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Testing an extended Theory of Planned Behavior to predict young people's intentions to join
a bone marrow donor registry

Melissa K. Hyde and Katherine M. White

School of Psychology and Counselling, Institute of Health and Biomedical Innovation,
Queensland University of Technology

Author Note

Melissa K. Hyde, School of Psychology and Counselling, Institute of Health and Biomedical Innovation, Queensland University of Technology; Katherine M. White, School of Psychology and Counselling, Institute of Health and Biomedical Innovation, Queensland University of Technology.

Correspondence concerning this article should be addressed to Melissa K. Hyde, School of Psychology and Counselling, Queensland University of Technology, Victoria Park Road, Kelvin Grove. Brisbane, Queensland, 4059, Australia. Telephone: +61 7 3138 4887. Fax: +61 7 3138 0486.

Email: mk.hyde@qut.edu.au

Abstract

An extended Theory of Planned Behavior (TPB) was used to understand the factors, particularly control perceptions and affective reactions given conflicting findings in previous research, informing younger people's intentions to join a bone marrow registry. Participants ($N = 174$) completed attitude, subjective norm, perceived behavioral control [PBC], moral norm, anticipated regret, self-identity and intention items for registering. The extended TPB (except PBC) explained 67.2% of variance in intention. Further testing is needed as to the volitional nature of registering. Moral norm, anticipated regret, and self-identity are likely intervention targets for increasing younger people's bone marrow registry participation.

Key words: bone marrow donation, bone marrow registry, theory of planned behavior

Bone marrow registries worldwide play a vital role in recording the substantial number of people willing to be contacted for donation given that only 1 in 3 people needing a transplant will find a donor match within their family (Australian Bone Marrow Donor Registry [ABMDR], 2010a). The number of registered donors, however, is still insufficient to meet demands (Glasgow & Bello, 2007; Studts, Ruberg, McGuffin, & Roetzer, 2010). Continued recruitment of underrepresented groups, particularly young people aged between 18 and 30 years (ABMDR, 2010b), is critical to ensure sufficient diversity on the registry to meet patient needs. Younger people are optimal targets for recruitment because they remain on the registry for a longer period of time, are likely to be in good health, and offer better clinical outcomes for patients (ABMDR, 2010b). Consistent with the ABMDR's recommendation to increase the number of registry members aged between 18 and 30 years, the purpose of this research is to understand the factors contributing to young people's decisions to join the ABMDR.

In the blood (Armitage & Conner, 2001a) and organ (Hyde & White, 2009) donation context, a popular choice to understand donation decisions is to use established attitude-behavior models such as the Theory of Planned Behavior (TPB) (Ajzen, 1991). The relationship between attitudes to donate bone marrow or join a registry, intention and behavior, however, has received little consideration (Anker, Feeley, & Kim, 2010). Two exceptions are Bagozzi, Lee, and Van Loo (2001) and Anker et al. (2010) who examined the attitude-intention and attitude-behavior relationship, respectively. Several findings from these studies are noteworthy. First, Bagozzi et al. demonstrated that decisions related to bone marrow donation may involve volitional choice, providing support for the use of attitude-behavior models. Second, Bagozzi et al. found both affective attitude and evaluative attitude contributed independently to predicting intention to donate bone marrow. In contrast, Anker

et al. (2010) showed general positive attitudes, rather than affective influences specifically, were better predictors of bone marrow donation-related intention. These contrasting findings suggest the potential importance of assessing affective as well as traditional attitude measures to further explore their contribution in this context. Third, both Bagozzi et al. and Anker et al. highlighted the potential for control perceptions to inform decision-making. We use an extended TPB framework to build on these two studies by including an assessment of traditional TPB attitude measures as well as affective reactions (represented by anticipated regret) and exploring the suggestion that control perceptions may inform people's bone marrow donation decisions.

Theoretical Framework: Extended Theory of Planned Behavior

Briefly, the TPB specifies that a person's intentions are the most proximal predictor of his or her behavior. Intentions are informed by a person's attitude (positive or negative evaluation of behavior), subjective norm (perceived social pressure or approval for behavior), and perceived behavioral control (PBC) (perceived ease or difficulty and confidence in ability to perform a behavior; also informs behavior directly; Ajzen, 1991, 2002). To overcome limitations such as the weak influence of the normative component, the absence of an affective measure, and half the variance in intention unexplained, the TPB can be extended to include other variables of theoretical significance (Ajzen, 1991). Consistent with previous blood and organ donation studies (e.g., Armitage & Conner, 2001b; Godin, Conner, & Sheeran, 2005; Hyde & White, 2009; Lemmens et al., 2005), we include in an extended TPB framework an assessment of additional influences of moral norm (moral judgement that behavior is the right or wrong thing to do and perceived personal responsibility to perform it; Manstead, 2000), anticipated regret (expectation of experiencing a negative emotional reaction of regret due to action or inaction in a real or imagined situation; Sandberg & Conner, 2008), and self (donor)-identity (perception of a given behavior, as an act that is

consistent with, and of central importance to, a person's self-concept; Stryker, 1968) that may explain young people's intentions¹ to join the ABMDR.

The Present Study

Consistent with TPB specifications, it is hypothesized that: (1) younger people who have more positive attitudes toward joining the ABMDR, perceive more normative pressure or approval for joining the ABMDR, and have greater perceptions of control over joining the registry, will have stronger intentions to join; and (2) for the additional predictors, it is expected that younger people who believe joining the ABMDR is the right thing to do, anticipate experiencing regret about *not* joining, and believe joining the registry is consistent with their self-concept will have greater intentions to join the ABMDR. Finally, gender (being female) and age (being younger) often emerge as an influence in organ/tissue donation contexts (Radecki & Jaccard, 1997) and giving a blood sample is an essential step in joining a registry with those who have donated blood in the past likely to have stronger intentions to give blood in the future (Masser, White, Hyde, & Terry, 2008) and potentially join a bone marrow registry. Although not a central hypothesis, the predictors of gender, age, and past blood donation behavior were considered in the current study.

Method

Participants and Procedure

Ethical approval from the University Ethics Committee was granted prior to conducting the study. As part of a larger study on donation and volunteering behavior, students who had not previously registered as a bone marrow donor and were undertaking an undergraduate psychology subject (from a range of degree courses such as health, business, science, law, and psychology) at a large metropolitan university in Queensland, Australia were invited to complete a questionnaire about registering on the Australian Bone Marrow Donor Registry (ABMDR). Students ($N = 174$) aged between 18 and 30 years were recruited

via in-class announcements and eligible participants received research participation credit or entry into a prize draw to win one of four AUD\$50 music gift cards in appreciation of their participation. Students were given the option at Time 1 of data collection to provide their contact details on a separate sheet of paper if they consented to be contacted 3 months later for the Time 2 follow-up survey assessing their behavior. Questionnaires completed at both time points were matched via a participant generated code identifier to preserve anonymity.

Measures

Measures of the standard TPB predictors (Ajzen, 1991) and additional influences of moral norm, anticipated regret, and self-identity (Armitage & Conner, 2001a; Godin et al., 2005; Hyde & White, 2009) were obtained for the target behavior of registering as a bone marrow donor in the next 3 months. Items were measured on 7-point response scales (1 *strongly disagree* to 7 *strongly agree*) unless otherwise specified. Some negatively-worded items (subsequently reverse scored) were included to reduce response biases.

Behavior. Participants reported whether or not they registered on the ABMDR in the 3-month follow-up period using a one item measure - “In the past 3 months did you register as a bone marrow donor with the Australian Bone Marrow Donor Registry (i.e., performed all of the behaviors listed below and received confirmation that you are a fully registered bone marrow donor)?, scored 0 *no, in the past 3 months I did not register as a bone marrow donor* and 1 *yes, in the past 3 months I registered as a bone marrow donor*. To ensure that we captured the full range of behaviors related to registering as a bone marrow donor, those respondents who answered no to this question were then asked if in the previous 3-months they had performed any of the following behaviors and were encouraged to select as many as applied: (1) donate blood to undergo blood donor screening and tissue typing tests for the purposes of registering, (2) complete a blood donor declaration form and questions about medical history for the purposes of giving a blood sample to join the registry, (3) fill out the

ABMDR consent form; (4) read the ABMDR brochure; (5) think about registering as a bone marrow donor.

Attitude. Four semantic differential items, including two reversed scored items, assessed attitude (e.g. “For me to register as a bone marrow donor in the next 3 months would be”: *worthless-valuable*, *good-bad*). The average of these items formed a reliable attitude scale ($\alpha = .92$).

Subjective norm. Two items comprised the subjective norm measure (e.g. “Most people who are important to me would approve of me registering as a bone marrow donor in the next 3 months”) and the average of these two items formed the subjective norm scale, $r(170) = .60, p < .001$.

Perceived behavioral control (PBC). Two items measured PBC (e.g. “I have complete control over whether I register as a bone marrow donor in the next 3 months”). The average of these two items created the PBC scale. These items were correlated at $r(171) = .29, p < .001$.

Moral norm. Moral norm was measured using two items (e.g., “I feel I ought to register as a bone marrow donor in the next 3 months”). These items were averaged to create the moral norm scale, $r(171) = .72, p < .001$.

Anticipated regret. Two items measured anticipated regret (e.g., “If I did not register as a bone marrow donor in the next 3 months I would regret it”). These two items were averaged to create the anticipated regret scale, $r(171) = .73, p < .001$.

Self-identity. Self-identity as a registered bone marrow donor was measured using two items (e.g., “I am the type of person who would register as a bone marrow donor”, scored 1 *completely false* to 7 *completely true*). These two items were averaged to create a self-identity scale, $r(171) = .59, p < .001$.

Intention. The measure of *intention* to register comprised two items (e.g., “I intend to register as a bone marrow donor in the next 3 months”). These two items were averaged to form an intention scale, $r(171) = .67, p < .001$.

Past blood donation behavior. Participants indicated if they had donated blood or blood products in the past, coded as 0 (*no*) and 1 (*yes*).

Demographic measures. Participants reported their gender 1 (*male*) and 2 (*female*) and age in years.

Data Analyses

Initially, the number of participants performing the target behavior was identified. As expected, no respondents performed the target behavior of registering as a bone marrow donor on the ABMDR in the 3 month period; however, a small number of young people did perform one or more of the steps that form the process of registering as a bone marrow donor (e.g., donating blood for tissue typing). Therefore, while not ideal due to the lack of correspondence between the intention and behavior measures, the correlation analysis was used to examine the relationship between intention and the preparatory steps young people performed in relation to joining the bone marrow registry. To test the extended TPB in predicting intentions to join the bone marrow registry, correlations between the predictors and dependent variable were examined initially. Hierarchical multiple regression analysis was then used to identify the predictors of intentions to register as a bone marrow donor in the next 3 months. To test the effectiveness of the TPB, the standard TPB predictors of attitude, subjective norm, and PBC were entered in Step 1. To examine the utility of the additional predictors of moral norm, anticipated regret, and self-identity, these variables were entered in Step 2. Gender, age, and past blood donation behavior were entered in Step 3 to establish the contribution, if any, of these variables over and above the standard and additional TPB predictors.

Results

Descriptive Analysis

At Time 1, participants completing the questionnaire ($N = 174$) were predominantly Caucasian (70.7%), female (76.7%) students ranging in age from 18 to 30 years ($M = 19.49$ years; $SD = 2.23$ years). Thirty-two (18.2%) respondents reported having donated blood or blood products in the past. Overall, participants held only moderate intentions to register as a bone marrow donor. Inspection of the correlations between the predictors and dependent variable showed that moral norm, self-identity, and anticipated regret had the largest correlations with intention to register as a bone marrow donor (see Table 1).

Insert Table 1 about here

Regression Analysis

The linear combination of attitude, subjective norm, and PBC explained 30.5% of the variance in intention to register as a bone marrow donor, $F(3, 162) = 23.75, p < .001$ (Table 2). Including the additional predictors of moral norm, anticipated regret and self-identity in Step 2 explained a further significant 36.4% of the variance in intention, $F(3, 159) = 58.34, p < .001$. The addition of gender, age and past blood donation in Step 3 did not explain an additional significant amount of variance, $F(3, 159) = .42, p = .736$. Overall the model explained 67.2% (65.3% adjusted) of the variance in intention, with attitude, subjective norm (but not PBC), moral norm, anticipated regret, and self-identity all emerging as significant predictors of intention to register as a bone marrow donor, at the final step (Table 2).

Insert Table 2 about here

Correlational Analysis for Behavior

Three months later (Time 2), 93 participants self-reported their registration behavior (age $M = 19.70, SD = 2.15, 79.6\%$ female) for the preceding 3 months. At follow-up, no respondents reported registering as a bone marrow donor. However, some respondents ($n = 32$) reported donating blood to undergo blood donor screening and tissue typing tests for the

purposes of joining the registry ($n = 3$), completing a blood donor declaration form and questions about medical history for the purposes of giving a blood sample to join the registry ($n = 5$), completing the Australian Bone Marrow Donor Registry consent form ($n = 4$), reading the Australian Bone Marrow Donor Registry brochure ($n = 9$), and thinking about registering as a bone marrow donor ($n = 27$) (note that participants could choose multiple responses). Participant responses were then grouped as either having performed behavior related to joining the registry (coded as 1) or not having performed any behavior related to joining the registry (coded as 0) for the purposes of obtaining a correlation between the intention measure and behavior. Spearman's rho correlation revealed that intention to register as a bone marrow donor was correlated significantly with performing behavior/s related to registering as a bone marrow donor, $\rho(93) = .28, p < .01$.

Discussion

We used an extended TPB framework to advance previous research on bone marrow-related decisions (Anker et al., 2010; Bagozzi et al., 2001) by further elucidating the role of control perceptions as well as traditional versus affective attitudes in predicting young people's (18-30 years) intentions to join the ABMDR. The extended TPB explained 67% of the variance in younger people's intentions to join the ABMDR, with attitude, subjective norm, moral norm, anticipated regret, and self-identity significantly predicting intentions as hypothesized. In contrast to expectations and previous research (Anker et al., 2001; Bagozzi et al., 2001), PBC was not a significant predictor. Descriptively, we identified the behaviors performed related to joining the ABMDR and explored the intention-behavior relationship. Intention to join the registry was positively and significantly correlated with behaviors related to joining the registry.

The finding for PBC which differs from previous research may be due to the measure of control perceptions adopted in the current study. In contrast to previous research using

solely efficacy measures (e.g., Anker et al., 2010), the current study used both perceived control and efficacy (additional analysis testing efficacy-only measures obtained identical results). Alternatively the finding for PBC in the current study may suggest joining the registry as a solely volitional behavior within an individual's control. Alternatively, younger people may have initially considered joining the registry but the multi-step process of registering proved more challenging than expected. The finding that both attitude and anticipated regret about the thought of not joining the registry were significant predictors of intention further clarifies prior bone marrow donation research (Anker et al., 2010; Bagozzi et al., 2001) by showing that both cognitive and affective components inform donation decisions, in this case joining the ABMDR. Future research adopting attitude-behavior models and their extensions to understand donation-related decisions, therefore, should continue to include measures of affective attitudes and control perceptions to further clarify their role as well as considering the decision-making of a range of people from differing demographic backgrounds.

Together, these findings offer strategies to encourage young people to join the bone marrow donor registry. Since anticipated regret was a significant predictor of intention, young people could be asked to consider how they would feel if they or someone they loved needed a transplant and one was not available because a donor match could not be found. Another strategy may include fostering a donor-identity by highlighting the similarity between the act of joining the registry and the individual as the type of person who helps others, an approach which may be particularly effective for young people who perform other types of donation (e.g. blood donation or joining the organ donor registry). Promoting joining the registry as the 'right thing to do' and encouraging young people to take personal responsibility to assist others in need may help to cultivate a sense of moral obligation to act on intentions to join the registry. Continued examination of attitude-behavior models and their extensions in this

context is essential to encourage people to join donation registries, ensuring that the vital services provided by donor registries meet patient needs.

Footnotes

1. Intention is considered to be a suitable proxy measure for donation behavior when actual behavior is not measured (e.g., Schlumpf et al., 2008). Our focus on intention was also guided by our expectation that participants would not join the bone marrow registry within the 3-month time-frame of the study. Joining the ABMDR involves making an appointment and completing relevant forms to donate blood, filling out a consent form to join the registry, and donating blood for the purpose of testing and tissue typing. University students have many other demands on their time and we anticipated that while they may think about joining the registry and some may even undertake one or two of the preliminary steps, very few, if any would complete all steps in the process. Nevertheless, we did attempt to assess behavior 3-months after the initial survey to give an indication of the range of behaviors that participants performed. This information is included in a descriptive manner, rather than within an explicit test of the intention-behavior relationship.

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Table 1

Bivariate Correlations, Means, and Standard Deviations for the Predictor Variables and Intentions to Register as a Bone Marrow Donor in the Next 3 Months (N = 174)

	1	2	3	4	5	6	7	8	9	10
1. Attitude	-									
2. Subjective norm	.38***	-								
3. PBC	.22**	.39***	-							
4. Moral norm	.29***	.47***	.35***	-						
5. Anticipated regret	.19*	.31***	.21**	.64***	-					
6. Self-identity	.24**	.33***	.25***	.52***	.51***	-				
7. Gender ^a	.22**	.02	-.01	.12	.17*	.05	-			
8. Age	-.16*	-.06	-.04	-.14	-.12	-.06	-.19*	-		
9. Past blood donation ^a	-.01	.02	-.05	.05	.03	.06	-.10	.22**	-	
10. Intention	.39***	.51***	.26***	.70***	.60***	.66***	.13	-.09	.07	-
<i>M</i>	5.38	4.24	4.67	3.62	2.79	3.06	-	19.49	-	3.41
<i>SD</i>	1.38	1.27	1.26	1.42	1.25	1.37	-	2.23	-	1.42

^a Dichotomous measure. * $p < .05$. ** $p < .01$. *** $p < .001$. PBC = Perceived behavioral control; Mean scores in the current study are based on 7-point scales, except past blood donation behavior, gender and age.

Table 2

Hierarchical Regression Analysis Testing the Extended TPB in Predicting Intention to Register as a Bone Marrow Donor in the Next 3 Months (N = 174)

Step	Variable	B	SE	β	R ²	ΔR^2
1	Attitude	.24	.07	.23**	.31	.31***
	Subjective norm	.45	.08	.40***		
	PBC	.07	.08	.06		
2	Attitude	.15	.05	.14**	.67	.36***
	Subjective norm	.18	.06	.16**		
	PBC	-.08	.06	-.07		
	Moral norm	.34	.07	.34***		
	Anticipated regret	.16	.07	.14*		
	Self-identity	.36	.06	.35***		
3	Attitude	.15	.05	.14**	.67	.00
	Subjective norm	.18	.06	.16**		
	PBC	-.07	.06	-.07		
	Moral norm	.34	.07	.33***		
	Anticipated regret	.16	.07	.14*		
	Self-identity	.36	.06	.35***		
	Gender	.11	.17	.03		
	Age	.03	.03	.03		
	Past blood donation	.13	.18	.04		

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