may prove more beneficial than interventions promoting abstinence [35; 114; 147; 159]. An important harm reduction practice that reduces ecstasy-related harm is ascertaining pill content, as dangers of ecstasy use are exacerbated by the fact that pills sold as 'ecstasy' can contain several substances and doses thereof [133]. In the Netherlands in 2006, less than 90% of the tested pills was pure (i.e. contained exclusively 3,4-methyldioxymethamphetamine (MDMA), the active component of 'ecstasy'), in doses ranging from a few milligrams to over 200 milligrams, with a mean of 78 milligrams [127]. Using untested pills creates risks by potentially exposing users to unexpected or unwanted drugs or even poison, or to doses that can be considerably higher then what those users are used to.

Despite these risks and variations in content and dose, in 2006 only 3,656 pills were tested [127], whereas most Dutch studies find that two-thirds of a dance event's visitors use ecstasy [8; 13; 74; 86; 112], and it is estimated that in the Netherlands, even the large dance events alone already host between seven and eight hundred thousand people yearly [11]. Thus, it appears desirable to increase ecstasy testing, and behaviour change interventions targeting the relevant modifiable determinants may achieve this [2]. However, evidence-based intervention development is precluded by the paucity of quantitative research on determinants of ecstasy testing. The current paper reports the results of two studies addressing this caveat.

Although ecstasy users try to determine pill content and purity with a host of different methods [161], only laboratories can provide certainty as to pill content and dose of MDMA [162]. In addition to this direct benefit, pill testing programs provide a number of indirect benefits, such as providing a channel

for communication of other harm reduction messages, allowing immediate initiation of warning campaigns in the case of detection of poisonous pills, and enhancing surveillance of drug markets [161; 162]. However, even in those countries where testing agencies exist (e.g. the Netherlands [162] and France [163]), no studies have identified psychosocial correlates of pill testing. A qualitative study by Benschop, Rabes and Korf [162] among ecstasy users showed that 85% of participating ecstasy users had their pills tested because they wanted to know the pill contents, 60% because of warnings, 50% had concerns about health, and 34% wanted to know if their dealer could be trusted. The most frequently mentioned reasons to not have ecstasy tested were: trust in dealer (57%), 'haven't come around to it yet' (48%), no testing facility nearby (36%), location testing facility unknown (36%), worries about anonymity (26%), intention to use ecstasy regardless of test results (26%) and 'it's exciting not to know what effect you'll get' (25%). These reasons have been supported by another Dutch qualitative study [147]. A number of international studies have addressed pill testing as one of several harm reduction strategies[80; 137]. A recent review [114] summarised the following reasons to get ecstasy tested: avoiding negative side-effects, minimizing the 'come-down' and neurotoxicity, and avoiding a 'bad pill'. However, self-reported reasons need not predict behaviour or intention: the same review reported reasons for using ecstasy that a recent meta-analysis [35] found to be unrelated to intention to use ecstasy. In addition, these studies did not assess association strength with intention or behaviour, and therefore cannot sufficiently guide intervention development. The studies reported in the current paper address this gap.

Planned behaviours such as testing (for the sake of brevity and readability, 'testing ecstasy' or simply 'testing' will be used when the behaviour 'getting ones ecstasy tested at a test-service' is meant; likewise, when 'behaviour' or 'intention' are used without specification, they concern testing) are predicted by determinants postulated in the Theory of Planned Behaviour (TPB; [30; 33; 41; 46; 164]). The TPB posits intention as proximal cognitive determinant of behaviour. Intention, in turn, is predicted by attitude (i.e. evaluation of the likelihood and desirability of that behaviours consequences), subjective norm (i.e. perception of others' approval of the behaviour) and perceived behavioural control (PBC, i.e. perception of control based on perception of skills and external obstacles/facilitators, also known as self-efficacy [30]).

In addition to measuring these traditional TPB variables, three additional social cognitive variables that earlier research found related to ecstasy use were

measured. Although using ecstasy is a different behaviour then getting ecstasy tested, nonetheless this research is the best available indication as to which determinants may be relevant. Subjective descriptive norm is an extension of the traditional subjective normative construct and addresses the perceived behaviour of social referents (see [142]; for its role in ecstasy use, see [56; 58]). Anticipated regret (or affect) refers to the amount of negative emotions one experiences when prospectively imagining not having performed the target behaviour (see [143; 144]; for its role in ecstasy use, see [59]). Habit has also been found related to ecstasy use (see [60]), and though habit is often not considered something health promotion interventions can change, a recent paper [77] on potential changeability of habit supports explorative inclusion in the current study. Finally, because personality may play an important role in explaining behaviour [165], has been found to be related to ecstasy use [74], and may likewise be relevant for getting ecstasy tested, the Big Five Index was also included [BFI; 166; 167].

Because this was the first study into the determinants of ecstasy testing, little was know about the applicability of the TPB and other theories that posited the measured variables at the time of study design, and related to this, the many measured variables necessitated leaving out other variables. Therefore, we reserved the possibility to include additional exploratory items at the third measurement, which were generated after and based on the results of the first measurement. Regarding testing, a number of qualitative questions were asked and some additional attitudinal beliefs, willingness to use untested ecstasy, and risk perception were measured. Sensation seeking [168] and impulsiveness [169] were also included, to see whether the independence of these constructs with testing that was found by Benschop et al. [162] would be replicated. For the sake of clarity, these additional exploratory variables measured at the third measurement will be reported as study 2, whereas the analyses of the TPB variables, measured at the first and second measurements, will be described as study 1.

Method

Procedure

An online questionnaire study was conducted, as the internet has been argued to be a suitable medium when studying hidden populations such as non-misusing illicit drug users [149]. Participants were recruited by links at several

dance-related Dutch websites (most participants came from the online community at http://partyflock.nl). The online questionnaire was administered online by a self-chosen virtual interviewer in a Flash interface [150; also see 151]. To activate the proper context for respondents, the interview took place to the background of several party pictures while dance music was playing. Server-side parsing of the content (using PHP and MySQL; see [152]) enabled tailoring of the questionnaire to the respondent (i.e. presentation of every item depended upon previous answers).

This possibility to tailor the questionnaire enabled data collection for several behaviours that are related to ecstasy use. Only results pertaining to testing will be reported here, and therefore only methodological details relevant to these results. At the first measurement (t_1), participants provided informed consent in a way approved by our university's Psychological Ethics Committee. Then, demographics, drug use, and party behaviour were measured for all participants, after which a subsample of participants answered questions about the intention to get ecstasy tested and the underlying determinants (the other participants answered questions about the determinants of other behaviours).

After three months, participants could access the follow-up measurement (t_2), where their testing behaviour and intention were measured, and for participants with a low intention, the reason why they did not intent to get their ecstasy tested. Five months later (logistical problems delayed this follow-up two months), participants could access the second follow-up measurement (t_3), where again behaviour and intention were measured, in addition to impulsiveness and sensation seeking, and a number of behavioural willingness and perceived risk measures. Participants were attended to the follow-ups by e-mail, and six weekly reminders were sent out.

Measurements study 1

At the first measurement (t_1), *demographic variables* (gender, age, education and urbanity), *drug use* and *party visiting frequency* were measured with one item each. *Personality* was measured using the Big Five Index [166; 167]. These variables will hereafter be referred to as distal variables, as they are assumed to be more cognitively distant from intention and behaviour than the specific social cognitive variables, which will therefore be referred to as proximal variables. *Behavioural intention to get ecstasy tested* was measured with two items (i.e. 'imagine that in three weeks, you want to use ecstasy at a party, and you already have the pills. Would you get your ecstasy tested?', followed by 'do you think that you would indeed do that?', both with answer options

absolutely not–absolutely; range 1-5). *Attitude* was measured with five semantic differentials (i.e. 'I think that testing is/would make me ...', unpleasant-pleasant, bad-good, unwise–wise, not nice-nice, unhappy-happy; range 1–5). *Subjective norm* was measured by multiplying an item tapping injunctive subjective norm (e.g. 'how would your parents feel if you were to test?', disapproving–approving; range -2–2, also included an option 'I don't know' with the same value as option 'neutral', i.e. 0) with an item tapping motivation to comply (e.g. 'how important do you find your parents' opinion about whether you test?', very unimportant–very important; range 1–5) for best friend, other friends, and parents, and dividing the product by 5 to get a range of -2–2. *Perceived behavioural control* was measured with two items (i.e. 'does it seem easy to you to test?', 'do you think you would manage to test?', absolutely not–absolutely; range 1–5).

Subjective descriptive norm was measured by three items about the behaviour of one's best friend, friends with whom one attended parties, and other friends (e.g. 'do you think your best friend tests?', absolutely not–absolutely; range 1–5) with the request to give an estimate when this was not known. *Prototype* was measured by one item (i.e. 'I think that testing has a positive image at parties', absolutely not–absolutely; range 1-5). *Anticipated regret* was measured by three items (i.e. 'imagine that you're at a party, you didn't test, but you want to take a pill. Imagine how you would feel. Would you [regret, worry about, feel guilty about] not having tested?', not at all–very much; range 1–5) and *habit* was measured by two items (i.e. 'is testing [a habit of yours, something you do automatically]?', absolutely not–absolutely; range 1–5).

At the second (t_2) and third (t_3) measurements, *intention* was measured with the first intention item used at t_1. The *behaviours of using ecstasy and testing ecstasy* were measured with one item each (i.e. 'since the last questionnaire, how often have you [used/tested] ecstasy?'; participants typed in a number). At the second measurement, after intention had been measured, low-intenders were asked to specify the *reason for their low intention* using a forced-choice format with the options in Table 9.3. Reliabilities of personality and cognitive variables are listed in Table 9.2. An earlier study found that regarding ecstasy use, subjective norm pertaining to parents is generally irrelevant [35]. It seems that this may be because 43% did not know their parents' position, as opposed to 3% for best friend and 9% for other friends. Parental norm was therefore not combined into the subjective norm scale.

Measurements study 2

A number of additional variables was explored at the third measurement. The BSSS [168] was administered to assess *sensation seeking* (8 items, $\alpha = .73$) and the BIS-11 [169] to assess *impulsiveness* (30 items, $\alpha = .81$). Also, a number of beliefs (see Table 9.5) were measured, generated on the basis of a qualitative study [for details, see 147], and the percentage of the ecstasy estimated to be pure was measured (i.e. unadulterated). Furthermore, exploratory *behavioural willingness* variables were measured ('imagine that you would want to use ecstasy at a party, but you did not get it tested. Would you be willing to use the ecstasy nonetheless?' and six items consisting of the leading statement 'imagine that you wanted to get your ecstasy tested, but you didn't. Would you be willing to use ecstasy if . . .' followed by 'a friend offers it to you', 'the friend tells you that the ecstasy has been tested', 'the friend already used the ecstasy him/herself', and the same three statements for 'a stranger' rather than 'a friend'), as well as willingness to get ecstasy tested at a party ('imagine that you wanted to get your ecstasy tested before a party, but circumstances prevented this. Would you get your ecstasy tested at the party?'). Participants were also asked whether they had ever gotten their ecstasy tested (not just in the past three months), and if not, why not, and whether they knew where they could get ecstasy tested. They had the opportunity of being sent extra information (their response was stored). Finally, *perceived risk* of using ecstasy, using tested ecstasy, and using untested ecstasy were measured ('if I use [ecstasy, tested ecstasy, untested ecstasy], this is…', completely harmless–very harmful; range 1–5).

Analyses

As Cohen argued, "the primary product of a research inquiry is one or more measures of effect size" [153, p. 1310]. Especially with large samples, trivial associations can become significant. Therefore, rather than their significance, associations' meaningfulness will guide the discussion of the results. Associations are considered meaningful when they are non-trivial. We distinguish five levels of association strength (effect size): trivial, weak (Cohen's d > .2; Pearson's r > .1; Cramer's V > .1; odds ratio > 1.5; omega squared (ω^2) = .01), moderate (Cohen's d > .5; Pearson's r > .3; Cramer's V > .3; odds ratio > 2.5; $\omega^2 = .06$), strong (Cohen's d > .8; Pearson's r > .5; Cramer's V > .5; odds ratio > 4; $\omega^2 = .14$), and very strong (Cohen's d > 1.3; Pearson's r > .7; Cramer's V > .7; odds ratio > 10) [70; 109; see also 154; 155]. For the significance tests of bivariate associations between one dichotomous and one continuous variable, the t-test

for unequal variances will be used (in recognition of the issues pointed out by Ruxton [156]).

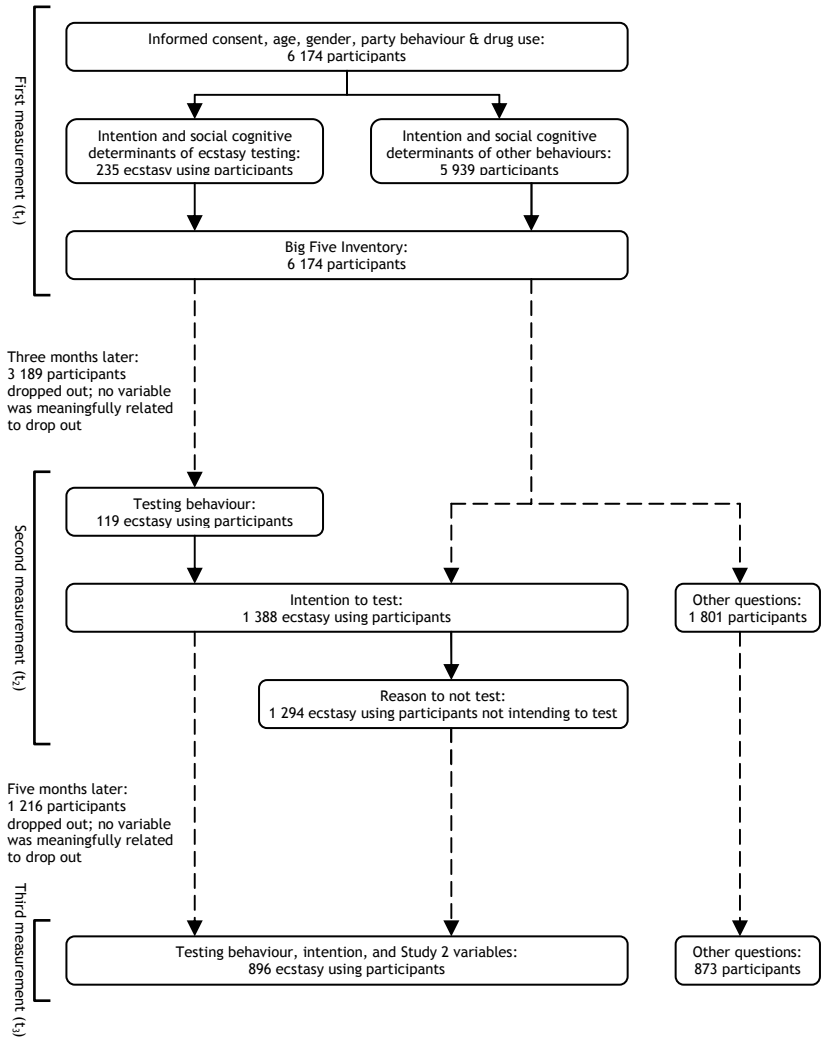

Figure 9.1: Procedure of the questionnaire.

Results

Results study 1

At t_1, 6 174 non-users, ecstasy users and ex-users participated (see Figure 9.1). Of these, 235 ecstasy users participated in the ecstasy testing subsample. At t_2, the testing behaviour of 119 of these 235 ecstasy users was measured. In addition, the testing intention of 1 388 ecstasy users was measured, and for the 1 294 ecstasy users with a low intention the reason for that low intention was assessed. Drop-out analyses for demographic variables, used drugs, and party behaviour showed no variables to be significantly and meaningfully associated to whether participants dropped out at t_2 or t_3 (largest Cohen's d = -.165 for age, largest OR = .708 for education).

Of the 119 of the 235 participants in the ecstasy testing subsample for whom behaviour was measured at t_2, 102 (86%) had used ecstasy in the past three months (and could therefore have tested that ecstasy prior to use). However, 91 participants had not gotten their ecstasy tested (of those who did, 8 participants got their ecstasy tested once, 2 participants twice, and 1 participant three times), a distribution which prohibits multivariate analyses. To be able to assess the association between intention at t_1 and subsequent behaviour, we compared those who had not tested with those who had. This revealed a very strong significant association between intention and subsequent behaviour ($d = 3.6$, $p < .001$, see Table 9.1), which was confirmed by the very strong association between intention at t_2 and behaviour at t_3 (2.07 vs. 3.86; $d = 1.95$, $p < .001$, $n = 646$ vs. 111; 56 vs. 9 of these participants had provided data about testing at t_1). A logistic regression with only intention as predictor of behaviour showed that a one-fifth increase in intention made the odds of getting ecstasy tested four times as big ($OR(t_1\text{-}t_2) = 15.2$, $p < .001$; $OR(t_2\text{-}t_3) = 3.9$, $p < .001$). Thus, study of intention's determinants seemed expedient.

The subsample of 235 participants that was examined at t_1 is described in Table 9.1. Age, club/small party visiting frequency, speed, psilocybin and ketamine use, age of first ecstasy use, ecstasy consumption both per year and at a party, and absolute frequency of use all had significant bivariate associations with intention to test. Age, cannabis use, ecstasy consumption at a party and last use occasion had significant bivariate associations with ecstasy testing. Of the personality variables reported in Table 9.2, only conscientiousness was bivariately associated to intention to test with a weak association. All traditional TPB variables (attitude, subjective norm and PBC) were significantly associated

Table 9.1: Means (standard deviations provided in parentheses) of distal variables, and their association with intention and behaviour.

	Univariate summary at t_1 (n = 235)	Association with intention at t_1 (n = 235)		Association with behaviour at t_2 (n = 102)	
Variable name/categories	**% or mean**	**Unit**	**Value**	**Unit**	**Value**
Age in years	25.13 (6.41)	r	.23***	d	1.13*
Gender (being female)	40%	d	.09	OR	1.75
Higher educated	53%	d	.04	OR	.90
Visits a big party twice a year or less	20%	ω^2	.01	V	.18
- every two to six months	59%				
- every month or more	21%				
Visits a club/small party bimonthly	34%	ω^2	.04**	V	.18
- every two to four weeks	47%				
- every week or more	19%				
Alcohol use	83%	d	-.20	OR	.32
Tobacco use	65%	d	-.24	OR	.33
Cannabis use	51%	d	-.14	OR	.18*[1]
Speed use	43%	d	-.45***	OR	.25
Cocaine use	43%	d	-.22	OR	.32
GHB use	18%	d	.01	OR	2.03
Poppers use	9%	d	-.03	OR	1.09
Nitruous oxide use	7%	d	.50	OR	1.20
Psylocybin use	4%	d	-.49*	OR	.89
Ketamine use	6%	d	-.57***	OR	.88
LSD use	1%	d	-.68	OR	.89
Age of first ecstasy use in years	19.70 (5.58)	r	.24**	d	1.29**
Duration of ecstasy use in years	5.43 (4.14)	r	.05	d	-.02
Ecstasy consumption in lifetime[2]	258.56(474.19)	r	-.08	d	-.31
Ecstasy consumption per year[2]	48.75 (71.88)	r	-.18**	d	-.24
Ecstasy consumption at one party[2]	2.57 (1.50)	r	-.28**	d	-.45*
Uses ecstasy three times a year or less	18%	ω^2	.04*	V	.22
- every two to three months	25%				
- every one to two months	24%				
- one to three times a month	24%				
- once a week or more	9%				
Uses ecstasy at a party (almost) never	9%	ω^2	.01	V	.15
- sometimes	14%				
- about half the time	14%				
- often	17%				
- (almost) always	52%				
Last use occasion < 2 weeks ago	46%	ω^2	.02	V	.33*
- 2-4 weeks ago	17%				
- 1-2 months ago	21%				
- 3-6 months ago	11%				
- > 6 months ago	5%				

[1] This was the only valid significance test of chi-square (i.e. no cells with an expected count of less than 5), [2] in pills.

to intention to test, but only attitude strongly. PBC was associated moderately to intention, and subjective norm weakly. Only attitude and PBC were also associated to testing behaviour, both with strong associations. All additional social cognitive variables were significantly and strongly or very strongly associated to both intention and behaviour.

In addition to these social cognitive determinants, the reasons to not test ecstasy were assessed at t_2. The frequencies are shown in Table 9.3: over half of the participants indicated not to test because they trust their dealer or producer (52%), whereas 17% did not know where to get their ecstasy tested, and 3% worried about anonymity. Though significance of an analysis of variance of intention indicated an association between reason and intention, it was a weak association ($\omega^2 = .039$, $p < .001$, $n = 1\,294$).

In order to determine to what degree the measured determinants predict intention, a hierarchical regression analysis was conducted, modelling intention

Table 9.2: Measured personality and social cognitive variables, reliabilities, and associations to intention and behaviour.

	Scale information at t_1 (n = 235)			Association to intention at t_1 (n = 235)	Association to behaviour at t_2 (n = 102)
Variable	**k**	**α**	**Mean**	**r**	**d**
Variables measured at t_1					
Personality (Big Five Index)					
Openness	10	.78	3.72 (.64)	.12	-.32
Conscientiousness	9	.80	3.26 (.65)	.23***	.69
Extraversion	8	.82	3.86 (.66)	.00	.22
Agreeableness	9	.72	3.65 (.57)	.05	-.02
Neuroticism	8	.78	2.55 (.67)	-.08	-.18
Specific cognitive (traditional TPB)					
Intention	2	.92	2.25 (1.12)	-	3.62***
Attitude	5	.75	3.85 (.72)	.52***	1.10***
Subjective norm	2	-[1]	.74 (.60)	.20**	-.08
Subjective norm (parents)	1	-[1]	.24 (.77)	.19**	.20
Perceived behavioural control	2	.85	3.77 (1.19)	.31***	1.06***
Specific cognitive (additional)					
Subjective norm (descriptive)	3	-[1]	2.31 (1.09)	.57***	1.43**
Anticipated regret	3	.90	1.55 (.82)	.64***	2.50**
Habit	2	.95	1.70 (1.06)	.74***	5.13***

[1] Because subjective norm measures are indices rather than scales, the different items are not assumed to measure the same variable. This violation of the assumption of parallelity prohibits calculation of Cronbach's alpha. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 9.3: Reasons to not get ecstasy tested (t_2, n = 1294).

Reason	%	Mean intention	Standard deviation
I don't know where I can get my ecstasy tested	17	2.18	.80
I always buy from a producer	4	2.24	.91
My dealer always buys from a producer	4	2.00	.76
My dealer always gets it tested	12	2.47	.91
I trust my dealer	39	1.94	.72
I fear that the testing is not anonymous	3	2.00	.84
Different reason	22	2.10	.83

as a function of the variables in Table 9.1 and Table 9.2. In the first block, of the distal variables in Table 9.1 and the personality variables, those that were significantly associated with intention were entered, and in the second block, those that did not achieve significance were removed again. In the third block, the traditional TPB measures were entered, and in the fourth block, the additional social cognitive measures. Habit was entered in the fifth block to provide insight into the predictability of intention without this potentially hard-to-modify determinant. The results of the last four blocks are shown in

Table 9.4: Prediction of intention to get ecstasy tested from distal variables (block 2), traditional TPB variables (block 3), additional social cognitive variables (block 4), habit (model 5) at t_1, n = 235.

Variable	Block 2	Block 3	Block 4	Block 5
Standardized betas of:				
Age of first use	.19**	.140*	.04	-.02
Ecstasy consumption at one party	-.13*	-.06	-.03	-.03
Absolute frequency of ecstasy use	-.22****	-.17**	-.10*	-.11**
Conscientiousness	.20***	.13*	.10*	.04
Attitude		.36****	.15**	.10*
Subjective norm		.05	.03	.02
Subjective norm (parents)		.07	.04	.04
Perceived behavioural control		.17**	.12**	.07
Descriptive subjective norm			.23****	.13*
Anticipated regret			.39****	.20****
Habit				.45****
R^2	.17	.37	.57	.66
R^2 change	-.02	.21	.20	.09
F of change	.95	18.5****	50.7****	59.0****
Df (change)	6	4	2	1
Df (error)	224	226	224	223
Lowest tolerance	.91	.74	.63	.45

* p < .05, ** p < .01, *** p < .001, **** p < .0001.

Table 9.4. In the final model, 66% of intention was explained. To check the predictive value of the TPB alone, another regression analysis was run with only the traditional TPB variables, where the TPB explained 30% of the variance in intention, with attitude and PBC as significant predictors ($\beta_{attitude}$ = .45, β_{PBC} = .17).

Results study 2

Because study 1 was the first study into the determinants of getting ecstasy tested, we addressed the relevance of a number of additional variables at the third measurement in an exploratory manner in order to guide future research. A number of beliefs associated to testing ecstasy were measured, and participants' responses and the associations to intention are shown in Table 9.5. Only the beliefs that testing ecstasy helps/is safer and that ecstasy is tested anonymously were associated to intention, and only moderately and weakly, respectively (see Table 9.5).

At t_3, 896 ecstasy users provided useful data. Of these, 35% had ever tested their ecstasy. This group had a significantly higher intention to test than those who had never tested before (2.0 vs 3.2; d = 1.3, p < .001). Of those who had not tested, 40% knew where they could get their ecstasy tested, but this knowledge was not associated to intention to test ecstasy. Of those who did not know, 57% (134 participants) opted to receive an e-mail with a link to this location, but this was again unrelated to intention. On average, the 896 participants estimated that 36% of the ecstasy out there was pure, which was significantly but weakly associated to intention (r = .18, p < .001).

Table 9.5: Beliefs about getting ecstasy tested (t_3, n = 896).

	Percentage of chosen answers					Association with intention
Belief	**1**	**2**	**3**	**4**	**5**	**r**
Testing helps/is safer[1]	2%	3%	15%	44%	37%	.32***
Most ecstasy out there is pure[1]	18%	41%	32%	8%	1%	.06
If ecstasy is not pure, it contains poison[1]	11%	33%	44%	11%	2%	-.04
If ecstasy is not pure, it is less good for your health[2]	6%	16%	44%	27%	8%	.03
Ecstasy is tested anonymously[2]	3%	5%	21%	36%	36%	.16***
Ecstasy is tested for free[2]	9%	9%	27%	27%	29%	.02

[1] The numbers 1-5 represent respectively completely disagree, disagree, neither agree nor disagree, agree and completely agree, [2] The numbers 1-5 represent respectively absolutely false, probably false, don't know, true and absolutely true, *** p < .001.

In a situation where participants ended up at a party with untested ecstasy, 17% would not test at the party and 66% would (17% was unsure). Participants' willingness to use untested ecstasy in seven different situations is shown in Table 9.6. Only 8% was unwilling, while 81% was willing, to use untested ecstasy. Willingness increased even further when the ecstasy was offered by a friend, and 91% was willing to use ecstasy offered by a friend who had already used that same ecstasy. Participants were less eager when ecstasy was offered by a stranger, but still, 22% was willing to use ecstasy if the stranger claimed to have used it already. Even among participants with a high intention (four or higher on the five-point scale; indicating that they would 'probably' get their ecstasy tested), 46% was willing to use untested ecstasy, and 82% was willing to use ecstasy when a friend claimed he/she had already used it (see Table 9.6).

Sensation seeking was not ($r = -.046$, $p = .17$, $n = 896$), and impulsiveness weakly ($r = -.125$, $p < .001$, $n = 896$) associated to intention. Mean perceived risk of using ecstasy was 3.0 (corresponding to 'quite harmful' on the original 5-point scale). The perceived risk of using tested ecstasy was also 3.0, but the perceived risk of using untested ecstasy was 3.3 (smallest paired $t[895] = 9.2$, $p < .001$), indicating that any given ecstasy pill was considered equally harmless or harmful as tested ecstasy, unless it was explicitly stated that the pill was not tested.

Table 9.6: Percentages of testing-related willingness in different situations (t_3) for all participants and those with a high intention (4 or higher).

	All participants (n = 896)			High intention subset (n = 159)		
Willingness to use untested ecstasy at a party if…	**No[1]**	**Maybe**	**Yes[2]**	**No[1]**	**Maybe**	**Yes[2]**
you brought it yourself	8%	11%	81%	26%	28%	46%
a friend offers it to you	7%	10%	83%	18%	18%	64%
a friend offers it and claims that it has been tested	4%	8%	88%	4%	11%	85%
a friend offers it and has used it him/herself	3%	6%	91%	5%	13%	82%
a stranger offers it to you	69%	20%	11%	84%	11%	5%
a stranger offers it and claims that it has been tested	68%	20%	12%	82%	11%	7%
a stranger offers it and has used it him/herself	56%	22%	22%	72%	14%	14%

[1] Aggregate of categories 'absolutely not' and 'probably not', [2] Aggregate of categories 'probably' and 'absolutely'.

Discussion

Study 1 examined the Theory of Planned Behaviour (TPB) in relation to getting ecstasy tested at a test-service, and explored the role of some additional variables in a longitudinal online survey. Whether participants got their ecstasy tested was strongly predicted by prior intention to get ecstasy tested, with a one-fifth increase in intention corresponding to a four times higher likelihood of testing. Intention, in turn, was bivariately associated to a number of distal and proximal variables. Multivariate analyses showed the strongest predictors to be the traditional TPB variables attitude and perceived behavioural control (PBC), and additionally descriptive norm, anticipated regret, and habit. Exploration at the second measurement revealed that most low-intending participants did not test because they trusted their dealer, supporting the findings by Benschop et al. [162].

Further investigation in study 2 at the third measurement showed that the traits sensation seeking and impulsiveness were found to have trivial or weak associations with intention to test, also supporting earlier research [162]. Further, the beliefs that testing helps/is safer and that ecstasy is tested anonymously were found related to intention. For those who had never tested, knowledge about where to test was not associated to intention, nor was willingness to receive information by e-mail, indicating that informing people of the location and protocol of testing facilities should not be expected to suffice to increase testing. Participants estimated about one third of the ecstasy to be pure, and accordingly, almost two thirds of the participants disagreed with the statement that most ecstasy is pure. Additionally, less than half disagreed with the statement that impure ecstasy contained poison. Thus, testing would clearly seem the sensible thing to do for most participants, but these variables were only trivially or weakly related to intention, and although almost two-thirds of the participants were willing to test ecstasy at a party if possible, over four-fifths were also willing to use untested ecstasy, even more when this was offered by a friend. One-fifth was even willing to use ecstasy offered by a stranger, though these percentages seemed lower among high-intenders. Risk perception measures indicated that when it was not specified whether ecstasy was tested, it was considered equally harmful as tested ecstasy, whereas untested ecstasy was considered more harmful.

So, in addition to providing information about testing facilities, which cognitions should an intervention target? Those who tested ecstasy indicated this to be habitual, and interventions aiming to create a habit of testing should

prompt creation of implementation intentions and/or utilise environmental cues (see [77], [170] and chapter 4 of Bartholomew et al. [2] for details). However, creation of implementation intentions presupposes a positive intention, so it seems wise to target those variables predicting intention in a model without habit (anticipated regret, descriptive norm, attitude and PBC). Inducing anticipated regret seems advisable (see chapter 4 of [2]). Changing descriptive norm is somewhat challenging given the low percentage of ecstasy users that gets its ecstasy tested, but perhaps this can be addressed by emphasising that almost everybody is willing to test their ecstasy (see Table 9.6). Turning to attitude, analysis of potential underlying beliefs measured at t_3 suggest that emphasizing that testing facilities work anonymously (if true in the country of intervention) and that they provide a precise content description of tested pills may serve to increase positive expectancies and thereby attitude. PBC should also be addressed, for example by clearly explaining the procedure, possibly even using guided practice [2], for instance, when an interactive medium (e.g. the internet) is available for the intervention.

The high willingness to use untested pills, in combination with the low estimates of the proportion of pills that was unadulterated, and the number of people who indicated that they 'trust their dealer', indicate that personal susceptibility regarding obtaining adulterated pills seems very low. Methods for increasing personal susceptibility include prompting re-evaluation or presenting scenarios (see [2]), but attempts at increasing personal susceptibility should be combined with increasing PBC to prevent backfiring [see 71; 72; 134]. Finally, interventions should carefully avoid addressing the percentage of adulterated pills, as most people actually overestimate this (as noted in the introduction, over 80% of the pills is pure).