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Predicting blood donation intentions and behavior among Australian blood donors: Testing
an extended theory of planned behavior model

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ABSTRACT

BACKGROUND: Donor retention poses a significant problem to blood collection agencies around the world. Previous research using an augmented Theory of Planned Behavior (TPB) approach has demonstrated that attitude, subjective norm, self-efficacy, moral norm, anticipated regret, donation anxiety from prior blood donations and self-identity as a blood donor predicts experienced donors' intentions and that intentions, self-efficacy, moral norm, and anticipated regret may impact upon people's actual blood donation behavior.

STUDY DESIGN AND METHODS: Established blood donors ($N = 263$) completed questionnaires assessing standard TPB constructs, anticipated regret, moral norm, donation anxiety, and self-identity as a blood donor. Three months later, a second questionnaire assessing blood donation behavior in the intervening three months was mailed and returned by 182 donors.

RESULTS: Using structural equation modeling, the final augmented TPB model provided an excellent fit to the data and included a direct path from intention to behavior and indirect paths to behavior through intention for attitude, self-efficacy and anticipated regret. Moral norm, donation anxiety and donor identity indirectly predicted intention through attitude. In total, 51% of the variance in donors' attitudes, 86% of variance in donors' intentions, and 70% of the variance in donors' behavior was accounted for in the final model.

CONCLUSION: An augmented TPB framework proved efficacious in determining the predictors of the intentions and behavior of established blood donors. Further, this framework highlighted the importance of considering in the future how donors' motivations for donating blood may evolve as a function of the number of prior donations.

KEYWORDS: Theory of Planned Behavior, intentions, established donors, moral norm, anticipated regret, donation anxiety, self-identity.

ABBREVIATIONS: TPB = Theory of Planned Behavior.

INTRODUCTION

Donor recruitment, and donor retention particularly, pose a significant problem for blood collection agencies in Australia and around the world.^{1,2} Only 3.5% of the age-eligible population within Australia currently donates blood or blood products^{1,2} and, consistent with recruitment and retention patterns in the U.S.³ and the U.K.,⁴ only around 60% of new Australian blood donors return within 2 years to make a further donation.² With the demand for blood and blood products forecast to increase,² research attention is shifting increasingly to the need to understand blood donors and the factors that motivate them to continue donating.^{5,6} A focus on donor retention is particularly pertinent as repeat donors provide the potential to save on costs associated with the continual recruitment of new donors,⁵ as well as supplying a stable and comparatively safe source of blood.^{7,8,9}

Despite the advantages of focusing on repeat donors, previous research considering individuals' motivations for donating blood has tended to consider only non donors,^{10,11} new (i.e., first-time) donors,¹² or samples comprising a mix of non donors and donors.^{13,14,15} Although recent research has highlighted the different motivations of current non donors and donors for donating blood in the future,¹⁶ few studies to date have focused exclusively on experienced blood donors and what motivates them to intend to donate blood again in the future^{12,17} and to engage in actual repeat donation. As such, in the current study we draw on previous blood donation research to test three models to determine how a number of factors contribute to experienced blood donors' motivations to engage in repeat donation

One dominant and enduring psychological theory that may assist with this aim is the Theory of Planned Behavior (TPB¹⁸ Figure 1). Across several research studies comprising mixed samples of blood donors and non donors, the TPB predictors have accounted for between 31-72% of the variance in blood donation intentions,^{10,13,14,19,20} and between 54-56% in blood donation behavior.^{13,14}

The TPB specifies that the most proximal determinant of behavior is an individual's intention to engage in that behavior (with perceived behavioral control also proposed as a direct predictor of behavior). This proposition is supported in the blood donation literature with intention emerging as the only consistent predictor of behavior.²¹ Behavioral intentions are, in turn, predicted by attitudes (the individual's overall positive or negative evaluation of performing the behavior), subjective norms (the individual's view of whether important people in their life would want them to perform or not perform the behavior), and perceived behavioral control (the extent to which an individual perceives the behavior to be under their volitional control). While perceived behavioral control usually reflects the two aspects of perceived controllability and self-efficacy, it has been argued that perceived behavioral control may be equated with an individual's confidence in their ability to perform the behavior (self-efficacy).¹⁸ Given that an individual may have little control over the actual factors that prevent blood donation (e.g., illness), and one's belief in their ability to donate blood (i.e., self-efficacy) has been shown to be a stronger predictor of intentions than perceived controllability,^{13, 17, 20} a measure of self-efficacy only was chosen to reflect perceived behavioral control in the current study.

In the context of blood donation, several researchers have extended the basic TPB model to account for other influences on donation intentions and behavior. A number of studies, for instance, have explored the influence of a perceived moral obligation or moral norm to donate blood,^{12, 13, 15} with this construct assessing feelings of personal responsibility or a duty to donate.²² For repeat blood donors, specifically, moral norm has been found to be a significant direct,^{12, 15} and indirect (via attitude¹⁷), predictor of intention to donate blood, as well as a direct predictor of behavior in one study.¹² Several researchers^{17, 23} have noted also that blood donation may prompt affective reactions,^{10, 24} with negative affective reactions being influential for both new^{25, 26} and experienced donors' returns.¹⁷ These

negative affective reactions can be conceptualized as anticipated regret (an expectation about the future experience of regret in response to either donation or non donation of blood^{12, 15}) or donation anxiety (anxiety about donating blood in the future related to concern about needles, exposure to blood, or pain^{13, 14, 27}). Anticipated regret has been demonstrated as a direct predictor of both intentions^{12, 15} and behavior¹² for donors. To date, however, the role of donation anxiety in blood donors' decisions has not been explored systematically. The findings of France et al.'s¹⁷ path analysis, however, demonstrated a predictive role for both donors' subjective experience of physiological reactions to, and general (dis)satisfaction with their last blood donation experience, on intentions to re-donate. These findings suggest that donation anxiety, if related to past blood donation experiences, may be a key predictor of a donor's intention to continue donating.²⁶ Both donation anxiety and the desire to avoid experiencing a feeling of regret associated with a failure to donate blood (i.e., anticipated regret),^{12, 15} then, may be key to understanding the donor's motivation to continue donating.

An additional personal influence that is clearly relevant for donor retention is self-identity; a donor's concept of themselves as a person who donates blood.^{28, 29, 30, 31} Drawing on identity theory,^{32, 33} Piliavin³⁴ proposed that individuals who have given blood in the past may come to internalize the identity of being a blood donor, with the relationship between past and future blood donation behavior being via self-identity and intention. In the few studies of donors and non donors that have examined the role of self-identity on blood donation intentions,^{13, 16, 20} results revealed a significant direct relationship between self-identity and intention to donate blood, particularly for those who had donated blood two times or more.²⁹

Aims of Current Study

In this study we focused specifically on donor retention by examining a number of factors that may contribute to experienced donors' intentions to donate blood as well as their

repeat donation behavior. To date, only France et al.¹⁷ have used modeling techniques (rather than the commonly used hierarchical regression) to represent the relationships amongst the extended TPB predictors in predicting experienced donors' intentions. As such, we contribute further to this literature in using structural equation modeling to represent the relationships between the extended TPB variables and donors' intentions as well as their donation behavior. Our hypothesized model was derived from previous research and specifically sought to extend the model obtained by France et al.¹⁷ in their recent analysis (see Figure 2). The proposed model incorporated attitude, subjective norm, self-efficacy, moral norm, anticipated regret, donation anxiety and self-identity as predictors of intention (see Figure 3). In line with the results of France et al.,¹⁷ we predicted that the effects of self-efficacy, moral norm, and donation anxiety on intention would be mediated via their effects on attitude (see Figure 3). Further, based on previous blood donation research,²¹ we expected that intention would be the sole predictor of behavior (with direct paths from self-efficacy, moral norm and anticipated regret to behavior also considered).¹² Similar to France et al.¹⁷ the comparative fit of the proposed model (Figure 3) to the data was compared to both the basic TPB model (Figure 1) and the model derived directly from the results of the France et al.¹⁷ analysis (Figure 2). It should be noted, however, that the current study does not comprise a direct re-test of the France et al.¹⁷ model as only donor anxiety at donating in the future was assessed rather than blood donation reactions or donor satisfaction as in France et al.¹⁷. Further, whilst France et al.¹⁷ sought only to predict intention to (re)donate, in the current study we also assessed actual re-donation behavior.

MATERIALS AND METHODS

Participants and Design

Two hundred and sixty three (101 men, 159 women, 3 undisclosed) residents of Queensland, Australia who were blood donors self selected to complete an initial survey on

blood donation. These donors were mostly married (70.2%) and had either finished high school or attended college/university (84.4%) and were aged 35-64 years (75.1%). Of these donors, 182 returned the follow-up survey sent out 3 months later (60 male, 122 female). Similar to the initial sample, these respondents were mostly married (63.7%) and had either finished high school or attended college/university (86.5%), and were in the age range 35-64 years (70.9%). Whilst a small number of respondents could not remember how often they had donated blood in the past (6.6%), the majority of the sample was experienced with a total of 83.4% having given blood more than twice in the past. Most of these donors indicated that they had given between 2 to 10 donations across their donor career (38.1%).

Measures

Theory of Planned Behavior

The initial survey included items designed to assess the standard TPB constructs of attitude, subjective norm, self-efficacy, and intention. In addition, moral norm, self-identity as a blood donor, anticipated regret (at not donating blood) and donation anxiety were also measured. Three months later, the second survey assessed participants' self-reported blood donation behavior (i.e., whether during the previous three months the person had attended a blood bank with the intention of donating blood) in the 3 months between the first and second survey. Standard TPB measures were based on the guidelines provided by Ajzen¹⁸ and measures for the additional constructs were derived from other extended TPB blood donation studies. All multi-item measures had good internal reliability (all α s > .77) and composite measures were created such that higher scores indicated more positive or stronger levels of each construct.

Attitude. Attitude towards donating blood in the next three months was assessed by participants rating the degree to which donating blood in the next 3 months would be

unpleasant/pleasant, bad/good, unsatisfying/satisfying, pointless/worthwhile, unrewarding/rewarding and *stressful/relaxing* on 7-point scales.

Subjective norm. Subjective norm was measured using three items: “People who are important to me would recommend that I donate blood”, “People who are important to me would think I should donate blood” both scored 1 (*strongly disagree*) to 7 (*strongly agree*), and “If I were to donate blood, people who are important to me would – “1 (*strongly disapprove*) to 7 (*strongly approve*).

Self-efficacy. Two items measured self-efficacy: “It would be easy for me to donate blood in the next 3 months” (1 *strongly disagree* to 7 *strongly agree*) and “I am confident that I will be able to donate blood in the next 3 months (1 *not confident at all* to 7 *very confident*).

Intention. Intention to donate blood within the next 3 months was assessed using three items: “I would like to donate blood in the next 3 months”, “I intend to donate blood in the next 3 months”, both scored 1 (*strongly disagree*) to 7 (*strongly agree*) and “I will donate blood in the next 3 months (1 *very unlikely* to 7 *very likely*).

Moral norm. Moral norm was measured using four items based on those used by Godin et al.¹⁵ and Lemmens et al.¹⁰: “I believe I have a moral obligation to donate blood”, “It is in line with my principles to donate blood”, “My personal values encourage me to donate blood” and “I have a responsibility to donate blood” all scored from 1 (*strongly disagree*) to 7 (*strongly agree*).

Self-identity. Self-identity was measured using three items based on Terry et al.³⁵: “I am the kind of person who donates blood”, “Blood donation is important to me”, and “Donating blood is a part of who I am” all scored 1 (*strongly disagree*) to 7 (*strongly agree*).

Anticipated regret. Anticipated regret was measured using three items based on Godin et al.,¹⁵ with the stem of “In the future if I did not donate blood”: “I would regret it”,

“It would bother me”, and “I would be disappointed” and all scored from 1 (*very unlikely*) to 7 (*very likely*).

Donation anxiety. Donation anxiety was measured using two items based on Robinson et al.,¹¹ with the stem of “In the future, if I donate blood, I would feel”: “distressed” and “anxious”. Responses to these items were scored 1 (*not at all*) to 7 (*very much*).

Behavior. Actual blood donation behavior was assessed in the second questionnaire sent 3 months after the return of the initial questionnaire. Participants were asked to indicate if they had “visited a blood collection site in the last 3 months with the intention of donating blood”, regardless of whether actual blood donation occurred. Responses to this question were scored 1 (*yes*) or 0 (*no*). Those who indicated that they had donated blood were then asked to provide further details (e.g., when and where they had donated) to improve the reliability of the self-report data.

Demographic details. A range of demographic questions focusing on age, gender, marital status, and level of education were included in the survey. In addition, participants were asked how often they had donated blood in the past (*less than twice before, 2-10 times, 10-20 times, 21-50 times, 50+ times, don't know*).

Statistical Analysis

The data were initially analyzed to confirm correlational relationships between the potential predictors (attitude, subjective norm, self-efficacy, moral norm, self-identity, donation anxiety, and anticipated regret) and both intention and behavior. Subsequent structural equation models were conducted using Mplus 4.1 computer software.³⁶ Consistent with France et al.¹⁷ all exogenous variables in the model were allowed to correlate. Because of the categorical nature of one of the dependent variables in the analyses (behavior), the models were estimated using a robust weighted least squares estimator.³⁷ A number of goodness-of-fit indices were calculated and examined for each of the tested models –

specifically chi-square, a comparative fit index (CFI), root mean square error of approximation (RMSEA) and, due to the presence of the categorical outcome variable, the weighted root mean square residual (WRMR). Within structural equation modeling, it is desirable that the chi-square statistic is non-significant, and that the CFI is above .95.³⁸ In addition, RMSEA should be below .08³⁹ or .06⁴⁰ and WRMR below .90.³⁶

RESULTS

Correlational Analyses

As shown in Table 1, preliminary correlational analysis revealed that all of the predictors were significantly correlated with behavioral intention (all $ps < .01$). Self-identity as a blood donor had the strongest positive relationship with intention to donate blood within the next 3 months, followed by self-efficacy, moral norm, anticipated regret, attitude, and subjective norm. Anxiety about donating blood again in the future (donation anxiety) had a significant negative relationship with intention as expected. In addition, with the exception of donation anxiety, all predictors were significantly associated with behavior at Time 2. Intention to donate blood within the next 3 months demonstrated the strongest relationship with behavior, with self-efficacy, self-identity as a blood donor, attitude, moral norm, anticipated regret, and subjective norm all positively associated with blood donation behavior (all $ps < .01$).

Test of the Models

In line with the procedure adopted by France et al.¹⁷ first the basic TPB model was compared with the model derived from the results of France et al.¹⁷ (see Figure 2) to confirm the conclusion that their model improved upon the basic TPB model. This comparison was achieved by specifying a model similar to the France et al.¹⁷ model but where the paths between moral norm, donation anxiety, self-efficacy and attitude were set to 0 as were the paths between anticipated regret, self-identity and intention. The results of the goodness-of-fit

tests for all of the tested models are presented in Table 2. Results revealed that all fit indices and statistics indicated that the France et al.¹⁷ model provided a superior fit to the data than the basic TPB model.

Next, the fit of the proposed model was calculated (Figure 3). This model comprised a revision of the France et al.¹⁷ model, with the addition of paths between anticipated regret, self-identity and intention. Examination of the goodness-of-fit indices (Table 2) indicated that the fit between the proposed model and the data was acceptable, and that the proposed model provided a superior fit to the data than the model derived by France et al.¹⁷ However, the model modification indices results also indicated that the fit between the model and data could be improved further with the inclusion of a path between self-identity and attitude. In contrast to recent analyses suggesting the inclusion of additional predictors for behavior in repeat donor samples,¹² further modifications involving self-efficacy, moral norm, and anticipated regret were not indicated.

Examination of the goodness-of-fit indices from Table 2 indicated that fit between the revised model (see Figure 4) and the data was good, with the comparative fit index, RMSEA and the WRMR all within their acceptable ranges. The final model revealed donation anxiety, moral norm, and self-identity as indirect predictors of intention via attitude and attitude, self-efficacy, and anticipated regret as direct predictors of intention (subjective norm was not a significant predictor in the model). Intention emerged as the only predictor of repeat blood donation behavior. Overall, the final model accounted for 51% of the variance in attitudes, 86% of the variance in intention, and 70% of the variance in behavior.

DISCUSSION

Drawing on France et al.¹⁷ and the results of previous studies,^{15, 12} the current study used an augmented TPB model to explore both the determinants of experienced blood donors' intentions to donate, as well as their repeat donation behavior. The proposed model

considered the direct effects of attitude, subjective norm, self-efficacy, anticipated regret, and self-identity as a blood donor on intention to donate and the indirect influence (via attitude) of moral norm, donation anxiety, and self-efficacy on blood donation intentions. The role of intention, self-efficacy, moral norm, and anticipated regret as predictors of actual repeat donation behavior was explored also. The proposed model was contrasted with the basic TPB model and an amended model suggested by the results of France et al.¹⁷ incorporating donation anxiety to represent concern about negative reactions to the donor's previous donations.

The results of the current study revealed that, whilst the initially proposed model provided a better fit to the data than either the basic TPB or the France et al.¹⁷ model, a further revised model incorporating self-identity as a blood donor as an indirect predictor of intention (through attitude) provided the best fit. As such, these data provide support for augmenting the basic TPB model with variables that are of specific relevance to blood donation (e.g., donation anxiety) and account for the previous experience of the sample with the behavior in question (e.g., self-identity as a blood donor). The combination of such variables in the current study accounted for a substantial amount of variance in experienced donors' attitudes, intentions, and, perhaps most critically, in their actual donation behavior.

Determining Behavior

The data suggest that, for these experienced donors, blood donation is still a behavior which is, at least partially, the product of a rational decision making process (cf²⁹) as captured in the TPB constructs of intention, attitude and self-efficacy. For these donors, the perceived 'pressure' to donate does not originate from external sources such as important others (cf^{14, 17, 20}) but is more internally driven, with respondents' own personal moral norms and conceptualizations of self as a blood donor (i.e., self-identity) serving to shape their attitudes toward blood donation, their subsequent intentions to donate blood, and ultimately

their blood donation behavior. Future donor retention efforts, then, should focus on maintaining positive attitudes toward donation by enhancing donors' perceived responsibility or moral obligation to donate (i.e., blood donation as something that one should do^{12,15}) and reinforcing their blood donor identity. This outcome could occur by making donors aware that their behavior is consistent with that of an established blood donor as well as continuing to provide role cues and signs (e.g., badges or car stickers that disclose their role identity⁴¹) which will allow others to easily identify them by their blood donor role.^{29, 42, 43, 44}

Self Efficacy

Consistent with much previous blood donation research involving both donors and non donors,^{13, 17, 20} a sense of efficacy over donating blood was revealed also as an important direct influence on blood donation intentions, but not on donation behavior. Potentially the direct link between efficacy and behavior may develop over a longer time period when perceptions of control start to approximate actual control^{12, 18}. Specifically, those donors who believed that blood donation was easy and was something that they were confident they could do were more likely to intend to donate. Although donors by definition have donated blood in the past and have shown themselves that they are capable of donating blood, it is likely that donors' intentions may still be impacted upon by structural or organizational elements related to the act of donating blood (e.g., perceived inconvenience, being too busy, blood donation process taking too long).^{7, 20, 43, 45, 46} Thus, future blood donor retention strategies should aim to enhance a sense of efficacy over donation by focusing on convenience (e.g., the ease of accessibility of donation centre locations and opening hours⁴⁶) and overcoming competing time demands and structural elements by making blood donation a planned behavior (through, for example, the routine scheduling of appointments) similar to that undertaken when attending the doctor or dentist.³⁰ Given its emergence as the strongest predictor of

donors' intentions (in terms of co-efficient size), a focus on self-efficacy in future interventions designed to increase blood donation intentions may prove particularly effective.

Anticipated Affective Consequences

The results of the current study also reveal an important role for negative affective influences in the decision to continue to donate blood. Negative affective experiences as a result of donating blood (i.e., donation anxiety) influenced intentions to donate indirectly via attitude, with those who believed they were less likely to experience distress or anxiety citing more positive attitudes. Thus, to foster continued positive blood donation attitudes, one potential retention strategy for donors at a more advanced stage of their donor career may be to ensure that each donation experience is positive or as minimally distressing as possible (see also ¹⁷). For these experienced donors, who may not be particularly inherently anxious about the process of donating blood, it may be important to minimize situational causes of vasovagal reactions (e.g., dehydration⁴⁷) that may result in the development of anxiety⁴⁸ or provide strategies to cope with the experience of such anxiety or distress.⁴⁹ A more direct affective influence on blood donation intentions was the anticipated negative emotional experience of regret resulting from *not* donating blood (i.e., anticipated regret), with those donors who anticipated reacting negatively if they did not donate blood reporting stronger intentions to donate. Future efforts to encourage repeat donation should emphasize the negative emotions of regret or disappointment that are likely to be experienced if one fails to donate blood (see also^{12, 15}).

Conclusions

In determining the key factors underpinning the intentions and, more importantly, the behavior of established blood donors, the results of the current study provide strong support for the utility of an augmented TPB framework and represents one of the first attempts to predict blood donation behavior (rather than just intentions) using structural equation

modeling. The results of the current study are largely consistent with the results of previous research^{12, 15, 17} in identifying the key motivators of blood donors; however, some questions remain as to the direct or indirect relationship of a number of predictors with intention and/or behavior. Whilst moral norm, anticipated regret, and self-identity as a blood donor have all been noted in previous research as consistent predictors of intention to engage in repeat donation (if not behavior), their relationship as either direct or indirect predictors of intention is less well agreed on. Analyses primarily undertaken using regression techniques^{13, 15} have identified direct predictive roles of moral norm,^{12, 13, 15} anticipated regret,^{12, 15} and self-identity as a blood donor^{13, 20} on intention. In contrast, recent analyses undertaken using structural equation modeling,¹⁷ along with the results of the current study, suggest that the paths between at least some of these constructs and intention are best conceptualized as being indirect.

The discrepancy in results may simply be a function of the analytical strategy undertaken, reflect the use of mixed samples of donors and non donors in some studies,^{13, 20} or the failure to differentiate adequately between donors at different stages of their donation career (i.e., how many times they have previously given blood). In instances where such details about donation experience have been provided, the experience of the donors is limited whereas, in the current analysis, of those who could recall the number of prior donations they had given, 89.3% had donated blood more than 2 times in the past (with the mode being between 2-10 donations) suggesting a sample somewhat more advanced in their donor career. It is likely that the key determinants of the intention to donate blood and the behavior of blood donation will change the more often a donor donates blood⁴³. As such, the differences between the current results and those obtained in previous studies may reflect the varying determinants of blood donation intentions and behaviors across the different stages of the donor career. Alternatively, the results may reflect the tendency for donors who have donated

a larger number of times to self-select into the study, or may be due to the relatively short 3-month follow-up period. This short follow-up period may have only allowed an enactment of the behavior by those respondents who were the most frequent or committed donors.

Future replication of the model identified in the current study with more evenly distributed and larger samples of donors, along with a longer follow-up period, is critical to verify the importance of the key predictors of established donors' intentions and behavior documented in the current research. Such replication will also help to ensure that the results obtained in the current study do not simply reflect capitalization on chance relationships present within our data. At present, it remains unclear within the literature as to precisely how the extended TPB constructs (e.g., moral norm) align to predict donors' intentions and behavior (i.e., whether they are direct or indirect relationships), and at what stages of the donor career this model can be augmented usefully by additional constructs such as self-identity. Future research investigating the motivations of experienced donors should adopt a longitudinal perspective, incorporating precise assessments of donation history (either through detailed self report, or objective records of behavior) to document accurately how the motivations of these donors evolve over both time and the number of donations given.^{30, 43, 50}

One further limitation of the current study relates to the two-item measure of donation anxiety. While the donation anxiety items used in the present study measured feelings of anxiety and distress, the measure failed to assess physiological reactions (e.g., dizziness, nausea) that may be experienced when donating blood.⁵¹ These physiological reactions have been demonstrated as an important factor in the decision to return for subsequent blood donations.^{26, 52} Future research should include an assessment of potential physiological reactions as well as donation anxiety to further clarify the impact of anxiety and physiological reactions on the decision to continue to donate blood in the future. Using the Blood Donation

Reactions Inventory,⁵³ which is a well established and validated scale of presyncopal reactions to donating, may assist in achieving this aim.

While the body of research that differentiates non donors from donors is growing,^{12, 15} we still know very little about the developmental process by which first-time donors become regular donors.⁷ With donor retention a key issue, knowing what motivates an existing donor to continue to donate remains critical to the maintenance of the blood supply worldwide.

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REFERENCES

1. Stephen N. Review of the Australian blood banking and plasma product sector, a report to the Commonwealth minister for health and aged care by a committee chaired by the Rt, Hon Sir Ninian Stephen. AGPS: Canberra, 2001.
2. Flood P, Wills P, Lawler P, et al. Review of Australia's plasma fractionation arrangements. Canberra: Commonwealth of Australia, 2006.
<http://www.donateblood.com.au/admin%5Cfile%5Ccontent1%5Cc5%5Creportdec06.pdf>
Accessed August, 2007.
3. Linden JV, Gregorio DI, Kalish RI. An estimate of blood donor eligibility in the general population. *Vox Sang* 1988;54:96-100.
4. McVittie C, Harris L, Tiliopoulos N. "I intend to donate but...": Non donors' views of blood donation in the UK. *Psychol Health & Med* 2006;11:1-6.
5. Chamla JH, Leland LS, Walsh K. Eliciting repeat blood donations: Tell early career donors why their blood type is special and more will give again. *Vox Sang* 2006;90:302-307.
6. O'Brien SF. Donor research: the foundation for a healthy blood supply. *Transfusion* 2006;46:1069-1071.
7. Callero PL, Piliavin JA. Developing a commitment to blood donation: The impact of one's first experience. *J Appl Soc Psychol* 1983;15:283-293.
8. Ibrahim NA, Mobley MF. Recruitment and retention of blood donors: a strategic linkage approach. *Health Care Management Review* 1993;18(3):67-73.
9. Royse D, Doochin KE. Multi-gallon blood donors: Who are they? *Transfusion* 1995;35:826-831.

10. Lemmens KPH, Abraham C, Hoekstra T, et al. Why don't young people volunteer to give blood? An investigation of the correlates of donation intentions among young nondonors. *Transfusion* 2005;45:945-955.
11. Robinson NG, Masser BM, White KM, et al. Predicting intentions to donate blood among non-donors in Australia: An extended Theory of Planned Behavior. *Transfusion*, in press.
12. Godin G, Conner M, Sheeran P, et al. Determinants of repeated blood donation among new and experienced blood donors. *Transfusion* 2007;47:1607-1615.
13. Armitage CJ, Conner M. Social cognitive determinants of blood donation. *J Appl Soc Psychol* 2001;31:1431-1457.
14. Giles M, Cairns E. Blood donation and Ajzen's theory of planned behaviour: An examination of perceived behavioural control. *Br J Soc Psychol* 1995;34:173-188.
15. Godin G, Sheeran P, Conner M, et al. Factors explaining the intention to give blood among the general population. *Vox Sang* 2005;89:140-149.
16. McMahon R, Byrne M. Predicting donation among an Irish sample of donors and nondonors: Extending the theory of planned behavior. *Transfusion* 2008;48:321-331.
17. France JL, France CR, Himawan LK. A path analysis of intention to redonate among experienced blood donors: An extension of the theory of planned behavior. *Transfusion* 2007;47:1006-1013.
18. Ajzen I, The theory of planned behavior. *Organ Behav Hum Dec* 1991;50:179-211.
19. Amponsah-Afuwape SA, Myers LB, Newman SP. Cognitive predictors of ethnic minorities' blood donation intention. *Psychol Health Med* 2002;7:357-361.
20. Giles M, McClenahan C, Cairns E, et al. An application of the theory of planned behaviour to blood donation: The importance of self-efficacy. *Health Educ Res* 2004;19:380-391.

21. Ferguson E. Predictors of future behaviour: A review of the psychological literature on blood donation. *Br J Health Psychol* 1996; 1:287-308.
22. Manstead ASR. The role of moral norm in the attitude-behavior relation. In: Terry DJ, Hogg MA, editors. *Attitudes, behavior, and social context: The role of norms and group membership*. New Jersey: Lawrence Erlbaum, 2000:11-30.
23. Farley SD, Stasson MF. Relative influences of affect and cognition on behavior: Are feelings or beliefs more related to blood donation intentions? *Exp Psychol* 2003;50:55-62.
24. Breckler SJ, Wiggins EC. Scales for the measurement of attitudes toward blood donation. *Transfusion* 1989;29:401-404.
25. Ditto B, France CR. The effects of applied tension on symptoms in french-speaking blood donors: A randomized trial. *Health Psychol* 2006;25:433-437.
26. France CR, France JL, Roussos M, et al. Mild reactions to blood donation predict a decreased likelihood of donor return. *Transfus Apher Sci* 2004;30:17-22.
27. Labus JS, France CR, Taylor BK. Vasovagal reactions in volunteer blood donors: Analyzing the predictive power of the medical fears survey. *Int J Behav Med* 2000;7:62-72.
28. Bagozzi RP. Attitudes, intentions and behavior: A test of some key hypotheses. *J Pers Soc Psychol* 1981;41:607-627.
29. Charng H, Piliavin JA, Callero PL. Role identity and reasoned action in the prediction of repeated behavior. *Soc Psychol Quart* 1988;51:303-317.
30. Ferguson E, France CR, Abraham C, et al. Improving blood donor recruitment and retention: Integrating theoretical advances from social and behavioral science research agendas. *Transfusion* 2007;47:1999-2010.

31. Piliavin JA. Is the road to helping paved with good intentions? Or inertia based on habit. In Howard J, and Callero PL, editors. *The self-society interface: Cognition, emotion, and action*. Cambridge: Cambridge University Press, 1991:259-280.
32. Stryker S. Identity salience and role performance: The relevance of symbolic interaction theory for family research. *J Marriage Fam* 1968;30:558-564.
33. Stryker S. Identity theory: Developments and extensions. In: Yardley K, Honess T, editors. *Self and identity: Psychological perspectives*. New York: John Wiley & Sons, 1987:89-103.
34. Piliavin JA. Why do they give the gift of life? A review of research on blood donors since 1977. *Transfusion* 1990;30:444-459.
35. Terry DJ, Hogg MA, White KM. The theory of planned behaviour: Self-identity, social identity and group norms. *Br J Soc Psychol* 1999;38:225-44.
36. Muthén LK & Muthén BO. *Mplus statistical software*. Los Angeles, CA. 1998-2007.
37. Muthén BO, du Toit, SHC & Spisic D. Robust inference using weighted least squares and quadratic estimating equations in latent variable modeling with categorical and continuous outcomes. Retrieved June 30, 2008, from <http://www.gseis.ucla.edu/faculty/muthen/psychometrics.htm>
38. Byrne BM. *Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications and programming*. Mahway, NJ: Lawrence Erlbaum Associates, 1998.
39. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, editors. *Testing structural equation models*. Newbury Park, CA: SAGE Publications, 1993:136-162.
40. Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling* 1999;6:1-55.

41. Banton MP. Roles: An introduction to the study of social relations. London: Tavistock, 1965.
42. Collier PJ, Callero PJ. Role theory and social cognition: Learning to think like a recycler. *Self and Identity* 2005;4:45-58.
43. Masser BM, White KM, Hyde MK, et al. The psychology of blood donation: Current research and future directions. *Transfus Med Rev* 2008;22:215-233.
44. Turner RH. The role and the person. *Am J Sociol* 1978;84:1-23.
45. McKeever T, Sweeney MR, Staines A. An investigation of the impact of prolonged waiting times on blood donors in Ireland. *Vox Sang* 2006; 90:113-118.
46. Schreiber GB, Schlumpf KS, Glynn SA et al. Convenience, the bane of our existence, and other barriers to donating. *Transfusion* 2006: 46:545-553.
47. Newman BH, Tommolino E, Andreozzi C, et al. The effect of a 473-mL (16-oz) water drink on vasovagal donor reaction rates in high-school students. *Transfusion* 2007;47: 1524-1533.
48. Rader, A.W., France, C.R., Carlson, B. Donor retention as a function of donor reactions to whole-blood and automated double red cell collections. *Transfusion* 2007: 47:995-1001.
49. France CR, Montalva R, France JL, Trost Z. Enhancing attitudes and intentions in prospective blood donors: Evaluation of a new donor recruitment brochure. *Transfusion* 2008; 48:526-530.
50. Ferguson E, Bibby PA. Predicting future blood donor returns: Past behavior, intentions, and observer effects. *Health Psychol* 2002; 21:513-518.
51. Meade MA, France CR, Peterson LM. Predicting vasovagal reactions in volunteer blood donors. *J Psychosom Res* 1996;40:495-501.

52. France CR, Rader A, Carlson B. Donors who react may not come back: Analysis of repeat donation as a function of phlebotomist ratings of vasovagal reactions. *Transfus Apher Sci* 2005;33: 99-106.
53. France CR, Ditto B, France JL, Himawan LK. Psychometric properties of the Blood Donation Reactions Inventory: A subjective measure of presyncopal reactions to blood donation. *Transfusion*, 2008 Jul 22. [Epub ahead of print] PMID: 18657080].

TABLE 1.

Descriptive data and zero order correlations among among Theory of Planned Behavior variables, moral norm, anticipated regret, donation anxiety and self-identity ($n = 178$)

	1	2	3	4	5	6	7	8	9
1. Behavior		.64***	.42***	.34***	.63***	.40***	.38***	-.14	.48***
2. Intention			.58***	.44***	.69***	.62***	.58***	-.21**	.70***
3. Attitude				.35***	.48***	.61***	.48***	-.41***	.67***
4. Subjective Norm					.44***	.55***	.41***	-.12	.44***
5. Self-Efficacy						.56***	.47***	-.17*	.65***
6. Moral Norm							.62***	-.23**	.79***
7. Anticipated Regret								-.17*	.61***
8. Donation anxiety									-.30***
9. Self-identity									
<i>M</i>	1.41	5.57	6.03	5.45	5.05	5.84	5.28	2.27	5.69
<i>SD</i>	0.49	1.63	1.01	1.30	2.00	1.20	1.74	1.33	1.39

* $p < 0.05$. ** $p < .01$. *** $p < .001$.

TABLE 2.**Goodness-of-fit test result for each model**

Model	χ^2 (d.f.)*	CFI**	RMSEA***	WRMR****
TPB	75.37** *(12)	0.77	0.17	2.13
France et al. (2007)	47.20*** (10)	0.87	0.15	1.66
Proposed model	25.17** (10)	0.95	0.09	1.11
Revised model	7.72(9)	1.00	0.00	0.62

* A non-significant chi-square is desirable; ** CFI = comparative fit index, with a range of 0.00-1.00. > .95 is acceptable; ***RMSEA = root mean square error of approximation. Lower limit is 0.00 and < 0.06 is acceptable; ****WRMR = weighted root mean square residual, <.90 is acceptable.

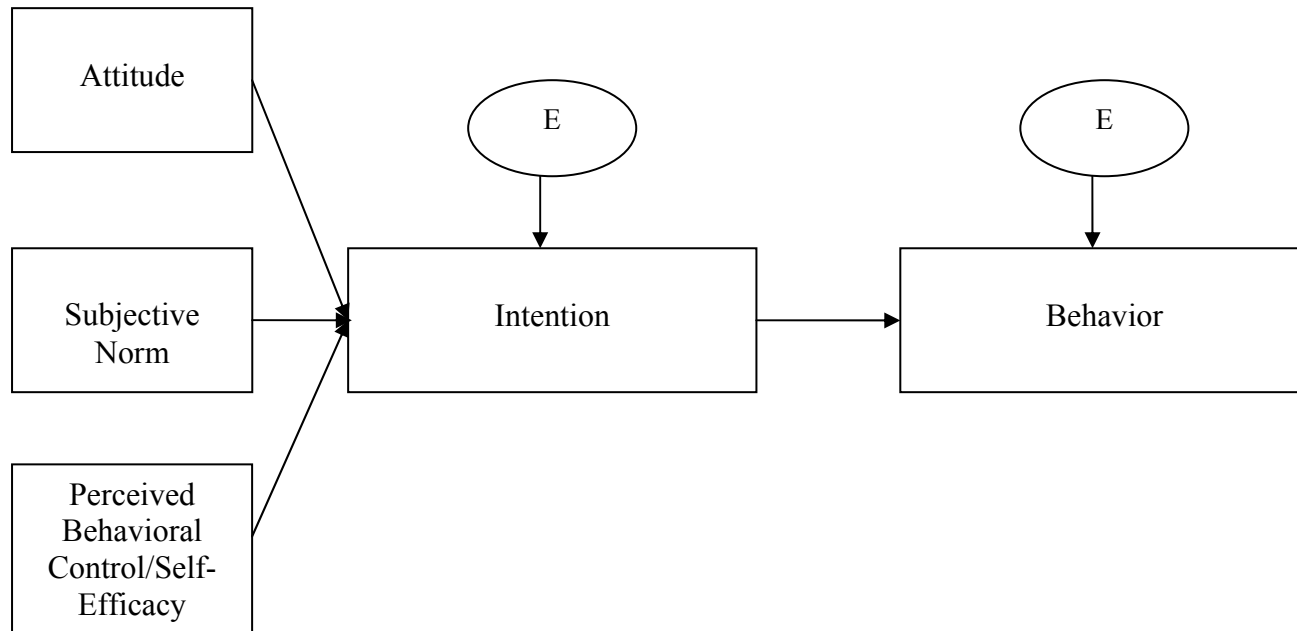


Figure 1. Basic Theory of Planned Behavior model

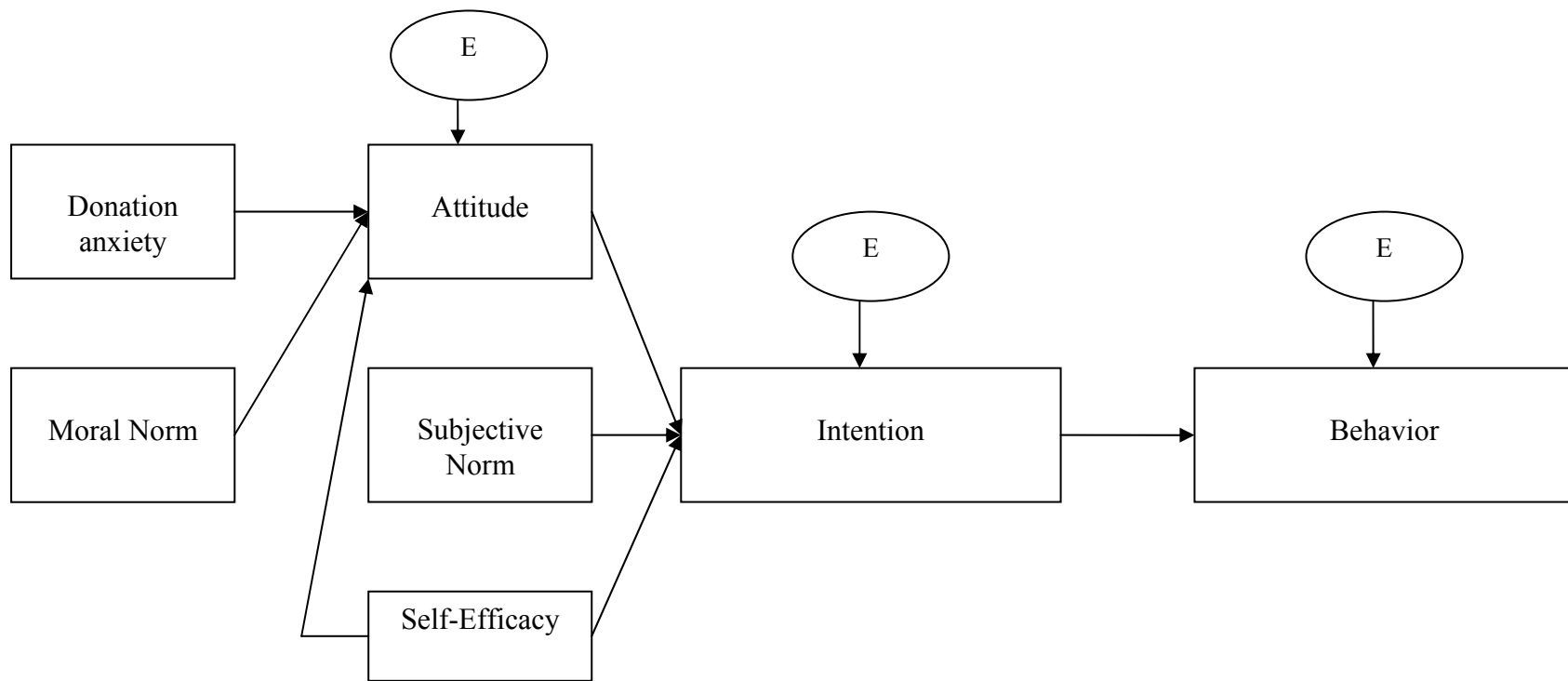


Figure 2. Suggested model from the results of France et al. (2007)

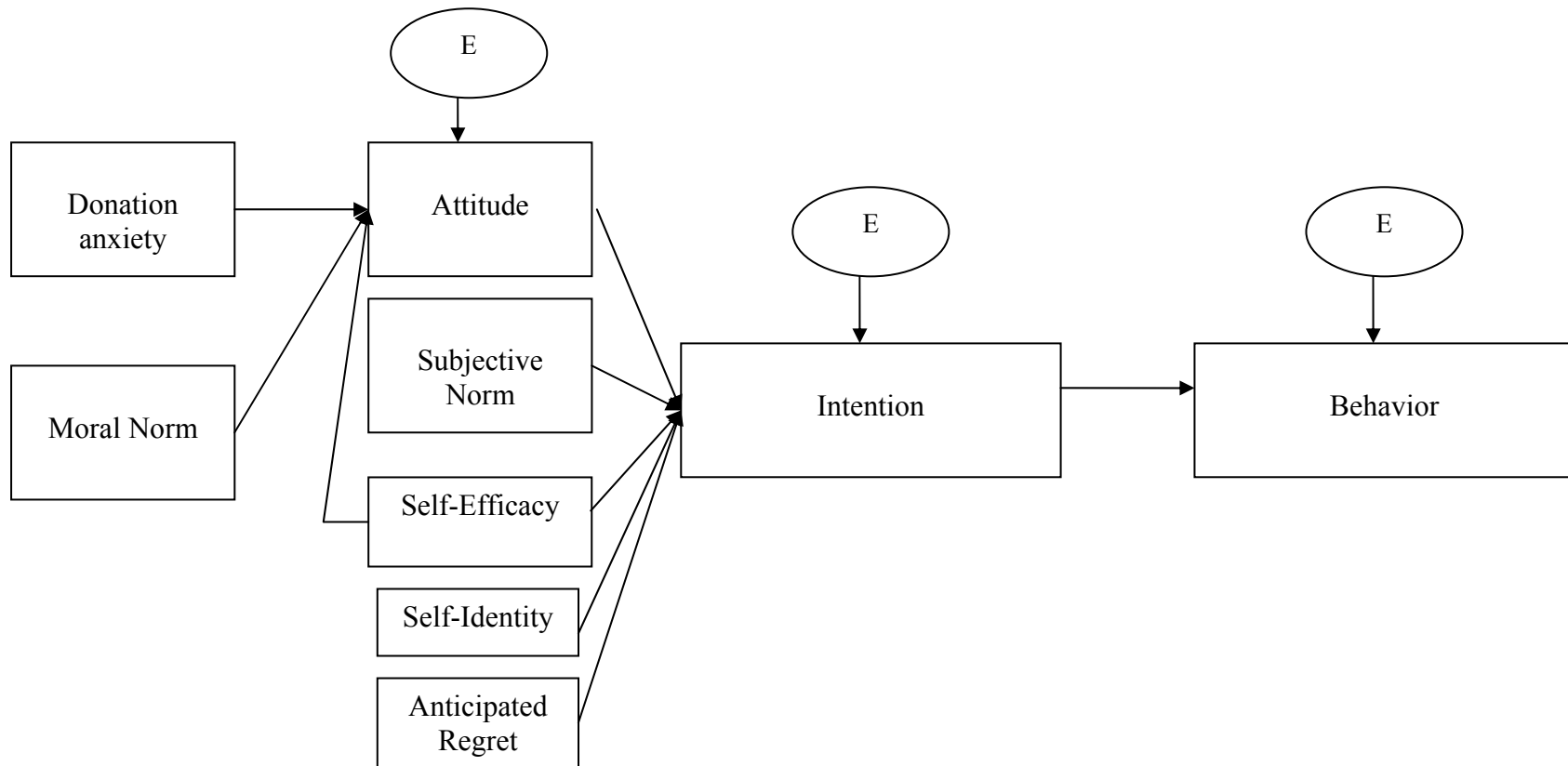


Figure 3. Proposed model

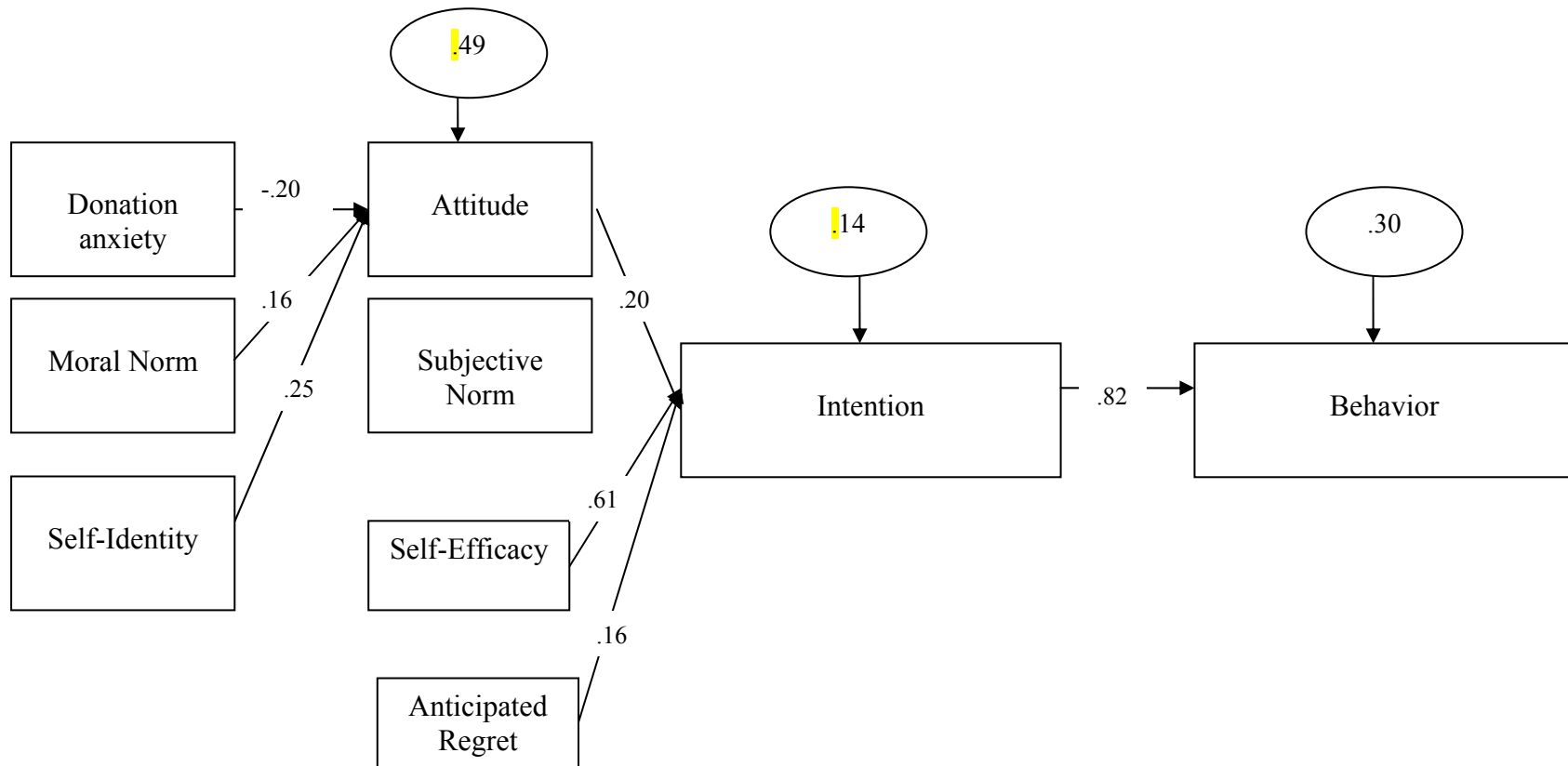


Figure 4. Revised model with standardized path coefficients (all paths $p < .05$, non-significant paths omitted)