

## Return behavior of occasional and multigallon blood donors: the role of theory of planned behavior, self-identity, and organizational variables

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**BACKGROUND:** For blood establishments it is important that blood donors return for a donation. Past research has stressed the importance of theory of planned behavior (TPB) on return behavior, but self-identity (SI) and organizational variables (OVs) might play a role as well. This study added SI and OVs to the TPB to identify the determinants for return behavior.

**STUDY DESIGN AND METHODS:** Whole blood donors ( $n = 2005$ ) completed a questionnaire assessing TPB, SI, and OVs. OVs contained “perceived satisfaction with the blood bank” and “feeling pressure from the blood bank to donate blood.” Return behavior over the past 2 years was dichotomized as low return (0%-50%) versus high return (51%-100%). Logistic regression analyses assessed the effects of TPB, SI, and OVs on high return, separately for occasional donors (two to 10 lifetime donations) and multigallon donors (>10 lifetime donations).

**RESULTS:** Results showed that, for all donors, affective attitude was positively associated with return behavior, whereas pressure to donate blood was negatively associated with return behavior. The point estimates of self-efficacy, SI, and perceived satisfaction are high for multigallon donors, but do not reach significance.

**CONCLUSION:** For all donors, positive feelings about donating blood stimulate return behavior, while experiencing a pressure to donate blood emanating from the blood bank was not beneficial. Results suggest that multigallon donors are more stimulated to return when they score higher on self-efficacy, SI, and perceived satisfaction. Interventions aiming at donor retention need to be carefully formulated to avoid negative effects of feeling pressure to donate blood.

The supply of safe blood is essential for medical health services. Every day, blood is needed for transfusions into patients and for the production of medicines. To ensure enough blood supply, blood banks rely on the helpfulness of a small volunteering group of donors (5%-8% of the eligible population).<sup>1-5</sup> Two important questions arise when aiming to maintain an adequate blood supply: “What is the most effective way to recruit new blood donors?” and “How do you retain blood donors for a longer period of time?” The current study addresses the latter question, because motivating donors to return for a donation is more cost-effective than recruiting new donors. The costs for recruiting new donors are mainly spent on recruitment materials and the first extensive medical testing procedure, while the costs for regular blood donors are spent on appealing to donate blood (like advertisements) and the regular medical screenings before a donation. In addition, the risk of viral infection diseases is much lower in regular donors than in new donors.<sup>6-9</sup>

It is therefore important to investigate the motives and barriers of the donor’s willingness to return for a blood donation. A theory that is widely used to understand return behavior of blood donors is the “theory of planned behavior” (TPB), developed by Ajzen and Fishbein.<sup>10</sup> The TPB, an extension of the theory of reasoned

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**ABBREVIATIONS:** OV(s) = organizational variable(s); SI = self-identity; TPB = theory of planned behavior.

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action, is based on the idea that a specific behavior is best determined by intention, and intention is influenced by attitude, subjective norm, and self-efficacy. Attitude refers to the person's positive or negative evaluations of performing a behavior. Subjective norm represents perceptions of the expectations of significant others regarding one's performance of the behavior, and self-efficacy refers to the person's confidence in being able to successfully perform a given behavior. Several studies have suggested that the concept of moral norm should be added to the model as fourth predictor.<sup>11,12</sup> Moral norm refers to a person's feeling of being morally obliged to perform a specific behavior.

With regard to blood donor behavior, previous research indicates that, in general, TPB variables accounted for 39% to 72%<sup>11-16</sup> of the variance in intention to donate blood and for 27% to 56% of the variance in blood donor behavior.<sup>11,14,15,17</sup> When adding moral norm to the core TPB model, a unique extra variance of 4% was explained in the prediction of behavioral intention.<sup>11,18</sup> Although the basic TPB model has proved its added value in predicting blood donor behavior, several meta-analytic reviews suggested augmenting the TPB with additional theories and concepts, like the self-identity (SI) theory<sup>19,20</sup> and organizational variables (OVs).<sup>21</sup> The SI theory refers to the identification with a specific behavior, which can lead to an important part of a person's self.<sup>19</sup> It is suggested that repeating a behavior, like donating blood, enhances the identification with the role as being a blood donor.

Furthermore, several researchers like Ferguson<sup>21</sup> investigated the importance of organizational factors on return behavior. The blood bank appeals donors to donate blood at a donation center. How donors experience the donation process, from an appeal to donate blood until the actual donation, can have an impact on return behavior. It is imaginable that donors, who are positive about the donation process, are also more satisfied with the blood bank as an organization and therefore more willing to respond to donate blood. The extent to which donors are satisfied with the blood bank, as well as their feelings about the appeals to donate blood, might therefore be important to investigate to understand return behavior.

In the following, first, a brief overview will be given of the effects of TPB and SI on return behavior. Subsequently the effects of OVs on return behavior will be discussed.

### SI and blood donor return behavior

Although it is frequently suggested to add SI to the TPB to predict return behavior of blood donors,<sup>19,20</sup> few studies have tested this extension. SI can have a key role in the donor's transition from being an early career donor to a committed donor.<sup>19</sup> The studies that have been performed among blood donors have mainly focused on the impact

of SI on the *intention* to return for a donation. In the TPB, intention is a precursor of behavior and can have a mediating role between SI and behavior. Piliavin and Callero<sup>19</sup> and Charng and colleagues<sup>22</sup> added SI to the theory of reasoned action (precursor of TPB) to predict the intention to donate blood. In both studies donors were stratified by their lifetime number of donations. In the study of Piliavin and Callero<sup>19</sup> SI significantly predicted the intention to redonate blood in donors with one or two donations and five or more. In the study of Charng and coworkers,<sup>22</sup> SI was significantly associated with intention in donors with two or more donations. In a more recent study from Masser and coworkers,<sup>23</sup> SI was added to the TPB variables to predict return behavior, as well as to predict the intention to return in first-time blood donors. They found that attitudes, perceived control, and SI, measured 3 weeks after the first donation and 4 months later, had a significant effect in predicting the intention to redonate.

In conclusion, these studies show that SI has an effect on the intention to return for donation, over and above the TPB variables. These effects seem to be more prominent among donors who donate blood repeatedly, although results are scarce or based on mixed samples and primarily examining the intention to return for blood donation. Further research on SI in addition to the TPB variables is desirable, especially among donors who have donated blood repeatedly. This study will therefore investigate the effects of SI and TPB on return behavior within donors with different levels of donation experience. In addition, all analyses will be executed on *actual* return behavior and not on the intended donation behavior.

### Blood donor return behavior and the role of OVs

Donating blood always occurs within an organizational context: donors receive appeals to visit the blood organization for a donation. Understanding the impact of OVs on return behavior of blood donors is therefore essential. OVs are of special importance, because they are amenable to change and have a good potential for interventions.<sup>21</sup> Factors like blood donation reminders, high accessibility of blood centers, short waiting time before donation, and convenience of donation opportunities stimulated donors to return for subsequent donations.<sup>24</sup> In a review article of Ferguson,<sup>21</sup> the impact of OVs and TPB variables on return behavior were compared independently of one another. He pointed out that OVs explained 19.3% of the variance in future blood donation, while the TPB variable intention explained 17.4%, subjective norm 1.4%, and attitudes 7.5%. His conclusion was that OVs were slightly better predictors of repeat blood donations than intentionality, and OVs were even better predictors than subjective norm and attitudes.

Although OVs, such as short waiting times and convenient donation opportunities, are factors that

contributed to a better understanding of blood donor return behavior, other OVs might be important as well. An interesting OV that has been applied in the field of volunteering research is the perceived pressure to volunteer. Grube and Piliavan<sup>25</sup> found that the more pressure volunteers felt from the organization to volunteer, the higher the intention was to leave the organization. Donating blood is a volunteering activity, where blood organizations try to commit blood donors to return for subsequent donations. It is therefore valuable to investigate how donors feel about the appeals to donate blood repeatedly and how satisfied they are with an organization like the blood bank. The overall premise is that people, in this case donors, are more likely to maintain a behavior when they are satisfied with the outcomes.<sup>26</sup> As yet, no research could be identified that has investigated the effect of “feeling pressure to donate blood” and the donor’s satisfaction with the blood bank, in addition to the TPB, and in relation to return behavior. It is expected that donors who are more satisfied with the blood bank are more likely to return for a donation, while donors who feel a pressure to donate blood emanating from the blood bank are less likely to return.

### Current study

As mentioned, previous research suggested extending the TPB model with other theories and constructs to gain a better understanding of return behavior. In the current article the TPB is used as a basic model. First, the effects of TPB on return behavior will be tested.

The hypothesis is that all TPB variables are positively related with return behavior. Second, the SI construct will be added to the TPB model to investigate its effect on return behavior. The hypothesis is that the effect of SI is positively related to return behavior and stronger among donors who have donated blood repeatedly. To test this hypothesis, donors who donated blood from two up to 10 times (defined as occasional donors) will be compared to donors with more than 10 blood donations (defined as multigallon donors).

Third, the OVs “feeling pressure to donate” and “satisfaction with the blood bank” will be added to the TPB in relationship with return behavior. We assume that perceived satisfaction with the blood bank has a positive effect on return behavior, while “pressure to donate” has a negative effect on return behavior. We will also investigate whether these effects differ for occasional donors and multigallon donors. The effects might even be stronger for multigallon donors, because they already have donated blood repeatedly, which might mean that they are more satisfied with the blood bank or feel more pressure to donate blood. Finally, SI and OVs are added to the TPB simultaneously to disentangle their effect on return behavior.

## MATERIALS AND METHODS

### Participants and procedure

In the Netherlands new donors initially schedule an appointment for an extensive medical screening test. At this first appointment, only blood samples are taken, and donors do not make a full donation. Eligible donors are subsequently invited to give blood for the first time. The target population for this study consisted of whole blood donors who donated blood at least once in the previous 2 years. In January 2011 a paper-and-pencil questionnaire was sent by postal mail to a random sample of 3000 whole blood donors. A cover letter informed the invited donors about the study goal, which was stated as learning more about blood donors and their motivation to donate blood. After 1 month a reminder letter was sent to nonresponse donors.

A total of 2169 donors completed the questionnaire (response rate, 72.2%). Women had a higher response rate than men (74.7% vs. 69.4%,  $p < 0.01$ ). Responders were older and had a higher return rate in the previous 2 years than nonresponders (respectively, 46.6 years vs. 41.7 years,  $p < 0.01$ ; and 63.1% return rate vs. 49.9% return rate,  $p < 0.01$ ). Two individuals could not be verified in the database by their sex, birth date, or zip code and were therefore removed from the sample, leaving a group of 2167 respondents. All analyses were executed on full cases, that is, including only those whole blood donors with a score on each psychological or organizational item. Missing data were randomly distributed across donors and the percentage missing per variable ranged from 0.2% to 1.7%. The full case analyses resulted in a sample of 2090 whole blood donors. Based on this sample, two groups were created for occasional donors and multigallon donors, using the tertiles of lifetime number of donations as cutoff points. The cutoff point for occasional donors was based on the first tertile, ranging from two to 10 donations ( $n = 606$ , 29%; see also Veldhuizen et al.<sup>27</sup>). First-time donors ( $n = 85$ , 4%) were not included, due to their lack of previous donation experiences. Donors in the second and third tertiles were defined as multigallon donors (>10 donations,  $n = 1399$ , 67%). The final analyses included a total of 2005 occasional and multigallon donors.

### Measures

The questionnaire incorporated items designed to assess various topics about blood donorship, including the TPB, SI, and OVs. The variables in the TPB included measures of self-efficacy, affective attitude, cognitive attitude, subjective norm, and moral norm. Items to measure the variables in the TPB were chosen to be consistent with previously published items.<sup>22,28,29</sup> SI was measured with items developed by Charng and coworkers.<sup>22</sup> OVs were measured with items related to “perceived satisfaction

with the blood bank” and items related to “feeling pressure from the blood bank to donate blood.” Items were based on a description of these concepts mentioned in articles about volunteering.<sup>25,30</sup> All items were measured with a Likert-type format, with alternatives ranging from 1 (*completely disagree*) to 7 (*completely agree*). Composite scores were created so that higher scores represented stronger levels of the variable.

#### *Self-efficacy*

Self-efficacy with respect to donating blood was measured with two items. The items included “If it were entirely up to me, I am confident that I would be able to give blood as long as my health allows it,” and “I consider myself that I would be capable to give blood if my health permits it” (Cronbach’s  $\alpha = 0.74$ ).

#### *Affective attitude*

Affective attitude toward blood donation was measured with three bipolar items. Respondents had to rate “I find giving blood . . .” “pleasant–unpleasant,” “annoying–enjoyable,” or “unappealing–appealing” ( $\alpha = 0.78$ ).

#### *Cognitive attitude*

Three bipolar items measured cognitive attitude toward blood donation, which respondents had to rate (“I find giving blood . . .” “negative–positive,” “good–bad,” or “meaningless–worthwhile”);  $\alpha = 0.83$ ).

#### *Subjective norm*

The variable subjective norm was measured with two items, “My partner thinks I should continue donating blood if my health permits it” (only if applicable), and “My family and friends think that I should continue giving blood as long as my health allows it” ( $\alpha = 0.57$ ).

#### *Moral norm*

The following three items measured moral norm: “Not giving blood is against my principles,” “I feel personally responsible to give blood,” and “It is a social obligation to give blood” ( $\alpha = 0.65$ ).

#### *SI*

SI was measured with the following three items: “For me, being a blood donor means more than just donating blood,” “Blood donation is an important part of who I am,” and “I would feel a loss if I were forced to give up donating blood” ( $\alpha = 0.69$ ).

#### *OVs: perceived satisfaction with the blood bank*

Four items assessed the donors’ perceived satisfaction with the blood bank (“Overall, I am satisfied with the blood bank as an organization,” “The staff approaches me in a personal way at the blood bank,” “I am always

treated in a friendly manner at the blood bank,” and “The staff is experienced and reliable at the blood bank”;  $\alpha = 0.84$ ).

#### *OVs: feeling pressure to donate blood*

Feeling pressure to donate blood was measured with two items (“I prefer to be invited by the blood bank less often for a blood donation” and “The blood bank does an appeal on me more often than I would like to”;  $\alpha = 0.78$ ).

#### *Outcome variable*

The dependent variable “return rate” was extracted using data from the donor database. The donation data covered a period of 2 years: from November 1, 2008, until the questionnaire was sent to the blood donors, November 1, 2010. Past return behavior for each blood donor was calculated as follows: (number of blood bank visits in the previous 2 years/number of donation invitations in the previous 2 years)  $\times 100$ .

The variable return rate did not have a normal distribution, which means that one of the assumptions of performing a linear regression analysis is violated. Therefore, donors were categorized in two return rate groups, ranging from 0% to 50% (defined as “low-return behavior,”  $n = 215$  for occasional donors,  $n = 523$  for multigallon donors) and ranging from 51% to 100% (defined as “high-return behavior,”  $n = 391$  for occasional donors,  $n = 876$  for multigallon donors). All return rates above the 100% (donors who donated blood more often than they were invited to,  $n = 18$ ) were set to 100%.

#### **Statistical analyses**

Logistic regression models were built to measure the effects on high-return behavior versus low-return behavior. All models were performed separately for occasional donors and multigallon donors. First, logistic regression analyses were used to measure the effect of TPB variables on the odds of high-return behavior versus low-return behavior (reference group). All variables (self-efficacy, affective attitude, cognitive attitude, subjective norm, and moral norm) were included in the logistic regression model at once (basic model). Second, logistic regression analyses were performed by adding SI to the TPB variables (basic model plus SI) and by adding both OVs to the TPB variables (basic model plus OV). Finally, a logistic regression analysis was conducted by including the TPB variables, SI, and OVs at once to the model (basic model plus SI plus OV). The strengths of the relationships were expressed as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). All logistic regression analyses were adjusted for sex and age by adding these variables in the models.



## RESULTS

Table 1 displays the demographic and donor characteristics of occasional donors and multigallon donors. Occasional donors were younger than multigallon donors (36.80 years vs. 51.28 years, respectively;  $p < 0.001$ ) and were less often male (27.1% vs. 54.5%, respectively;  $p < 0.001$ ). Not surprisingly, occasional donors had less lifetime number of donations than multigallon donors (median 5 vs. 34, respectively;  $p < 0.001$ ). Although occasional donors received fewer invitations to donate blood in the previous 2 years than multigallon donors (mean invitation 6.89 vs. 8.37, respectively;  $p < 0.001$ ), their return rate in the previous two did not significantly differ from multigallon donors (mean return rate previous 2 years 64.10 vs. 62.61, respectively;  $p > 0.05$ ).

### Mean values of TPB variables, SI, and OVs

Table 2 shows the mean values of TPB variables, SI, and OVs for low-return behavior and high-return behavior of occasional donors and multigallon donors. The mean values resulted in a pattern, in which multigallon donors scored significantly higher ( $p < 0.05$ ) and in the expected direction on self-efficacy, affective attitude, and SI compared to occasional donors. There were no significant dif-

ferences in mean values between occasional donors and multigallon donors for the other variables.

When examining occasional donors and multigallon donors separately, within both groups the mean values of most variables were significantly higher ( $p < 0.05$ ) and in the expected direction for high-return behavior compared to low-return behavior. This significance was not reached in occasional donors for subjective norm, moral norm, and perceived satisfaction ( $p > 0.05$ ) and in multigallon donors for cognitive attitude ( $p > 0.05$ ). Pressure to donate was shown to have a significantly negative effect on return behavior ( $p < 0.05$ ), which means that donors who feel a higher pressure to donate are less stimulated to return for a donation. It should be noted that a lack of significant differences for some variables in occasional donors might be attributable to a smaller population number ( $n = 606$ ), when compared to multigallon donors ( $n = 1399$ ).

### Determinants of high-return behavior in occasional donors

Table 3 displays the results of the logistic regression analyses on high-return behavior in occasional donors (low-return behavior as reference group). The results show that in the basic model a higher score on affective attitude increased the odds on high-return behavior (OR, 1.26; 95% CI, 1.08-1.48). Adding SI to the basic model showed that this variable was not associated with high-return behavior, and only affective attitude enhanced the odds on high-return behavior (OR, 1.25; 95% CI, 1.07-1.47). When the OVs "pressure to donate blood" and "perceived satisfaction with the blood bank" were added to the basic model, results revealed that pressure to donate blood decreased the odds on high-return behavior (OR, 0.84; 95% CI, 0.72-0.98),

**TABLE 1. Demographic and donor characteristics in occasional donors and multigallon donors\***

Characteristic	Occasional donors (n = 606)	Multigallon donors (n = 1399)
Age (years)	36.80 ( $\pm 12.38$ )	51.28 ( $\pm 10.66$ )
Sex N (%)	164 (27.1)	762 (54.5)
Lifetime donations, median (25th-75th)		
Male	6 (3.25-8)	44 (27-64)
Female	5 (3-8)	25 (17-37)
Number of invitations†	6.89 ( $\pm 3.51$ )	8.37 ( $\pm 3.93$ )
Number of visits†	3.87 ( $\pm 1.84$ )	4.81 ( $\pm 2.41$ )
Return rate†	64.10 ( $\pm 27.87$ )	62.61 ( $\pm 25.41$ )

\* Data are reported as mean ( $\pm$ SD), number (%), or median (25th-75th).

† Variables based on the previous 2 years.

**TABLE 2. Mean ( $\pm$ SD) for TPB variables, SI, and OVs in low-return behavior and high-return behavior, separately for occasional donors and multigallon donors**

Variable	Occasional donors		Multigallon donors	
	Low return (n = 215)	High return (n = 391)	Low return (n = 523)	High return (n = 876)
<b>TPB</b>				
Self-efficacy*	6.18 ( $\pm 0.89$ )	6.33 ( $\pm 0.80$ )†	6.35 ( $\pm 0.84$ )	6.53 ( $\pm 0.65$ )†
Affective attitude*	4.86 ( $\pm 1.13$ )	5.22 ( $\pm 1.18$ )†	5.29 ( $\pm 1.04$ )	5.56 ( $\pm 0.95$ )†
Cognitive attitude	6.49 ( $\pm 0.72$ )	6.61 ( $\pm 0.71$ )†	6.59 ( $\pm 0.74$ )	6.63 ( $\pm 0.76$ )
Subjective norm	3.45 ( $\pm 1.86$ )	3.71 ( $\pm 1.90$ )	3.43 ( $\pm 1.80$ )	3.77 ( $\pm 1.87$ )†
Moral norm	4.22 ( $\pm 1.25$ )	4.40 ( $\pm 1.26$ )	4.32 ( $\pm 1.28$ )	4.49 ( $\pm 1.33$ )†
SI*	4.16 ( $\pm 1.20$ )	4.41 ( $\pm 1.24$ )†	4.30 ( $\pm 1.32$ )	4.68 ( $\pm 1.27$ )†
<b>OVs</b>				
Perceived satisfaction	6.08 ( $\pm 0.76$ )	6.16 ( $\pm 0.78$ )	6.05 ( $\pm 0.76$ )	6.22 ( $\pm 0.75$ )†
Pressure to donate	2.18 ( $\pm 1.37$ )	1.84 ( $\pm 1.05$ )†	2.13 ( $\pm 1.21$ )	1.84 ( $\pm 1.10$ )†

\* Significant mean values ( $p < 0.05$ ) for occasional donors versus multigallon donors.

† Significant mean values ( $p < 0.05$ ) for low-return behavior versus high-return behavior within occasional donors and multigallon donors.

while affective attitude was still positively associated with high-return behavior (OR, 1.23; 95% CI, 1.05-1.44).

Finally all variables (TPB, SI, and OVs) were included at once to test their effects on high-return behavior. Results from the final model showed, again, that affective attitude enhanced the odds on high-return behavior, while pressure to donate decreased the odds on high-return behavior (OR<sub>affective attitude</sub>, 1.22; 95% CI, 1.04-1.44; OR<sub>pressure to donate</sub>, 0.84; 95% CI, 0.72-0.98).

### Determinants of high-return behavior in multigallon donors

Table 4 displays the results of the logistic regression analyses on high-return behavior in multigallon donors (low-return behavior as reference group). Analyses from the basic model showed that higher scores on self-efficacy and affective attitude increased the odds on high-return behavior (OR<sub>self-efficacy</sub>, 1.32; 95% CI, 1.12-1.55; OR<sub>affective attitude</sub>, 1.28; 95% CI, 1.12-1.45).

The basic model with SI revealed that SI increased the odds on high-return behavior (OR, 1.12; 95% CI, 1.01-1.25), as well as self-efficacy (OR, 1.28; 95% CI, 1.09-1.51) and affective attitude (OR, 1.23; 95% CI, 1.08-1.41). When the basic model is extended with both OVs, results showed that pressure to donate blood decreased the odds on high-return behavior (OR, 0.86; 95% CI, 0.77-0.95), while self-efficacy and affective attitude still increased the odds on

high-return behavior (OR<sub>self-efficacy</sub>, 1.20; 95% CI, 1.01-1.42; OR<sub>affective attitude</sub>, 1.22; 95% CI, 1.07-1.39).

In the final model (TPB, SI, and OVs), affective attitude enhanced the odds on high-return behavior (OR, 1.19; 95% CI, 1.04-1.36) and pressure to donate decreased the odds on high-return behavior (OR, 0.86; 95% CI, 0.78-0.96). It is worthwhile to note that the ORs of self-efficacy (OR, 1.18; 95% CI, 0.99-1.40), SI (OR, 1.11; 95% CI, 0.99-1.23), and perceived satisfaction (OR, 1.11; 95% CI, 0.95-1.31) remain high in the final model, although both CIs include one. (Logistic regression analyses were also performed with return rate categorized in three equally divided groups, comparing donors in the highest tertile [ranging from 78% to 100%] versus donors in the lowest tertile [ranging from 0% to 50%, reference group]. For both occasional donors and multigallon donors, the effects for each determinant became stronger, compared to the effects found when categorizing return rate in two groups [0%-50% vs. 51%-100%.])

## DISCUSSION

In the current study, SI and OVs were added to the TPB to disentangle the effects on return behavior for occasional donors and multigallon donors. Results in the final model showed that, for all donors, affective attitude was positively associated with return behavior, whereas pressure to donate blood was negatively associated with return

**TABLE 3. Logistic regression analyses on high-return behavior in occasional donors**

Variable	Basic model*	Basic model plus SI*	Basic model plus OV*	Final model*
<b>TPB</b>				
Self-efficacy	1.04 (0.84-1.30)	1.04 (0.83-1.30)	0.97 (0.76-1.23)	0.97 (0.76-1.23)
Affective attitude	1.26 (1.08-1.48)	1.25 (1.07-1.47)	1.23 (1.05-1.44)	1.22 (1.04-1.44)
Cognitive attitude	1.09 (0.85-1.40)	1.08 (0.84-1.39)	1.08 (0.84-1.39)	1.08 (0.83-1.39)
Subjective norm	1.05 (0.95-1.15)	1.04 (0.95-1.15)	1.05 (0.95-1.16)	1.05 (0.95-1.15)
Moral norm	1.08 (0.94-1.25)	1.08 (0.92-1.25)	1.08 (0.93-1.25)	1.07 (0.92-1.25)
<b>SI</b>				
		1.03 (0.88-1.22)		1.03 (0.87-1.22)
<b>OVs</b>				
Perceived satisfaction			0.97 (0.76-1.24)	0.96 (0.75-1.23)
Pressure to donate			0.84 (0.72-0.98)	0.84 (0.72-0.98)

\* All analyses were adjusted for age and sex. Data are reported as OR (95% CI).

**TABLE 4. Logistic regression analyses on high-return behavior in multigallon donors**

Variable	Basic model*	Basic model + SI*	Basic model + OV*	Final model*
<b>TPB</b>				
Self-efficacy	1.32 (1.12-1.55)	1.28 (1.09-1.51)	1.20 (1.01-1.42)	1.18 (0.99-1.40)
Affective attitude	1.28 (1.12-1.45)	1.23 (1.08-1.41)	1.22 (1.07-1.39)	1.19 (1.04-1.36)
Cognitive attitude	0.87 (0.74-1.03)	0.87 (0.73-1.03)	0.86 (0.72-1.02)	0.85 (0.72-1.02)
Subjective norm	1.06 (0.99-1.13)	1.04 (0.97-1.11)	1.06 (0.99-1.13)	1.04 (0.98-1.12)
Moral norm	1.00 (0.91-1.10)	0.97 (0.88-1.07)	0.99 (0.91-1.10)	0.97 (0.87-1.07)
<b>SI</b>				
		1.12 (1.01-1.25)		1.11 (0.99-1.23)
<b>OVs</b>				
Perceived satisfaction			1.13 (0.96-1.32)	1.11 (0.95-1.31)
Pressure to donate			0.86 (0.77-0.95)	0.86 (0.78-0.96)

\* All analyses were adjusted for age and sex. Data are reported as OR (95% CI).

behavior. Thus, whether being an occasional donor or a multigallon donor, the same set of variables was associated with return behavior. In addition, point estimates in the final model of self-efficacy, SI, and perceived satisfaction were high, but not significant in multigallon donors. This result suggests that feeling capable to donate blood, identifying oneself as a blood donor, and feeling satisfied with the blood bank as an organization stimulates multigallon donors to return for donations.

To investigate how TPB, SI, and OVs are associated with return behavior, each concept was added one by one in a logistic regression model. When considering the basic model (all TPB variables included at once), the variable affective attitude had an effect for both occasional and multigallon donors on return behavior, and self-efficacy had an effect only in multigallon donors. These results confirm previous studies on TPB and return behavior, which also found that having positive feelings about blood donation and feeling capable to donate blood were positively associated with return behavior.<sup>11,17,29,31</sup>

Subsequently the construct SI was added to the basic model. Only for multigallon donors, SI had a positive effect on return behavior, as it was hypothesized. This finding supports the theory that donors who repeatedly donate blood, identify themselves more as a blood donor and are more willing to return for a donation.<sup>19</sup> It is worthwhile to mention that SI had an effect only for donors with more than 10 donations, whereas previous research found an effect of SI also in donors who are more at the start of their donor career (one to five lifetime donations). Thus, it is difficult to conclude at which stage exactly donors develop a donor identity.

When the OVs “pressure to donate” and “satisfaction with the blood bank” were added to the basic model, results clearly demonstrated that feeling pressure to donate blood is negatively associated with return behavior in both donor groups. Surprisingly, there was no significant effect of the donor’s satisfaction with the blood bank as an organization on return behavior. It seems that feeling satisfied with the blood bank as an organization did not compensate for the negative effect of feeling pressure to donate blood.

Finally, when TPB, SI, and both OVs were added into one model, a positive effect of affective attitude and a negative effect of pressure to donate remained. For multigallon donors the point estimate of self-efficacy decreased when OVs were added to the model, but remained high compared to occasional donors. Also the point estimates of SI and perceived satisfaction remained constantly high among different models, although the effects were not significant in the final model. Thus, it can tentatively be concluded that multigallon donors who score higher on self-efficacy, SI, and perceived satisfaction are more stimulated to return, due to their high point estimates and overall pattern among different models.

Although previous research has focused on the separate effects of TPB, SI, and OVs on return behavior, to our knowledge, this is the first study that has incorporated the TPB variables, SI, and OVs into one model. These effects are tested in a large amount of data derived from blood donors at different stages of their donor career. Two groups could be formed based on the lifetime number of donations: occasional donors (two to 10 donations) and multigallon donors (>10 donations). Our results show that the same variables are important in both occasional and multigallon donors, implicating that these variables do not change over time. However, this study is limited by its cross-sectional and correlational nature, and no conclusions can be drawn over time without any follow-up data.

Another limitation that should be mentioned is the lack of clarity on how different variables are related to each other. In this study effects of variables are regressed directly on behavior, but other linkages between variables are also possible. Using advanced techniques, like structural equation modeling, would shed more light on the various possible linkages between variables.

Although our results confirmed the negative effects of feeling pressure to donate blood, future research should investigate how this pressure is originated. A question that needs to be considered is: what kind of pressure do these donors actually feel? Further analyses showed that there is a weak correlation between the amount of invitations that were sent to the donors in the previous 2 years and the feeling pressure to donate ( $r = 0.11$ ,  $p < 0.01$ ). This result suggests that donors almost do not feel more pressure when receiving more invitations to donate blood. In addition, it is also interesting to further investigate if different donor characteristics are related to the pressure to donate blood. This information is valuable for the development of targeted intervention programs.

It should also be noted that in this study self-efficacy is measured in relation to a donor’s health; “I consider myself capable of donating if my health permits it.” However, it is possible that a donor whose health sometimes does not allow him or her to donate, could score high on self-efficacy. Thus, scoring high on self-efficacy is not always necessarily related to being in good health. Unfortunately, this study does not allow for distinguishing between donors who are always in good health and donors who are sometimes in good health.

In conclusion, to our knowledge this is the first study that added SI and the OVs “pressure to donate blood” and “satisfaction with the blood bank” to the TPB to identify the determinants for return behavior in occasional donors and multigallon donors. For all donors, positive feelings about donating blood stimulate return behavior, while donors who feel a pressure to donate blood emanating from the blood bank were less likely to return for a donation. Furthermore, results suggest that multigallon donors are more willing to return when they score higher on

self-efficacy, SI, and perceived satisfaction. Interventions aiming at donor retention need to be carefully formulated to avoid negative effects of feeling pressure to donate blood. Because this is the first study that has incorporated this item and due to its strong effect it is recommended to take this variable into account in further research.

#### CONFLICT OF INTEREST

None.

## REFERENCES

- Linden JV, Gregorio DI, Kalish RI. An estimate of blood donor eligibility in the general population. *Vox Sang* 1988; 54:96-100.
- America's Blood Center News Release. Urgent appeal for blood donation in New York: Advertising Community Pledges Massive Weeklong Blood Donation Campaign. 2006. New York.
- Heinrich J. Availability of blood. Washington (DC): United States General Accounting Office; 1999.
- McKeever T, Sweeney MR, Staines A. An investigation of the impact of prolonged waiting times on blood donors in Ireland. *Vox Sang* 2006;90:113-8.
- Schoenborn CA, Marsh SL, Hardy AM. AIDS knowledge and attitudes for 1992. Data from the National Health Interview Survey. *Adv Data* 1994;243:1-16.
- Kakaiya RM, Jacobs B, Pelletier M, Morse EE, Cable RG. Trends in hepatitis B surface antigen (HBsAg) prevalence in volunteer blood donors in Connecticut, 1973-1983. *Ann Clin Lab Sci* 1986;16:380-5.
- Archer GT, Buring ML, Clark B, Ismay SL, Kenrick KG, Purusothaman K, Kaldor JM, Bolton WV, Wylie BR. Prevalence of hepatitis C virus antibodies in Sydney blood donors. *Med J Aust* 1992;157:225-7.
- Schreiber GB, Glynn SA, Damesyn MA, Wright DJ, Tu Y, Dodd RY, Murphy EL. Lapsed donors: an untapped resource. *Transfusion* 2003;43:17-24.
- Glynn SA, Kleinman SH, Schreiber GB, Busch MP, Wright DJ, Smith JW, Nass CC, Williams AE. Trends in incidence and prevalence of major transfusion-transmissible viral infections in US blood donors, 1991 to 1996. *Retrovirus Epidemiology Donor Study (REDS)*. *JAMA* 2000;284:229-35.
- Ajzen I, Fishbein M. *Understanding attitudes and predicting social behavior*. Englewood Cliffs (NJ): Prentice Hall; 1980.
- Armitage CJ, Conner M. Social cognitive determinants of blood donation. *J Appl Soc Psychol* 2001;31:1431-57.
- Lemmens KP, Abraham C, Hoekstra T, Ruiters RA, de Kort WL, Brug J, Schaalma HP. Why don't young people volunteer to give blood? An investigation of the correlates of donation intentions among young nondonors. *Transfusion* 2005;45:945-55.
- Giles M, McClenahan C, Cairns E, Mallet J. An application of the theory of planned behaviour to blood donation: the importance of self-efficacy. *Health Educ Res* 2004;19:380-91.
- Conner M, Sparks P. Theory of planned behaviour and health behaviour. In: Conner M, Norman P, editors. *Predicting health behaviour*. Berkshire: Open University Press; 2005. p. 170-222.
- Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol* 2001; 40(Pt 4):471-99.
- Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. *Am J Health Promot* 1996;11:87-98.
- Giles M, Cairns E. Blood donation and Ajzen's theory of planned behaviour: an examination of perceived behavioural control. *Br J Soc Psychol* 1995;34(Pt 2):173-88.
- Conner M, Armitage CJ. Extending the theory of planned behavior: a review and avenues for further research. *J Appl Soc Psychol* 1998;28:1429-64.
- Piliavin JA, Callero PL. *Giving blood: the development of an altruistic identity*. Baltimore (MD): Johns Hopkins University Press; 1991.
- Masser BM, White KM, Hyde MK, Terry DJ. The psychology of blood donation: current research and future directions. *Transfus Med Rev* 2008;22:215-33.
- Ferguson E. Predictors of future behaviour: a review of the psychological literature on blood donation. *Br J Health Psychol* 1996;1:287-308.
- Charng H, Piliavin JA, Callero PL. Role identity and reasoned action in the prediction of repeated behavior. *Soc Psychol Q* 1988;51:303-17.
- Masser B, Bednall TC, White KM, Terry D. Predicting the retention of first-time donors using an extended theory of planned behavior. *Transfusion* 2012;52:1303-10.
- Ferguson E, France CR, Abraham C, Ditto B, Sheeran P. Improving blood donor recruitment and retention: integrating theoretical advances from social and behavioral science research agendas. *Transfusion* 2007;47:1999-2010.
- Grube JA, Piliavin JA. Role identity, organizational experiences, and volunteer performance. *Pers Soc Psychol Bull* 2000;26:1108-19.
- Rothman AJ. Toward a theory-based analysis of behavioral maintenance. *Health Psychol* 2000;19 1 Suppl:64-9.
- Veldhuizen IJ, Doggen CJ, Atsma F, De Kort WL. Donor profiles: demographic factors and their influence on the donor career. *Vox Sang* 2009;97:129-38.
- Conner M, Godin G. Temporal stability of behavioural intention as a moderator of intention-health behaviour relationships. *Psychol Health* 2007;22:875-97.
- Veldhuizen I, Ferguson E, de Kort W, Donders R, Atsma F. Exploring the dynamics of the theory of planned behavior in the context of blood donation: does donation experience make a difference? *Transfusion* 2011;51:2425-37.



30. Finkelstein MA, Penner LA, Branninck MT. Motive, role identity, and prosocial personality as predictors of volunteer activity. *Soc Behav Pers* 2005;33:403-18.
31. Godin G, Conner M, Sheeran P, Belanger-Gravel A, Germain M. Determinants of repeated blood donation among new and experienced blood donors. *Transfusion* 2007;47:1607-15. 