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Applying self-determination theory to the blood donation context: The blood donor competence, autonomy, and relatedness enhancement (Blood Donor CARE) trial

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Abstract

The Blood Donor Competency, Autonomy, and Relatedness Enhancement (Blood Donor CARE) project was designed as a practical application of self-determination theory to encourage retention of first-time donors. Self-determination theory proposes that people are more likely to persist with behaviors that are internally-motivated, and that externally-motivated behavior can evolve and become internalized given the appropriate socio-environmental conditions. According to self-determination theory, motivation to engage in blood donation may become increasingly self-determined if the behavior satisfies fundamental human needs for competence (a sense of self-efficacy to achieve specific goals), autonomy (a sense of volitional control over one's behavior), and relatedness (a sense of connection to a larger group). The primary aim of this randomized controlled trial is to examine the effect of competence, autonomy, and/or relatedness interventions on donor retention. Using a full factorial design, first-time donors will be assigned to a control condition or one of seven intervention conditions. Donation competence, autonomy, and relatedness, along with additional constructs associated with return donation, will be assessed before and after the intervention using online surveys, and donation attempts will be tracked for one-year using blood center donor databases. We hypothesize that, compared to the control condition, the interventions will increase the likelihood of a subsequent donation attempt. We will also examine intervention-specific increases in competence, autonomy, and relatedness as potential mediators of enhanced donor retention. By promoting first-time donor competence, autonomy, and relatedness our goal is to enhance internal motivation for giving and in so doing increase the likelihood of future donation.

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Keywords

clinical trial; blood donation; internal motivational

1. Introduction

In the US, nearly one-third of all whole blood donations are provided by first-time donors [1]. Whereas there is good evidence that new donors internalize the role and expectations of being a blood donor as they gain donation experience [2–6], many new donors never provide a second donation [7–9] and one study showed that only 2% of first-time donors under the age of 20 become committed donors [8]. Because of this retention challenge, the US blood supply is highly reliant on continual recruitment of first-time donors. With this in mind, the Blood Donor Competency, Autonomy, and Relatedness Enhancement (Blood Donor CARE) project was designed as a practical application of self-determination theory (SDT) in an effort to encourage retention of first-time donors.

Much research regarding donation behavior has focused on the theory of planned behavior (TPB) [10, 11] and its major constructs of *attitude* (a basic evaluative judgment), *subjective norm* (perception of social pressure), and *perceived behavioral control* (a combination of self-efficacy and controllability). However, whereas the TPB has been consistently shown to predict blood donation intention and behavior [e.g., [12–24], the model does not account for all of the variance in donation intention and there remains a notable intention-behavior gap (i.e., intention is not the sole predictor of donation behavior). These findings highlight the need to expand our consideration to other potential factors that may affect people's motivations and behaviors regarding blood donation. While the TPB focuses on situational-level intentions, SDT offers an alternative conceptualization centered on contextual-level motivations.[25–27]

SDT proposes that people are more likely to persist with behaviors that are internally-motivated as opposed to externally-motivated [28]. Indeed, studies in a variety of health contexts have demonstrated that individuals with greater internal motivation exhibit better medication adherence [29, 30], glucose control [31, 32], healthy eating and physical activity [33], and commitment to addictions treatment [33–35]. Similar findings have also been reported in the blood donation context, where measures of the extent to which a donor identity has been internalized are positively related to both donation intention and behavior [2–6, 12–14]. Importantly, according to SDT, motivation to engage in a behavior can evolve from an extrinsic focus and become self-motivated and integrated as a personal value given the appropriate socio-environmental conditions. Specifically, as shown in Figure 1, SDT posits that motivation may become increasingly internalized and self-determined as a function of the satisfaction of fundamental human needs for *competence* (a sense of self-efficacy or perceived ability to achieve specific goals), *autonomy* (a sense of volitional control over one's behavior) and *relatedness* (a basic sense of connection or need to belong to a larger group) [28].

Over the past few years, we have developed interventions designed to address these fundamental human needs among blood donors. For instance, we have demonstrated that

self-efficacy or feelings of competence as a blood donor is enhanced through exposure to coping materials that address common donor fears and concerns [17, 36–39]. We have also demonstrated that a brief telephone interview based on motivational interviewing principles, which encourages donors to reflect on their unique motivations for giving, has a positive effect on internal motivation [40] and subsequent donation behavior [41]. And most recently, we developed a social media intervention designed to increase perceptions of belonging or feelings of connectedness among donors [42]. Thus, we have interventions to promote each of the basic human needs that, according to SDT, should foster greater internal motivation to donate blood. The Blood Donor CARE project is a multi-component, randomized controlled trial that uses a full factorial design to test the impact of these interventions when delivered in isolation and in combination.

Importantly, this trial also offers an opportunity to test a recent model of motivation that proposes an integration of SDT and the TPB. This integrative model is based on the premise that the processes proposed by SDT and the TPB regarding motivated behavior are complementary. Specifically, motivational autonomy is seen as a key contextual-level factor that influences the proximal, situational-level variables of attitude, subjective norm, and perceived behavioral control. While this integrated model has received empirical support in a wide variety of health-related contexts,[25, 43–46] to date it has not been tested with respect to blood donation behavior.

2. Design and Methods

Using a full factorial design, 16–24 year-old first-time donors with the New York Blood Center will be randomly assigned to a control condition or one of seven intervention conditions designed to enhance one or more fundamental human needs (i.e., competence, autonomy, relatedness). A total of 2240 participants will complete baseline survey measures approximately 1–2 weeks after their donation, engage in their assigned intervention(s), and then repeat the surveys approximately 6 weeks after the baseline. In addition to survey measures, donation attempts will be tracked for 1 year using blood center records.

2.1. Hypotheses

The primary aim of this study is to examine the effect of the intervention conditions on donation attempts in the one-year follow-up period (i.e., donor retention). We hypothesize that, compared to controls, the intervention conditions will increase the likelihood of a donation attempt in the next year. Our secondary aim is to examine intervention-specific increases in competence, autonomy, and relatedness as potential mediators of enhanced donor retention. We hypothesize that 1) participants will exhibit intervention-specific increases in competence, autonomy, and relatedness as compared to all other conditions that do not receive the corresponding intervention, and that 2) post-intervention competence, autonomy, and relatedness will be positively related to likelihood of a donation attempt in the next year. Finally, an exploratory aim will examine an integrative model of motivation that views motivational autonomy as a mediating influence on the more proximal, situational-level determinants of behavior described by the Theory of Planned Behavior [15, 16, 47]. That is, we will examine whether any observed intervention effects on attitude,

subjective norm, perceived behavioral control, and donation intention are mediated by changes in motivational autonomy.

2.2 Study design

This multi-site study is being conducted by Ohio University (Athens, OH, USA) and New York Blood Center (New York, NY, USA). Study candidates include whole blood donors who have recently completed their first New York Blood Center donation and who remain eligible to give again in the future. As shown in Figure 2, interested donors provide informed consent and then complete a baseline assessment using REDCap [48], which is a secure online survey and database management application.

Within a few days of completing the baseline survey, participants are randomly assigned using the REDCap randomization procedure into one of eight groups: 1) Treatment-as-Usual control, 2) Competence, 3) Autonomy, 4) Relatedness, 5) Competence + Autonomy, 6) Competence + Relatedness, 7) Autonomy + Relatedness, or 8) Competence + Autonomy + Relatedness. Participants in the control group receive an email indicating that they will be contacted again to complete a second survey in approximately 6–7 weeks. Participants in the intervention groups receive an email invitation to complete their assigned intervention. For those assigned to complete more than one intervention, each intervention is administered in a set order (Competence, Autonomy, and then Relatedness) and email invitations for each new assigned intervention are sent within a few days of completing the prior assignment. The study protocol was approved by the Institutional Review Boards of Ohio University (14-X-256) and New York Blood Center (818209-6), and is registered with [ClinicalTrials.gov](https://www.clinicaltrials.gov) (NCT02717338).

2.3. Participant recruitment, screening, and randomization

Each week, a randomly-selected subset of all NYBC donors from the previous week who meet inclusion criteria receive an email invitation to participate in the study. Initial eligibility is determined on the basis of New York Blood Center donor records, and includes individuals who are between 16 and 24 years of age, are providing their first New York Blood Center donation, made a whole blood donation, and meet eligibility requirements to continue to donate whole blood. A second eligibility screening takes place at the time of the online informed consent procedure, as interested donors must be willing to be randomly assigned to a study group and must be willing to establish a Facebook account (if they do not have one already). Those who consent to the study procedure are then asked to provide their contact and demographic information and to complete a series of baseline surveys (described below).

A randomization table was created by the study statistician (BWC) prior to study onset, with block randomization within gender employed to ensure relatively equal gender distribution for each of the eight study groups. The randomization table has been uploaded to the study REDCap website and the REDCap randomization module assigns participants. The randomization module does not allow study investigators to access the assignment sequence or to alter the sequence in any way during the study; hence, study personnel are blind to the participant randomization sequence. Participants are notified how to proceed to their next

assigned step in the study via an automated email sent by REDCap immediately after randomization.

2.4. Baseline assessment

The online baseline survey is available to the participant immediately upon receipt of consent for those 18–24 years of age, or upon receipt of assent and parent/guardian consent for 16–17 year-olds. Participants are asked to provide demographic (e.g., age, gender, occupation status, education level) and contact information, and then complete the measures described in Table 1 that relate to self-determination theory (i.e., donor competence, autonomy, and relatedness) and the theory of planned behavior (i.e., donation attitudes, subjective norms, perceived behavioral control, and intention). In addition, the baseline assessment includes questions regarding their recent donation experience (syncopal reactions, pain, and satisfaction), use of social media, and measures of anticipated regret, personal moral norm, anxiety, decisional balance and donation ambivalence.

2.5. Study groups

2.5.1. Control group—Participants in the control group receive the standard New York Blood Center communications for first-time donors, including: 1) a thank you email (approximately 4 days post-donation), 2) delivery of a donor card via surface mail (approximately 2 weeks post-donation), and 3) an email reminding them of their eligibility to give blood again (8 weeks post-donation). These communications are also received by participants in each of the intervention conditions.

2.5.2. Competence group—Participants assigned to the competence group are instructed to review a donor coping website [36] that combines text, videos, and interactive features to directly address common donor fears and to offer advice on empirically-validated strategies to reduce fear, pain, and syncopal reactions.

2.5.3. Autonomy group—Participants assigned to the autonomy group receive a brief telephone-based motivational interview that encourages donors to reflect upon their unique motivations for giving and how the act of donating is consistent with their broader life goals and values [40]. The intervention covers a series of topics, including: 1) individual motivations for giving, 2) the relationship between past donation behavior and the individual's personal goals/values, 3) donation importance and confidence rulers (i.e., a motivational interviewing technique to enhance commitment), and, as appropriate, 4) implementation intentions that develop individualized “If...then...” action and coping plans regarding each participant's preferred time and location for their next donation as well as any barriers to donating that they anticipate. An important strength of this intervention is the ability to tailor the discussion to address unique issues raised by each donor. Thus the focus is on personally relevant motivators, whether they be based on perceived need, altruism, or other factors.[49] To enhance follow-through, this component also encourages use of the New York Blood Center app or website that allows users to locate drives (by address, ZIP code, or current GPS/IP location) and schedule a donation date and time. Based on prior studies [40, 41], the average telephone interview is expected to last less than 15 minutes.

With participant permission, these calls are recorded to allow for treatment fidelity assessment and ongoing interviewer supervision.

2.5.4. Relatedness group—Participants assigned to the relatedness group are asked to join a closed Facebook group for one-month. The group is invisible to non-members and encourages participants to discuss their experiences with blood donation, including such things as posting images of their donations and/or reasons for donating. The Facebook group is actively moderated and supervised by members of the study team. In addition to ensuring that participant postings conform to blood center policy on acceptable use of social media, the moderator also posts donation-relevant images, graphics, messages, polls and links to encourage discussion of donation, social interaction around donation experiences, and feelings of affiliation among members of the group. This posted material includes images that were highly rated for likeability and for promoting of a sense of blood donor connectedness in a pilot study [42]. Moderator posts are uploaded on a twice-daily basis using a rotating 30-day schedule to ensure that all participants have the opportunity to be exposed to the same material during their 30-day assignment to the closed Facebook group.

2.6. Post-intervention assessment

2.6.1 Post-intervention survey assessment—Approximately 6–7 weeks after completing the baseline survey, participants receive an email (and, if needed, text message and/or phone reminder) with a link to the post-intervention survey website. This timeframe is designed to allow for the follow-up assessment to be conducted shortly before the donor's next date of eligibility (i.e., whole blood donors can give blood every 8 weeks). The post-intervention survey parallels the baseline assessment with the exception of the demographic and contact information. To encourage participation and retention, participants receive a check for US\$100 upon completing their assigned intervention(s) and the post-test survey.

2.6.2. One-year follow-up—Because all blood donors receive unique identification codes, the New York Blood Center donor database can be used to track instances of subsequent donation attempts. Subsequent donation attempts are tracked for one year from the date of next whole blood donation eligibility (i.e., eight weeks after the first donation). It should be noted that donors who intend to donate may be turned away at the donor health screening (e.g., due to low hemoglobin); hence, both donation attempts and completed donations will be recorded. At the one year follow-up participants are also contacted by telephone, text, and/or email to make a direct inquiry about their donation attempts in the preceding year. This communication ensures that we have information from participants who may have moved from the New York Blood Center catchment area or who may have donated with an alternate blood collection agency. During the one year follow-up all participants will receive the usual care that is provided by New York Blood Center, including possible email, text message, social media and/or telephone calls.

2.7. Blinding

Due to the nature of the behavioral interventions, participants and interventionists are not blind to intervention assignment. However, baseline and post-intervention assessments are completed by the participants online, and therefore are not be subject to potential bias by the

examiner. The one-year follow-up data from the donor records will be collected by blinded blood center staff.

2.8. Process evaluation

Autonomy group interviewers will be undergraduate students who complete a minimum of 6 hours of training in the conduct of a telephone-based motivational interview for blood donation. The training program was designed to cover (1) education about blood donation, including common motivators and barriers, (2) motivational interviewing techniques adapted for blood donors, and (3) development of implementation intentions. Training modalities include lectures, readings, discussion, and role-playing using a specially-designed interview script. The training was developed and is supervised by licensed clinical psychologists (CRF and JLF).

To allow for ongoing assessment of treatment fidelity, with participants' permission interviews are audio recorded and later coded by two independent raters for fidelity to the interview script. In addition, each recording is reviewed by trained clinical psychology graduate students and performance feedback is provided to each interviewer.

2.9. Statistical analysis plan

All analyses will first be conducted on an intent-to-treat basis for the original cohort to examine the intervention effects on subsequent donor retention regardless of adherence/attrition. The analyses will then be repeated for all participants demonstrating adherence to their assigned intervention (i.e., logged on to the competence web site, completed the autonomy interview, and/or joined the relatedness Facebook group).

2.9.1. Intervention effects on donor retention—The primary hypothesis, that the interventions will enhance donation attempts, will be examined with two approaches. The first approach will use a Fisher's exact test to compare the proportion of participants who attempt to donate. An omnibus test will compare participants in the control group to the participants who receive any type of intervention, and will be followed by planned comparisons of controls versus each of the intervention conditions. The second approach will use a Cox proportional hazards survival analysis (or a stratified or extended Cox survival analysis in the event that the assumptions of the Cox proportional hazards survival analysis are not met) to model the number of days to the first return. The principal predictor variable will be group membership. An omnibus test comparing controls to participants who receive any type of intervention will be followed by planned comparisons of controls to each intervention condition. We will also examine potential moderators of the relationship between group and number of days to attempt a new donation, including: 1) donor variables (i.e., age, sex, race, ethnicity), 2) initial blood donation experience (objective and subjective syncopal reactions, pain, and satisfaction), and 3) intervention adherence. Interactions between each of these variables and group will be used to test for moderation.

2.9.2. Potential mediators of intervention effects—We will conduct path analyses to examine intervention-specific increases in competence, autonomy, and relatedness as potential mediators of enhanced donor retention. We hypothesize that competence,

autonomy, and relatedness can be both dependent and independent variables; hence, we will conduct a path analysis to model the relationship among the variables to examine 1) the effect of each intervention on competence, autonomy, and relatedness and 2) the effects of competence, autonomy, and relatedness on donation attempts. Baseline levels of competence, autonomy, and relatedness will be included as covariates if they differ significantly between groups.

2.9.3. Exploratory analysis—In line with recent integrations of Self-Determination Theory and the Theory of Planned Behavior [25, 27, 43], we will conduct a path analysis to examine autonomy as a mediating factor between the interventions and Theory of Planned Behavior constructs of attitude, subjective norm, perceived behavioral control, intention, and donation attempts. Baseline levels of autonomy, attitude, subjective norm, perceived behavioral control, and intention will be included as covariates if they differ significantly between groups.

2.10. Sample size calculation

Sample size estimates were calculated based on the minimum sample required to examine 1) intervention effects on donor retention and 2) potential mediators of intervention effects.

With respect to intervention effects on retention, Fisher's exact tests will be conducted to compare the proportion of participants attempting to donate. The one-year return rate for New York Blood Center first-time donors at the time the study as designed was 33.8%; hence, this figure served as the estimated return rate for controls. Assuming a 12.5% increase in return rate for participants who receive any type of intervention (i.e. a 46.3% return rate for those who receive any type of intervention), a sample size of 137 participants in each of the eight groups is needed to achieve at least 80% power at $\alpha = 0.05$ for the omnibus test. For the follow up comparisons, 243 participants in each group is needed to achieve at least 80% power at $\alpha = 0.05$. It should be noted that a projected 12.5% increase in donor returns is a conservative estimate given that our previous autonomy study increased one-year donor returns from 45.2% to 67.2% (i.e., 22%) [41] and our competence intervention increased recruitment from 29.7 to 43.8% (i.e., 14.1%) [37]. In addition, a Cox proportional hazards survival analysis will be conducted on the number of days to first return (i.e., donation attempt). The principal predictor variable is group membership. Assuming a 33.8% return rate for controls and a 12.5% increase for any intervention, 151 participants in each of the eight groups are needed to achieve at least 80% power at $\alpha = 0.05$ for the omnibus test. For the follow-up analyses, 236 participants in each group are needed to achieve at least 80% power at $\alpha = 0.05$.

To examine potential mediators of the intervention effects, a path analysis will be conducted with 11 variables involved in the hypothesized model; hence there are 66 distinct elements in the 11×11 variance-covariance matrix. There are 35 parameters to be estimated in the hypothesized model, and therefore the model has 31 degrees of freedom. Using MacCallum et al. criteria [50], a minimum total sample of 324 donors is needed to achieve 80% power at $\alpha = 0.05$ for a test of exact fit.

Based on the above sample size calculations, this study will require 1944 donors (243 per group) to achieve at least 80% power at $\alpha = 0.05$ across all of the specified hypotheses. We plan to recruit a total of 2240 donors (280 per group) to allow for up to 15% attrition.

3. Discussion

Self-determination theory proposes that people are more likely to persist with behaviors that are perceived as internally-motivated [28]. SDT further posits that behavior that is not inherently interesting or internally motivated may be promoted by extrinsic factors (e.g., urging or modeling of significant others in one's environment), and that such external forms of motivation may be internalized and integrated over time as personal values given the appropriate socio-environmental conditions [28]. This notion is reflected in a continuum of motivation that ranges from behavior that is non-self-determined to behavior that is completely self-determined. As shown in Figure 3, within the self-determination continuum there are three broad types of motivation [amotivation, controlled (external) motivation, and autonomous (internal) motivation] and six types of behavioral regulation that are each associated with distinct reasons for acting.

This continuum of motivation can readily be applied to describe an individual's current thoughts or intentions regarding the act of blood donation. As shown in the left side of Figure 3, the most extreme form of non-self-determined behavior is reflected in "amotivation", which is a state of lacking any intention to act due to a combination of not valuing the activity, not feeling competent, or not believing action will yield a desirable outcome (e.g., an individual who has no interest in or intention of becoming a blood donor). Behaviors that are engaged in to satisfy external forces are viewed as only partly self-determined as they also reflect significant control of sociocultural environment. These include instances of "external regulation" in which behaviors are performed to achieve external rewards (e.g., donating blood for thank-you gifts, such as T-shirts and water bottles) and "introjected regulation" in which behaviors are engaged in to avoid guilt or enhance one's ego (e.g., donating blood to avoid feeling guilt, shame, or regret). Behaviors that are engaged in to satisfy increasingly autonomous, internal needs include 1) "identified regulation", wherein the behavior is seen as leading to important and valued outcomes (e.g., donating blood as an important choice for the health of others), 2) "integrated regulation", wherein the behavior is viewed as both important and a part of one's larger system of needs, values and identity (e.g., donating blood as an important part of one's overall life goals), and 3) "intrinsic regulation", wherein the behavior is engaged in out of inherent interest and satisfaction (e.g., donating blood for enjoyment). Figure 3 also provides sample items from the Blood Donor Identity Survey [54], a multidimensional measure of blood donor motivations that corresponds to the different forms of behavioral regulation.

In addition to describing current forms of motivation, SDT provides a practical framework to design behavior change interventions, particularly for behaviors such as blood donation that may not typically be viewed as inherently appealing. As noted above, according to SDT motivation may become increasingly internalized and self-determined through the satisfaction of fundamental human needs for relatedness, competence, and autonomy [28]. In the context of blood donation, initial donation attempts are likely to be externally

motivated by significant others who offer encouragement, model the behavior, or otherwise demonstrate that they value blood donation. For example, a high school student may not be interested in, or even thinking about, donating blood, but may volunteer to donate for the first time in response to direct or perceived social pressure or influence from fellow students (i.e., external regulation). Hence, an intervention that promotes a sense of belonging to a larger community of donors or connectedness to a smaller group of like-minded peers may capitalize on the underlying need for relatedness and make blood donation a more intrinsically motivated behavior for the individual.

Although an initial donation may be motivated by external pressure, according to SDT environmental feedback plays an important role in whether someone will internalize this motivation and persist with the behavior. Negative feedback that contributes to a sense of incompetence will undermine the internalization of extrinsically motivated behavior, and therefore a negative blood donation experience (e.g., syncopal reactions such as dizziness or nausea) may reduce the individual's sense of self-efficacy or competence as a donor. In contrast, a positive donation experience should promote a greater sense of self-efficacy or competence (e.g., "This is something that I can do!"), and in so doing contribute to a greater intrinsic interest in engaging in future donations. Thus, an intervention that provides information and coping strategies for dealing with potential negative donation experiences may contribute to internalizing the behavior.

Finally, socio-environmental conditions that promote autonomy with respect to blood donation behavior will support motivational internalization and provide a critical context to allow the behavior to become freely integrated with an individual's existing goals and values. From this perspective, provision of external rewards for donating (e.g., T-shirts, water bottles, stickers) and external pressure to re-donate on a pre-determined schedule (e.g., eligibility reminders and encouragement to schedule every 8 weeks) may reduce a sense of autonomy. In contrast, a non-judgmental assessment of each donor's unique reasons for giving, as well as how donation behavior fits in with their broader goals and values, would foster a sense of autonomy.

In sum, using a full factorial design that includes interventions designed to address each of the three fundamental human needs described by SDT, the Blood Donor CARE project will test the effect of the intervention conditions, alone and in combination, on donation attempts in the one-year follow-up period. We will also be able to examine intervention-specific increases in competence, autonomy, and relatedness as potential mediators of individual differences in donor retention. Ultimately, by promoting first-time donor competence, autonomy, and relatedness we hope to enhance internal motivation for giving and in so doing increasing the likelihood of long-term commitment to volunteer blood donation.

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Figure 1.
Contributors to the development of internal motivation for blood donation.

Figure 2.
Study protocol flowchart.

Nonself determined ←————→ Self-determined						
Type of Motivation	Amotivation	Controlled (External) Motivation		Autonomous (Internal) Motivation		
Type of Behavior Regulation	Non-regulation	External regulation	Introjected regulation	Identified regulation	Integrated regulation	Intrinsic regulation
Reason for Acting	NA (No intent to act)	To gain rewards or avoid punishments	To gain others' approval or avoid guilt	Because it is important and has value	Because it is consistent with <u>my</u> goals and values	Because it is inherently enjoyable and satisfying.
Blood Donor Identity Survey (sample items)	"I really do not think about donating blood"	"I donate blood for thank-you gifts, such as T-shirts or water bottles."	"I would feel bad about myself if I did not donate blood."	"Donating blood is very important for the health of others."	"Donating blood is consistent with my life goals."	"I enjoy donating blood."

Figure 3.

The self-determination theory continuum with the associated types of motivation, types of behavior regulation, reasons for acting, and sample items from the Blood Donor Identity Survey. Adapted from Deci & Ryan (2000) [51], Ryan and Deci (2000) [28], Ryan et al (2008) [52], and Ng et al. (2012) [53].

Table 1

Study survey measures.

Measure	Description	Sample item(s)	Anchors
Competence	A 6-item measure of respondent confidence in their ability to engage in blood donation behavior and to cope with barriers that may arise.	"If I choose to donate blood, I am confident that I can find a time to do so." and "I am confident that I can cope with any concerns I may have about donating blood."	1 (Not at all) to 7 (Extremely)
Autonomy	An 18-item measure of six different regulatory styles, ranging from unmotivated to donate to increasing levels of autonomous motivation to donate (i.e., non-regulation to intrinsic regulation).	"Donating blood is consistent with my life goals."	1 (Not at all true) to 7 (Very true)
Relatedness	A 9-item measure of the extent to which respondents feel accepted and connected to other blood donors.	"I feel accepted by other blood donors."	1 (Not at all) to 7 (Extremely)
Attitude	A 6-item measure of respondent attitudes towards blood donation. Includes a total score and subscales of cognitive and affective attitude.	"For me, donating blood within the next year would be..."	1 (Unpleasant) to 7 (Pleasant)
Subjective norm	A 6-item measure of respondents' perceived social pressure or expectations of significant others that they will donate blood within the next year. Includes a total score and subscales of injunctive and descriptive norms.	"The people who are most important to me think I should give blood in the next year."	1 (Disagree) to 7 (Agree)
Perceived behavioral control	A 6-item measure of respondent confidence and perceived ability to donate blood within the next year. Includes a total score and subscales of perceived self-efficacy and controllability.	"How confident are you that you will be able to donate blood within the next year?"	1 (Not very confident) to 7 (Very confident)
Intention	A 5-item measure of respondents' intention to donate blood within the next year.	"I plan to donate blood in the next year."	1 (Disagree) to 7 (Agree)
Syncopal reactions	A 6-item survey of respondents' subjective experience of syncopal symptoms during and after their most recent blood donation.	To what extent did you experience faintness (as if about to faint or become unconscious?"	0 (Not at all) to 5 (To an extreme degree)
Pain	A 2-item measure of respondents' pain in response to the pre-donation blood sample finger stick and the donation needle at their most recent blood donation.	"Please rate the pain that you felt from the donation needle."	0 (No pain) to 100 (Worst possible pain)
Satisfaction	A 1-item measure of respondents' overall satisfaction with their most recent blood donation.	"Please rate your overall satisfaction with your last blood donation."	0 (Not at all satisfied) to 100 (Completely satisfied)
Anticipated regret	A 3-item measure of negative feelings that the respondent would expect if they did not donate within the next year.	"If I do not donate blood within the next year, I will regret it."	1 (Very unlikely) to 7 (Very likely)
Personal moral norm	A 3-item measure of respondents' perception of the moral	"I feel a moral obligation to give blood."	1 (Strongly agree) to 7

Measure	Description	Sample item(s)	Anchors
	correctness of donating blood.		(Strongly disagree)
Anxiety	A 3-item measure of respondents' expected anxiety during blood donation.	"If I donate blood I will feel nervous."	1 (Not at all) to 7 (Very much)
Decisional balance	A 12-item measure of respondents' perception of the reasons for and against donating blood. Includes a total score and subscales of donations pros, donation physical Cons, and donation eligibility cons.	"I may be helping somebody in my community."	1 (Not at all important) to 5 (Extremely important)
Ambivalence	A 6-item scale measure of respondents' sense of ambivalence towards blood donation. Includes subscales of donation commitment and indecision.	"I am sure that I will donate blood in the future." and "I have mixed feelings about donating blood."	1 (Not at all true) to 7 (Very true)
Social media use	A 3-item measure of respondents' typical level of social media activity.	"How often do you use other social media? (e.g., Twitter, Snapchat, Reddit)"	1 (Not at all) to 7 (More than 3 times a day)
Social media relatedness	A 12-item measure of respondents' level of perceived connection with other social media users. Includes subscales of connection and disconnection.	"I feel close to people on social media." and "I don't feel I participate with anyone or any group on social media."	0 (Not at all) to 6 (Extremely)