A Post-Donation Motivational Interview with Implementation Intentions Enhances Blood Donor Identity

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by

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Abstract

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Background: Individuals who donate blood are presented with unique challenges to continuing their donation career such as managing existing fears, perceived lifestyle barriers (such as work or family commitments), and even moving past prior negative donation experiences. Donors must persist through several donations and gain experience throughout the process to internalize the role and expectations of being a blood donor. As such, donors may benefit from interventions which not only increase their ability to overcome perceived barriers to repeat donation but which also enhance their identity as a blood donor. The current research project examined the effect of a post-donation motivational interviewing intervention with implementation intentions on blood donor identity, and donation related intention, as well as actual repeat donation behavior.

Study Design and Methods: 142 females and 53 males who ranged in age from 18 to 72 years (Mean = 37.2; SD = 13.5) were recruited from Hoxworth Blood Center in the Cincinnati, Ohio region between October 2013 and January 2015. Following completion of baseline questionnaires, participants were randomly assigned to a post-donation motivational interview with implementation intentions (MI+II) or a no-interview control group and received a telephone call. Participants in the MI+II group completed a brief telephone (<18 minute) interview designed to promote and clarify

intrinsic motivations for donating, explore how donating blood fits in with their goals and values, address barriers that may prevent future donation and develop individualized implementation action plans to promote repeat donation. They were then asked to complete follow-up questionnaires regarding blood donor identity, donation intention, attitudes, subjective norms, perceived behavioral control, anxiety, and personal moral norms. Participants in the no-interview control group were simply asked to complete the same series of follow-up questionnaires one month later. Repeat donation attempts were examined for 12 months from the index donation for all participants using the Hoxworth Blood Center donor database.

Results: A series of ANCOVA analyses revealed that donors in the MI+II group reported higher levels of autonomous regulation, $F(1, 195) = 4.8$, $p = .03$, greater intention to provide a future donation, $F(1, 195) = 7.6$, $p = .01$, more positive attitudes towards donation, $F(1, 195) = 6.4$, $p = .01$ and greater personal moral norms, $F(1, 195) = 13.7$, $p = .00$. Further, chi-square analyses revealed that while the MI+II intervention did not produce an effect for the overall MI+II group, it was associated with higher rates of return among females donors with five or greater prior donations who received the intervention ($p < 0.05$).

Conclusion: The application of a MI+II intervention may be an effective strategy for enhancing blood donor identity, as well as socio-cognitive factors impacting donor intention and attitude, and may be a particularly useful tool for promoting retention among select groups of existing donors.

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Introduction

The United States blood supply depends largely on a volunteer donation system to meet current demand for blood and blood products (US Department of Health and Human Services, National Blood Collection and Utilization Survey Report, 2011). As such, it is imperative that effort is directed towards not only recruiting new donors, but motivating existing donors to return. Retaining repeat donors has several advantages as this population pose a lower risk for infectious diseases, and is less likely to experience adverse reactions (Glynn et al., 2000; Yu, Chung, Lin, Chan, & Lee, 2007; Zou, Stramer, & Dodd, 2012). Unfortunately, repeat donors are faced with a variety of challenges which impact their decision to return, such as access to donation sites, perceived inconvenience, and potential fears about needles, pain, and possible vasovagal reactions (Bednall & Bove, 2011; Masser, White, Hyde, & Terry, 2008; Shaz et al., 2009). Accordingly, effective retention efforts should target strategies which increase the donors' confidence in their ability to overcome perceived barriers to repeat donation.

Various theoretical approaches have highlighted the role of motivation as a determining factor in the extent to which a person will pursue and persist in a behavior (Finkelstein, Penner, & Brannick, 2005; Grube & Piliavin, 2000; Lee, Piliavin, & Call, 1999; Piliavin & Callero, 1991). One of the most prominent general theories of motivation, self-determination theory (SDT), has been used to explain behavior in a variety of contexts such as addictive behaviors, medication adherence, medical education, exercise, weight loss and anorexia nervosa (Fortier, Duda, Guerin, & Teixeira, 2012; Kinnafick, Thøgersen-Ntoumani, & Duda, 2014; Ng et al., 2012). As seen in Figure 1,

SDT views motivation on a continuum and emphasizes the extent to which behaviors originate from the individual (i.e., autonomous regulation emanating from the self and reflecting personal interests and values) or external pressures (i.e., controlled regulation emanating from self-imposed pressures such as feelings of shame or external controls such as gifts and rewards) (Ryan & Deci, 2000). In regards to prosocial behaviors such as blood donation, SDT maintains that autonomous and intrinsically driven behavior positively impact the subjective experience and well-being of the helper by satisfying basic psychological needs for competence, autonomy and relatedness (Ryan & Deci, 2000). The need for competence is addressed when one can effectively achieve a desired effect or outcome. Autonomy is supported when one's actions are congruent with one's values. And relatedness is satisfied by feelings of closeness and connectedness to significant others (Ryan & Deci, 2000). SDT proposes that the enhancement of these psychological needs can shift external or controlled regulation and allow for an internalization process, which increases identification with the target behavior thus bringing it closer to the self (Deci, Eghrari, Patrick, & Leone, 1994; Kinnafick et al., 2014; Sabiston, McDonough, Sedgwick, & Crocker, 2009). This is especially important in the donation context because internalization of a donor identity has been shown to be positively related with future donation behavior and to predict additional variance in donation intention over and above other key determinants of intention such as attitude, subjective norm, and perceived behavioral control (Armitage & Conner, 2001a; Masser, Bednall, White, & Terry, 2012; Piliavin & Callero, 1991).

One potential strategy to facilitate this internalization process and to promote identification with a goal behavior, thus enhancing behavioral engagement, is motivational interviewing (MI). Existing research supports the use of MI as an effective tool to increase intrinsic motivation and to help navigate perceived barriers towards the adoption of a variety of health promoting behaviors including lifestyle changes for patients with Type II diabetes, interventions to stop smoking, and adoption of diet and exercise regimens in weight-loss trials (Adamian, Golin, Shain, & DeVellis, 2004; Burke, Arkowitz, & Menchola, 2003; DiMarco, Klein, Clark, & Wilson, 2009; Resnicow et al., 2002). Within the blood donation literature, there is support for the use of a post-donation motivational interview to promote repeat donation behavior. Specifically, Sinclair and colleagues (2010) used a telephone-based adapted motivational interview (France et al., 2011) to encourage recent donors to review their donation experience in the context of their wider motivations for giving, and augmented this approach by problem-solving solutions to perceived barriers (e.g., concerns about adverse reactions, inconvenience, lack of time). Results showed that, as compared to a no interview control group, those who received a post-donation motivational interview had significantly higher rates of repeat donation attempts during a 12 month follow-up (OR, 2.48; 95% CI, 1.27-4.87). This study also found that the post-donation motivational interview yielded statistically significant increases in theory of planned behavior constructs (Ajzen & Fishbein, 1980), including intentions to donate in the future ($d = 0.43$), attitudes toward donation ($d = 0.27$), and self-efficacy for preventing negative donation reactions ($d = 0.43$). Within the theory of planned behavior, intention is the proximal determinant of

behavior and is hypothesized to be determined by attitude (positive or negative evaluation towards performing a behavior), subjective norm (perception of the beliefs of important others), and perceived behavioral control (one's perception of the amount of control they have in performing the behavior). This theory has been widely applied to the blood donation context to understand return behavior and previous research shows that 31% to 72% of the variance in intention and between 54% to 56% of the variance in blood donation behavior can be predicted by a combination of attitude, subjective norms, perceived behavioral control and/or self-efficacy (Ferguson, France, Abraham, Ditto, & Sheeran, 2007; France, France, & Himawan, 2007a; France, Kowalsky, France, McGlone, et al., 2014; Masser et al., 2008; Veldhuizen, Ferguson, de Kort, Donders, & Atsma, 2011). The basic TPB model has also been extended to include additional variables to explain unique variance in donation intention such as personal moral norms (perceived responsibility or sense of moral obligation to donate blood) and anxiety (the relative experience of tension and calm symptoms regarding donating blood) (Conner & Armitage, 1998; Rise, Sheeran, & Hukkelberg, 2010; Terry, Hogg, & White, 1999).

While TPB research makes it clear that intention is one of the most powerful predictors of behavior, in most situations the relationship between intention and behavior is far from perfect. This discrepancy is referred to as "the intention-behavior gap" (Sheeran, 2002) and suggests that post-intention processes are also important in determining behavioral completion. To address this intention-behavior gap, Gollwitzer (1993) proposed using the self-regulatory strategy of forming implementation intentions (i.e., specifying in advance, the when, where and how one wants to strive for a set goal).

Various studies have provided support for the use of implementation intentions, showing that they assist with quick and reliable initiation of intended behavior by increasing readiness to respond to a target situation or cue (Godin & Germain, 2013; Godin et al., 2010; Gollwitzer, 1993, 1999; Sheeran, 2002; Webb & Sheeran, 2007). That is, when confronted with the target situation or cue, memory for one's goal intention is activated (i.e., easily identified or attended to) and is then followed by a series of pre-determined actions (i.e., when, where, how), which culminate in the initiation and completion of the target behavior.

Within the blood donation context, Godin et al. (2010) compared the impact of four interventions on donation registering at 6 and 12 months follow-up among a sample first-time donors. The interventions included completing questionnaires eliciting 1) behavioral intention only, 2) implementation intentions only, 3) behavioral intention plus anticipated regret (asking whether one would regret not giving blood again) or 4) implementation intentions plus anticipated regret. The implementation intentions questionnaire took the form of if-then plans which specified how three potential obstacles to donating blood could be managed effectively (forgetting to attend, fitting the opportunity to give blood into one's schedule and organizing transportation to the donation venue). Results showed that donors in the implementation intention-only condition donated more frequently at 6 months compared to each of the other conditions and increased the frequency of donations over one year by 12% compared to the behavioral intention and control conditions. Eliciting anticipated regret did not appear to add to the effect of forming implementation intentions in this sample of first-time donors

who may have weaker intentions and considerably less regret for non-performing a new behavior. While factors accounting for the superior effects of the implementation intention only condition is not completely clear, the parsimony and low response burden associated with forming implementation intentions may add to their effectiveness.

Subsequently, Godin and colleagues (2013) compared return behavior among temporarily deferred donors assigned to one of five conditions. The conditions included a no questionnaire control, two implementation intention conditions (created implementation intentions for intention only or intention plus anticipated regret) and two mere measurement conditions (asked questions about intention only or about intention plus anticipated regret). Once again, the implementation intention if-then plans addressed forgetting to donate, fitting a donation into one's schedule, and finding transportation to a donation site. Results showed no difference between the two implementation intention conditions, but found that participants who formed the if-then plans had a 19% greater chance of donating blood within four years of their first life-time donation when compared to either of the mere measurement conditions.

Most recently, Godin et al. (2014) compared repeat donation behavior among "lapsed" donors who had not donated blood in the past two years. These donors were randomly assigned to either a control group or one of six interventions, which included an implementation intentions only group and five questionnaire groups. Questionnaire group participants reported on either intentions only (in a declarative format, e.g. "I intend…"), interrogative intention only (in an interrogative format, e.g. "Do I have the intention to…"), intention plus moral norm, intention plus anticipated regret, or intention

plus positive self-image. The implementation intention group was asked to choose items relevant to them from a prescribed list of obstacles to donating blood and to match each obstacle with a solution from a list. At a 6 month follow-up, the implementation intentions group had higher donor registration rates as compared to the intention plus regret, intention plus moral norm, or intention plus positive self-image groups (Godin et al., 2014). At 15 month follow-up, the implementation intentions condition was associated with higher donor registration rates than all other study conditions (Godin et al., 2014).

While the Godin et al. (2010, 2013, and 2014) studies provide support for the use of implementation intentions in the blood donation context and suggest that they yield lasting effects, the study designs may have limited the impact of the intervention because implementation intentions addressed pre-selected donation obstacles that may not have been relevant to individual donors. Given that blood donors can be faced with a wide variety of challenges to continuing to give blood, perhaps a more effective approach to donor retention would be to address individual donor barriers.

The Current Study

Building on the design of the aforementioned Sinclair et al. (2010) and Godin et al. (2010, 2013, and 2014) studies, the current study combined a post-donation motivational interview with an implementation intention intervention. Intervention effects on the constructs of the self-determination theory (blood donation identity survey), theory of planned behavior (intention, attitude, subjective norm, and perceived behavioral control) and extended theory of planned behavior (anxiety and personal moral

norm) were examined. Using a randomized controlled trial design, recent blood donors were randomly assigned to either a telephone-delivered motivational interview with implementation intention (MI+II) group or a no-interview control group. Based on the existing literature, it was predicted that, compared to the no-interview control group, participants in the MI+II group would 1) report greater increases in autonomous regulation, 2) endorse stronger donation intentions, based on enhanced attitudes, subjective norms, perceived behavioral control, and 3) demonstrate a higher likelihood of returning to donate blood within a one year follow-up period. Finally, mediational analyses were conducted to explore the possible contribution of self-determination theory and theory of planned behavior constructs to repeat donation attempts.

Methods

Power Analysis

Effect sizes from Sinclair et al. (2010) suggest that MI alone is associated with small to medium effects on donor intention, attitude, anxiety and self-efficacy (i.e., d = 0.27-0.43). Given that the proposed study incorporated an additional intervention (i.e., implementation intentions), the present study used the higher value as an effect size estimate. Using an effect size of d = 0.43 with 80% power and an alpha level of 0.05, a minimum sample size of 172 participants (N = 86 per group) was estimated to provide adequate power to conduct between groups analyses on all variables. With respect to an analysis of donor return, a minimum sample size of 143 was needed to conduct a chi-square goodness-of-fit test with 80% power at an alpha level of 0.05 using the effect size of Cohen's w = 0.30 from the previous MI study (Sinclair et al., 2010).

Participants

Eligible donors included whole blood donors who were at least 18 years of age, had no more than 2 completed donations in the past year, and whose latest donation had occurred at least 4 weeks prior to recruitment. Additional inclusion criteria included the ability to speak and read English fluently and to have access to the internet and a landline or cellular telephone. The final sample included 195 donors recruited from Hoxworth Blood Center in the Cincinnati, Ohio region between October 2013 and January 2015. Participants were 142 women and 53 men with a mean age of 37.2 years (standard deviation (SD), 13.5 years, range, 18 –72 years). As shown in Table 1, individuals with 5 or more prior donations made up the largest single subgroup in the sample (i.e., 38.5%);

however, the majority of the participants had fewer than 5 prior donations. The sample was predominantly Caucasians (93.8%) and non-Hispanic (97.9%). The motivational interviewing with implementation intentions (MI+II) group consisted of 86 individuals (22 men and 64 women) and the no-interview control group consisted of 109 individuals (31 men and 78 women).

Measures

Donor characteristics and demographic questionnaire (Appendix C-1). A brief questionnaire concerning basic donor characteristics (e.g., age, sex, race, ethnicity, and prior donation history), contact information and preferred days and times for future telephone contact.

Blood donor identity survey (France, Kowalsky, France, Himawan, Kessler & Shaz, 2014; Appendix C-2). The blood donor identity survey consisted of 18-items assessing the six regulatory styles of the self-determination theory applied to blood donor motivations. As can be seen in Table 2, each factor had three items and estimated the quality of the donor's motivation and reason for engaging in blood donation and ranged from amotivation to increasing levels of autonomous motivation. As seen in Figure 1, the factors included amotivation (lack of intent or motivation to engage in the behavior), external regulation (motivation to engage due to external rewards), introjected regulation (engagement in the behavior to avoid guilt or boost one's ego), identified regulation (engagement due to the importance and value placed on the behavior), integrated regulation (engagement due to both importance and consistency with one's values and needs), and intrinsic regulation (active engagement and enjoyment of the behavior). In

the present sample, acceptable levels of internal consistency were observed for each administration of the survey: amotivation (baseline α = 0.72; follow-up α = 0.71), external regulation (baseline α = 0.81; follow-up α = 0.84), introjected regulation (baseline α = 0.85; follow-up α = 0.86), identified regulation (baseline α = 0.66; follow-up α = 0.77), integrated regulation (baseline α = 0.81; follow-up α = 0.82) and intrinsic regulation (baseline α = 0.75; follow-up α = 0.79). Consistent with the existing SDT literature (Markland, 2011; Ryan & Connell, 1989; Vallerand, Pelletier, & Koestner, 2008), a relative autonomy index (RAI) score was calculated for each participant using the formula RAI = - 3(amotivation item score) - 2(extrinsic item score) - 1(introjected item score) + 1(identified item score) + 2(integrated item score) + 3(intrinsic item score). The resulting RAI score represents blood donor identity and has a theoretical range from −126 to + 126, with higher scores reflecting higher levels of self-determined motivation. The six factor motivational structure of the blood donor identity survey has been found to be replicable across diverse donor samples (France, Kowalsky, France, Himawan, et al., 2014). High scores on factors of internalized motivation are strongly associated with greater engagement in donation behavior (France, Kowalsky, France, Himawan, et al., 2014; France et al., 2015).

Theory of planned behavior measures. The theory of planned behavior measures used in the current study were developed by France and colleagues (2014) were based on existing diverse versions of these scales in blood donation literature (Armitage & Conner, 2001a; France, Kowalsky, France, McGlone, et al., 2014; France, Montalva, France, & Trost, 2008; Godin, Conner, Sheeran, Belanger-Gravel, & Germain, 2007;

Lemmens et al., 2005; Lemmens et al., 2009; Masser, White, Hyde, Terry, & Robinson, 2009; McMahon & Byrne, 2008). Using exploratory and confirmatory factor analyses of responses provided by separate samples of experienced blood donors, novice blood donors, and non-donors, France and colleagues (2014) provided support for the validity of each of the following measures.

Blood donation intention (France, Kowalsky, France, McGlone, et al., 2014; Appendix C-3). As can be seen in Table 2, intention was assessed by three items examining the likelihood that a donor will give blood again. This scale also included one test question designed to identify those who were not responding carefully (e.g., "This is a test question. Please answer 'agree' for this item."). Those who failed to respond accurately to the test question were not included in the sample. In the present sample, strong internal consistency was found for each administration of the scale (baseline α = 0.99; follow-up α = 0.98).

Blood donation attitude (France, Kowalsky, France, McGlone, et al., 2014; Appendix C-4). As can be seen in Table 2, attitude was assessed by six items examining negative and positive evaluations of donating blood. This scale has been shown to distinguish between cognitive (the evaluative judgment of the behavior), and affective (the emotional reaction to the behavior) subfactors of attitude towards donating blood (France, Kowalsky, France, McGlone, et al., 2014). In the present study, results are presented based on the sum of all six items (as shown in Appendix B-2: Table 15, analysis of the subfactors did not alter the observed results or add to interpretation in any meaningful way). Strong internal consistency was found for each administration (baseline

α = 0.85; follow-up α = 0.80). See Appendix A-1: Table 6 for internal consistency data for the subfactors.

Blood donation subjective norm (France, Kowalsky, France, McGlone, et al., 2014; Appendix C-5). As can be seen in Table 2, subjective norm was assessed by six items examining perceived social approval of donating blood. This scale has been shown to distinguish between injunctive norms (the perception of social pressure to donate blood) and descriptive norms (the perceptions of the extent to which significant others donate blood) as subfactors of global subjective norms (France, Kowalsky, France, McGlone, et al., 2014). In the present study, results are presented based on the sum of all six items (as shown in Appendix B-2: Table 15, analysis of the subfactors did not alter the observed results or add to interpretation in any meaningful way). Strong internal consistency was found for each administration of the scale (baseline α = 0.88; follow-up α = 0.90). See Appendix A-1: Table 6 for internal consistency data for the subfactors.

Blood donation perceived behavioral control (France, Kowalsky, France, McGlone, et al., 2014; Appendix C-6). As can be seen in Table 2, perceived behavioral control was assessed by six items examining the perceived ease or difficulty of donating blood. This scale has been shown to distinguish between controllability (confidence in one's ability to donate blood) and self-efficacy (the perception that donating blood is under their control) as subfactors of perceived behavior control (France, Kowalsky, France, McGlone, et al., 2014). In the present study, results are presented based on the sum of all six items (as shown in Appendix B-2: Table 15, analysis of the subfactors did not alter the observed results or add to interpretation in any meaningful way). Strong

internal consistency was found for each administration of the scale (baseline α = 0.91; follow-up α = 0.91). See Appendix A-1: Table 6 for internal consistency data for the subfactors.

Extended theory of planned behavior measures.

Blood donation anxiety (STAI-Y-short-form) (Marteau & Bekker, 1992; Spielberger, 1983; Appendix C-7). As can be seen in Table 2, anxiety was assessed using a six-item short form of the Spielberger State–Trait Anxiety Inventory asking how one feels about donating blood (calm, tense, upset, relaxed, content, worried). The abbreviated version of the STAI produces scores similar to those obtained using the full-form across subject groups manifesting normal and raised levels of anxiety (Marteau & Bekker, 1992). In the present sample strong internal consistency was found for each administration of the scale (baseline α = 0.88; follow-up α = 0.91). This scale has been used to measure anxiety related to donating blood and correlates negatively and significantly with donation related attitude, providing support for its validity (France, France, Kowalsky, & Cornett, 2010; Sinclair et al., 2010).

Blood donation related personal moral norm (Lemmens, 2005; France, 2007; Appendix C-8). As can be seen in Table 2, personal moral norm was assessed by three items examining one's personal feelings of responsibility to donate blood. In the present sample strong internal consistency was found for each administration of the scale (baseline α = 0.82; follow-up α = 0.83). Scores on this scale have been correlated with measures of attitude and intention to provide a future donation (Masser, 2008; Lemmens, 2005; France et al., 2007).

Interview feedback questionnaire (Appendix C-10). Perceived utility of the post-donation motivational interview with implementation intention was assessed using three individual items. Each item was rated on a 7-point Likert-type scale (range 1 to 7) along the following dimensions: "Strongly Disagree" to "Strongly Agree," and asked whether the interview was a good use of time, whether the information covered was useful, and whether it motivated them to donate blood again.

Procedures

Recruitment and random assignment. A flowchart of the study protocol is provided in Figure 2. Overall, 6, 873 potential participants were emailed or telephoned and given a brief overview of the study including information on risks, benefits, compensation and confidentiality. Those interested in participating could click on a link within the advertisement email or were emailed an internet link following the recruitment telephone call allowing them to access the study website. On the study website, hosted by Qualtrics (Qualtrics, Provo, UT, USA), participants were able to review and approve a consent statement and then proceed to complete demographic questions, a series of baseline questionnaires and provided future contact information. It is of note that recruitment continued until both study groups had a final sample size of at least 86 in order to achieve adequate power to conduct group analyses, thus equal sample size was not achieved for the two groups. A total of 705 participants logged into the study website, however only 419 participants completed the consent form, demographics questionnaires and provided future contact information. Participants were then randomly assigned to either a no-interview control group ($N = 180$) or a post-donation motivational interview

with implementation intentions group ($N = 239$) based on a list of randomly generated numbers from a computerized research randomizer (i.e., www. randomizer.org).

Study conditions. The intervention was conducted independent of typical Hoxworth Blood Center procedures; hence, all participants received usual care from the blood collection agency in terms of follow-up contact and reminders.

No-interview control. Within one week (+/- 3 days) of completing the consent form, demographic and baseline questionnaires, participants received a brief telephone call thanking them for participating in the study. At the time of the call, participants were informed that they would receive an additional email within the next 4 weeks with the link to the follow-up questionnaires to complete (see Appendix C-14). When participants were not spoken to directly, a voicemail message was left. In order to promote completion of the follow-up questionnaire, participants received up to four reminder emails and two telephone calls requesting that they complete the follow-up questionnaire. While 180 participants were contacted to complete the follow-up questionnaire, only 109 were used in analysis as 64 participants failed to complete the final questionnaires and 7 participants were excluded due to an incorrect response on the test question.

Post-donation motivational interview with implementation intentions. Following completion of the consent form, demographic and baseline questionnaires, participants received a brief telephone call to thank them for participating in the study and to complete the post-donation motivational interview with implementation intentions (MI+II). If participants were unavailable to complete the MI+II at the time of the call, a more convenient time and date was scheduled for the interview. If needed, multiple

telephone calls were made to reach participants. On average, participants in the MI+II group completed the telephone interview within 12.8 days (SD = 15.5) of entering the study. The intervention was designed to be 15-20 minutes in duration. The actual length averaged 17 minutes and 40 seconds (SD = 6:06; range 8:07 to 37:28). The interview followed a pre-prepared script (see Appendix C-11 for an overview) which embodied the spirit of motivational interviewing to facilitate collaboration, promote donor autonomy and elicit intrinsic motivations for donating blood. The interventionists asked open-ended questions, offered reflective responses, engaged in planning and problem-solving and provided affirmations and summaries in order to (a) identify and/or clarify the participants' specific motivations for donating, (b) address ambivalence participants may feel about donating blood, (c) develop an individualized implementation/action plan to promote goal progress, and (d) develop a specific coping plan for barriers or difficulties the participant experienced that may prevent future donation. All interview participants received a summary email of their individualized implementation intentions consisting of if-then plans with a specific reminder, and details of when, where and how (includes coping plans to address barriers) they may donate next (see Appendix C-15).

At the end of the interview participants were informed that they would receive an additional email within the next 4 weeks with a link to the follow-up questionnaire to complete (see Appendix C-14). The follow-up questionnaire for participants in the MI+II group included the same measures completed by the no-interview control group, along with an additional measure to assess the perceived utility of the intervention. In order to promote completion of the follow-up questionnaire, participants received up to four

reminder emails and two telephone calls reminding them to complete the follow-up questionnaire. Of the 239 participants contacted for the interview, only 115 participants successfully completed the entire interview. Data was further reduced as 27 interview participants failed to complete the final questionnaires and 2 participants were excluded due to an incorrect response on the test question. A total of 86 participants were used in analysis for the MI+II group.

Interventionist training. The motivational interview with implementation intentions was conducted by eight clinical psychology graduate students and four undergraduate psychology majors. All interventionists were pre-screened to ensure that they held a positive view of blood donation. All interventionists completed a 10-hour workshop which included: (1) psycho-education about blood donation, (2) training in issues salient to blood donors, (3) training in motivational interviewing techniques and the formation of implementation intentions, and (4) discussion and role-play.

Intervention fidelity. To maintain intervention fidelity, telephone interventionists participated in weekly group supervision over the course of the study with licensed clinical psychologists. Telephone interviews were audio-recorded with participant permission for review with clinical supervisors during the weekly supervision sessions. Further, the last 15 minutes of each audio recording was selected from each interview and two trained coders rated the interview using the global scores from the Motivational Interviewing Treatment Integrity Code, Version 3.1 (MITI) (Moyers, Martin, Manuel, Miller, & Ernst, 2010; Moyers, Martin, Manuel, Hendrickson, & Miller, 2005). Prior to coding the study interviews, both coders reviewed the MITI manual and engaged in

repeated practice in assigning codes to standard training interviews until an inter-rater reliability of at least 0.70 was achieved on three consecutive interviews. The MITI provides proficiency cut-offs for global scores that indicate beginning proficiency and more advanced competency in motivational interviewing. On average, therapists met competency across global scores assessing evocation, collaboration, autonomy, direction and empathy. While variability existed across interventionists, all met at least beginning proficiency (and often competency) on global scores, suggesting that interventions conducted in the current study remained adherent to motivational interviewing principles.

Assessment of Donor Return

To determine whether each donor provided a repeat donation, Hoxworth Blood Center staff used SafeTrace Tx software (El Dorado Hills, CA, USA) to determine specific dates of subsequent donations since entering the study. Repeat donation behavior was examined for 12 months from the index donation for all participants.

The study protocol was reviewed and approved by the Ohio University and University of Cincinnati Institutional Review Boards.

Statistical Analyses

Group differences and associations. All analyses were conducted using SPSS version 21.0 software (IBM Corp, Armonk, NY). Chi-square analyses were conducted to examine differences between the motivational interview with implementation intentions (MI+ II) and the no-interview control group on all categorical measures including sex, race, ethnicity and prior donation history. Independent-samples t-tests were used to examine group differences in age. The primary analyses consisted of a series of

ANCOVAs to compare baseline-adjusted group differences on follow-up measures of the six self-determination theory regulatory styles, RAI and the primary and extended TPB constructs (i.e., donation intention, attitude, subjective norms, perceived behavioral control, anxiety, self-efficacy, personal moral norms). Chi-square analyses were conducted to compare the proportion of donors in each group who returned to donate within 12 months of entering the study. A Mann-Whitney test examined group differences in mean number of attempted donations between the groups.

Mediation analyses. The Preacher and Hayes (2004, 2008) bootstrapping methodology was used to assess whether the effect of the post-donation motivational interviewing intervention on repeat donation attempts was mediated by post-intervention levels of blood donor identity (via the relative autonomy index), donation intention, attitude, subjective norm, perceived behavioral control, anxiety and personal moral norm. More specifically, if any post-intervention self-determination theory or theory of planned behavior construct (M) mediate the relationship between MI+II (X) and repeat donation attempts (Y), then 1) the MI+II intervention should be associated with significantly higher post-intervention outcome levels ($X \rightarrow M$) and repeat donation attempts ($X \rightarrow Y$), 2) higher post-intervention outcome levels should be significantly associated with repeat donation attempts ($M \rightarrow Y$), and 3) the relationship between the MI+II intervention and repeat donation attempts should decrease or become non-significant when controlling for post-intervention outcome levels of that construct.

Results

Participant Attrition

As noted above (and illustrated in Figure 2), 224 people (71 no-interview controls and 153 MI+II) were not retained in the final sample. Examination of demographic variables revealed that completers (i.e., the 195 participants who completed all study components) and the 224 non-completers did not differ on any of the study variables except age and race. Specifically, non-completers were significantly younger than completers, $t(417) = -2.18$, $p = .03$, and as a group had more non-Caucasian participants (93.8% versus 87.0%) (See Appendix A-2: Table 7a and 7b). It is also of note that examination of differences between completers and non-completers did not reveal any significant difference between the groups on baseline scores of blood donor identity, donation intention, attitude, subjective norm, perceived behavioral control, anxiety or personal moral norm.

Demographic Comparison

As shown in Table 1, among those who completed the study, between groups comparisons revealed no significant differences between the MI+ II and no-interview control groups with respect to sex, race, ethnicity and prior donation history. However, significant group differences were observed for age, $t(193) = 2.1$, $p = .04$, reflecting a higher mean age among participants in the no-interview control group (38.9 years) versus the MI+II group (35.0 years). To account for the potential influence of this age difference, the following analyses were conducted with and without age as a covariate; however, results are presented without age as a covariate because this analytic approach

did not alter the observed results in any meaningful way (see Appendix B-1: Table 14 for analyses with age included as a covariate).

Baseline Analyses

A series of independent-samples t-tests was conducted to identify any significant baseline difference between the study conditions on each of the outcome measures. As can be seen in Table 3, group differences were found at baseline for the amotivation subfactor of the blood donation identity survey, and for the intention, attitude and perceived behavioral control measures. Specifically, at baseline participants in the no-interview control group had significantly higher levels of amotivation compared to those in the MI+II group, while participants in the MI+II group had significantly higher levels of intention, attitude and perceived behavioral control. There were no other significant group differences observed at baseline.

Analyses of Intervention Effects

Given the presence of baseline group differences on some measures, ANCOVAs were conducted to examine between group differences at follow-up while adjusting for baseline differences. As shown in Table 4, these analyses revealed significant post-intervention group differences on the overall relative autonomy index (RAI) for donor identity and on the individual amotivation, introjected, identified, integrated, and intrinsic regulatory styles. As shown in Figure 3, participants in the MI+ II group reported higher RAI scores, indicating more autonomous regulation compared to the no-interview control group at follow-up, ($p = .02$). Results for the individual regulatory styles showed that participants in the MI+ II group had significantly higher scores on the more self-

determined factors (intrinsic regulation, integrated, identified, introjected) and significantly lower scores on amotivation, when compared to the no-interview control group at follow-up.

As can be seen in Table 4, significant group differences were also observed for the theory of planned behavior measures of donation-related intention, attitude, and personal moral norm. Specifically, in ANCOVAs controlling for baseline differences participants in the MI+ II group had significantly higher post-intervention levels of blood donation intention, attitude, and personal moral norms compared to the no-interview control group when controlling for pre-treatment baseline. There were no other significant main or interaction effects observed.

Analysis of Donor Return

During the one-year follow-up interval, the no-interview control group attempted 2.3 donations (SD = 2.2 donations; Median = 2, Range = 0-7) and the MI+II group attempted 2.7 donations (SD = 2.2; Median = 2, Range = 0-7). Results of a Mann-Whitney test revealed no significant group difference in the number of repeat donation attempts, U (193) = 4430.0, Z = -.67, p = .50. Comparison of whether donors returned or not during a 12 month follow-up revealed that 82.6% of participants in the MI+II group attempted to provide a repeat donation as compared to 73.4% of no-interview control participants. While this effect did not reach significance, χ^2 (1, N = 195) = 2.3, p = .13, η^2= .11, exploratory analyses revealed that there was a significant group difference among the more experienced female blood donors (i.e., those with ≥ 5 prior donations). Specifically, as shown in Table 5, among female donors with ≥ 5 prior donations a

significantly higher rate of repeat donation attempts was observed for the MI+II group (100%) as compared to the control group (70.8%), $\chi 2$ (1, N = 48) = 8.2, p = .00, $\eta 2$= .41.

Mediation Analyses

Because the MI+II intervention did not have a significant effect on repeat donation attempts for the sample as a whole but did promote retention among female experienced donors (i.e. those with ≥ 5 prior donations), exploratory mediation analyses were conducted for this small subsample (n=48). Given the presence of baseline group differences in the larger sample on some measures, ANCOVAs were conducted to examine between group differences on post-intervention levels of each of the potential mediators (i.e., relative autonomy index, donation related intention, attitude, subjective norm, perceived behavioral control, anxiety and personal moral norm), while adjusting for baseline differences. These ANCOVAs revealed significantly higher post-intervention intention and attitude scores for the MI+II group versus the control group; hence these variables met the first criterion as potential mediators. In addition, logistic regression analyses confirmed that these variables were also significantly related to repeat donation attempts. Accordingly, each of these constructs was examined as a potential mediator using Preacher and Hayes (2004, 2008) bootstrapping method with bias-corrected confidence estimates. Pre-treatment baseline was included as a covariate in each analysis and the 95% confidence interval of the indirect effects were obtained with 1000 bootstrap resamples (Preacher & Hayes, 2004, 2008). Results of these analyses did not support post-intervention intention or attitude as potential mediators in the

relationship between MI+II intervention and repeat donation attempts among the more experienced female blood donors in this sample.

Given the small size of the experienced female blood donor subsample, additional exploratory mediation analyses were also considered for the entire sample of female donors. First, there was a significant relationship between group and repeat donation attempts among all female donors, with higher rates of return observed for the MI+II versus control group (87.5% and 73.1%, respectively), $\chi 2$ (1, N = 142) = 4.5, p = .03, $\eta 2$= .18). Second, ANCOVAs for the overall female donor subsample revealed significantly higher post-intervention blood donor identity, intention, attitude, and perceived behavioral control scores for the MI+II group versus the control group; hence these variables met this criterion for consideration as potential mediators. In addition, logistic regression analyses confirmed that these variables were significantly related to repeat donation attempts. Accordingly, each of these constructs were examined as potential mediators for female donors using Preacher and Hayes (2004, 2008) bootstrapping method with bias-corrected confidence estimates. Pre-treatment baseline was included as a covariate in each analysis and the 95% confidence interval of the indirect effects were obtained with 1000 bootstrap resamples (Preacher & Hayes, 2004, 2008). As shown in Figure 4, results of these analyses supported a potential mediating role for post-intervention intention (B = 0.18; CI (0.00, 0.52) and attitude (B = 0.31; CI (0.05, 0.79) in the relationship between MI+II intervention and repeat donation attempts among female donors. Further, the direct effect of the MI+II intervention on repeat donation attempts became non-significant when controlling for post-intervention levels of

intention and attitude, suggesting full mediation when each variable is analyzed separately. Blood donor identity and perceived behavioral control did not emerge as potential mediating variables.

Intervention Utility

Exploration of participant's perception of the utility of the MI+II intervention using a brief feedback questionnaire revealed that 58.3% believed it motivated them to donate again, 73.0% reported that they found the information covered in the interview useful and 73.0% reported that the interview was a good use of their time.

Discussion

The primary aim of this randomized clinical trial was to examine whether those who received a post-donation motivational interviewing intervention would report more autonomous motivation, increased intention to donate, and show higher rates of repeat donation attempts within a one year follow-up, as compared to those assigned to a no-interview control group. The observed findings support the notion that MI+II promoted more internal self-regulation of donor motivation and increased donation intention, attitudes and personal moral norms. With respect to actual donation attempts the hypothesis was only partially supported, with the highest proportion of donation attempts observed for experienced female donors who received the MI+II intervention versus equivalent no-interview controls. Of note, enhanced donation intention and attitude were shown to be significant mediators of the relationship between the MI+II intervention and repeat donation attempts among all female donors in the sample.

As a whole, these findings support and extend prior blood donor retention research in at least two important respects. First, by demonstrating the effects of MI+II on blood donation intention ($d = 0.34$), attitude ($d = 0.30$), and personal moral norm ($d = 0.35$), the findings are consistent with prior research on the efficacy of motivational interviewing to enhance key contributors to motivation and goal-directed behavior in a variety of health domains such as medication adherence, smoking cessation, reducing risky sexual behavior, promoting physical activity, and mental health treatment (Cosio et al., 2010; Kolt, Schofield, Kerse, Garrett, & Oliver, 2007; Swartz, Cowan, Klayman, Welton, & Leonard, 2005; Zhu et al., 2002). In fact, the Cohen's d effect size differences

observed between the MI+II and no-interview control group are similar to other studies comparing motivational interviewing to no treatment (Burke, Arkowitz, & Menchola, 2003b; Hettema, Steele, & Miller, 2005; Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Sinclair et al., 2010). Within the context of blood donation, even a small enhancement of blood donor identity, donation related intention, attitude and personal moral norm is practically significant and may have important effects on retention. For example, the 9.2% higher return rate associated with the MI+II versus the no-interview control group, although not statistically significant in the overall sample, would represent a meaningful practical increase in whole blood collections if applied to the entire donor pool. Given an annual pool of roughly 9 million donors (National Blood Collection and Utilization Survey Report, 2011), a 9.2% increase in donations would represent almost one million extra units of blood collected in the subsequent year. Although it may not be feasible to provide the MI+II intervention on this scale, the effects on blood donor identity and the socio-cognitive determinants of intention and behavior suggest that this intervention should be considered as a focused intervention for those at greater risk of not returning. In fact, follow-up analyses of the current study suggests that the MI+II intervention may be particularly effective among more experienced female donors.

In addition, within the subsample of female donors, the impact of the MI+II intervention on repeat donation attempts was mediated by enhanced intention and attitude and highlighted that in the current study the factors with the strongest influence on return behavior were positively impacted by the brief MI+II intervention. This finding is consistent with prior research utilizing the theory of planned behavior model to predict

blood donation behavior, which has consistently demonstrated that attitude affects intention, and that intention is the key determinant of behavior (Ajzen, 1991, 2002). It is of note that enhanced intention and attitude did not emerge as significant mediators of the relationship between the MI+II intervention and repeat donation attempts for the subsample of experienced female donors. However, this results was not surprising as the subsample of female experienced donors was small and participants endorsed high levels of intention and attitude at baseline. These high baseline scores exhibited a ceiling effect which may have masked the impact of the intervention on these variables.

Another important contribution of the present study is that it is the first to integrate the principles of motivational interviewing and self-determination theory within the blood donation context. Prior research suggests that the transition from external forms of motivation towards more autonomous motivation promotes blood donor identity and is positively related to both donation intention and future donation behavior (Armitage & Conner, 2001b; Masser et al., 2012; Wevers, Wigboldus, van Baaren, & Veldhuizen, 2014). The current study demonstrates that a post-donation motivational interview with implementation intention may be effective in helping to facilitate this internalization of intrinsic reasons for donating blood (i.e., enhancing autonomous regulation). Specifically, the MI+II intervention resulted in significant increases in the levels of the three most autonomous regulatory styles (intrinsic, integrated and identified), and reduced levels of amotivation. The observed changes for those who received the MI+II intervention show that this brief intervention significantly influenced autonomous motivation and was accompanied by meaningful changes in donation intention. Unexpectedly, increased

autonomous motivation did not emerge as a significant direct mediator of the relationship between the MI+II intervention and repeat donation attempts. One potential explanation for this lack of relationship is that the magnitude of change in autonomous motivation was small. Moreover, the impact of autonomous motivation on donor return may have been indirect. Previous research has demonstrated that autonomous motivation has a significant effect on the proximal determinants of intention (specifically attitude, and perceived behavioral control) rather than on intention or behavior (Hagger & Chatzisarantis, 2009; Hagger & Chatzisarantis, 2012). As such, it is possible that increased autonomous motivation contributed to the significance of donation related attitude as a mediator of the relationship between the MI+II intervention and repeat donation attempts observed for female donors.

Because the individual components of motivational interviewing and implementation intentions were not evaluated individually, the specific mechanism responsible for the observed changes in blood donor identity, intention, attitude, and behavior remain unclear. However, the combined use of motivational interviewing techniques with the theoretical prescriptions of self-determination theory, while not previously examined in the context of blood donation, has received significant attention in other domains and may offer some insight. Of note, several studies have indicated that self-determination theory offers a way to explain "why" motivational interviewing works. Specifically, these studies propose that motivational interviewing successfully promotes change by enhancing identification with the goal behavior and integrates the behavior with one's value-system (Markland, Ryan, Tobin, & Rollnick, 2005; Patrick & Williams,

2012; Vansteenkiste, Williams, & Resnicow, 2012; Vansteenkiste, 2006). The post-donation motivational interview with implementation intention used in the current study was consistent with this notion. Specifically, it elicited autonomous reasons for donating blood by exploring donor beliefs about how the act of donating fit in with personal goals and values. For example, participants often initially reported external reasons (e.g., incentives) as their primary reason for donating blood; however, with further exploration during the interview more autonomous reasons emerged (e.g., desire to help others, experiencing positive emotional rewards, and wanting to replace blood used by family members). Consequently, the process of promoting awareness and clarifying and expanding upon the donors' reasons for donating may have contributed to the higher levels of identified, integrated, and intrinsic regulation reported among participants who received the MI+II intervention.

Another potential contributor to the beneficial effects of the MI+II intervention involved promoting donor autonomy related to the act of donating blood again. Research utilizing self-determination theory has shown that autonomy support such as eliciting and acknowledging the "doers" perspective, offering options and providing relevant information while minimizing pressure, assists in building autonomous motivation and perceived competence for completing the goal behavior (Gagné, 2003; Grant, 2008; Weinstein & Ryan, 2010; Williams et al., 2006). Given that a key principle of motivational interviewing is supporting autonomy, in the context of the MI+II intervention perceived challenges to blood donation were acknowledged, the donor was able to choose ways to navigate those challenges that would work best for them, and had

the opportunity to create personalized implementation intentions to facilitate completion of their next donation. The observed increase in self-reported measures of autonomous regulation suggests that providing autonomy support may be a contributing factor to the observed results.

The task or forming implementation intentions may also have served as an important contributor to the beneficial effects of the MI+II intervention. Specifically, the individualized implementation intentions built upon the donors' stated motivation and commitment by creating a link between goal-relevant behaviors (e.g. scheduling a specific time or identifying a particular location) and a future context (e.g. seeing this date, time and location on the calendar) to promote action. It is possible that forming these implementation intentions helped bridge the gap between stated intention and behavioral completion for female experienced donors and accounted for the higher rates of repeat attempts observed within this subgroup. Indeed, the differential effect observed for female experienced donors may be due to the coping planning incorporated in the intervention. Existing research has shown that female donors have a greater likelihood of experiencing negative donation reactions (Ditto, France, Lavoie, Roussos, & Adler, 2003). Similarly, more experienced donors may be familiar with the process of donating blood but nonetheless remain at risk for deferral from donating and the possibility of experiencing vasovagal reactions (France, Rader, & Carlson, 2005; Olatunji, Etzel, & Ciesielski, 2010; Rader, France, & Carlson, 2007). In the current study, the interventionist assisted the donor in learning coping strategies (e.g. fluid loading, applied muscle tensing, and distraction) that could be useful to them in managing perceived

barriers. Thus, the task of creating implementation intention not only increased readiness to donate but may also have increased confidence in their ability to be successful. While the above areas of focus may be critical elements and account for the observed effects of the post-donation motivational interviewing intervention with implementation intentions, future studies should consider employing dismantling strategies to identify active ingredients or necessary components for changes in blood donor identity, intention, attitude, and behavior.

Limitations and Directions for Future Research

Although the present study provides supporting evidence for the use of motivational interviewing with implementation intentions in the blood donation context, the study results should be considered in light of several limitations. First, there were issues with attrition as 53.4% of participants randomized to the study conditions were non-completers (i.e., they either could not be reached for the interview, did not complete the questionnaires or answered test questions incorrectly). This rate of attrition is an important consideration for generalizability as participant attrition is a potential source of bias. For example, in the current study attrition could have contributed to an overrepresentation of donors with more positive attitudes, stronger intentions, and higher personal moral norm related to blood donation. However, no significant differences were found on baseline outcome measures between non-completers and completers; hence, attrition did not appear to jeopardize internal validity. Further, analyses examining demographic differences between those who did and did not complete all study components indicated no significant differences between the two groups except in age

and race (see Appendix A-2). In fact, the participants who did not complete the study were reflective of a donor population at a higher risk to not return to provide a repeat donation in that, as a whole, they were younger and had a higher proportion of non-Caucasian donors. While only a few studies have specifically explored racial and ethnic differences in return rates, these existing studies have highlighted that minority and non-US-born donors were less likely than white and US-born donors to be repeat donors (Misje, Bosnes, & Heier, 2008; Murphy et al., 2009; Shaz, James, Demmons, Schreiber, & Hillyer, 2010; Shaz, Zimring, Demmons, & Hillyer, 2008). These donors also often represent a younger and first-time donor population (Misje et al., 2008; Murphy et al., 2009). As such, incorporating age-specific and culturally sensitive components into interventions may be a promising direction for enhancing donor retention within these populations.

Second, the sample size was small, which limited power to fully examine the relationship between levels of training, motivational interviewing skill and intervention effects. Within the final sample, 66 of the interviews were conducted by graduate student interventionist, while only 20 were conducted by undergraduate interventionists. While exploratory analysis revealed no significant difference in return or on any other study measure as a result of graduate or undergraduate training, this lack of a significance must be interpreted with caution given the relatively small proportion of calls conducted by undergraduate interviewers. Nonetheless, these results do suggest that it may not be necessary to have advanced training in clinical psychology to conduct an effective MI+II interview for blood donors.

Third, surprisingly high rates of repeat donation attempts were observed for the study participants as a whole. This is particularly notable as 58.4% of non-completers returned to provide a repeat donation compared to 73.4% in the no-interview control group, which represents a statistically-significant difference (see Appendix A-2). While one would expect similar rates of return for the no-interview control and non-completers, one possible explanation for this difference is the "mere-measurement effect" (Godin, Sheeran, Conner, & Germain, 2008; Godin et al., 2010). It is possible that the mere act completing the brief questionnaires measuring cognitions about blood donation (baseline and follow-up) influenced return behavior among the no-interview control group. As such, this phenomenon may have contributed to the higher return behavior observed for the no-interview control group compared to those who did not complete the study.

Fourth, the study lacked a true attentional control for the < 18 minute telephone interview. Accordingly, future studies should use a similar length control call to eliminate the potentially confounding effect that greater attention may have had on participant survey responses and subsequent donation behavior.

In spite of these limitations, strengths of the current study included the use of a pre-test/post-test design to collect both baseline and post-intervention measures, multiple interventionists to conduct the telephone interviews, and the incorporation of implementation intentions procedures to enhance behavioral follow-through among those who intended to provide another donation. Additionally, the current study included the use of a prepared script for the interviewers, which served to maintain intervention integrity. Equally important, the majority of study participants who received the MI+II

intervention reported that the interview was motivating, useful and a good use of their time.

In conclusion, the post-donation motivational interview with implementation intentions was associated with higher levels of autonomous motivation, enhanced intention to provide a future donation, more positive attitudes and personal moral norm related to donating, and an increased proportion of repeat donation attempts among some donor subgroups. As a whole these findings suggest that a post-donation motivational interview with implementation intentions is an effective and potentially useful tool to enhance blood donor retention among specific populations of blood donors.

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Table 1

Demographic Characteristics (%) for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) Group

	All (N=195)	No-interview (N=109)	MI+II (N=86)	p
Female	72.8	71.6	74.4	
Male	27.2	28.4	25.6	.39
Past Donations				
1	20.5	22.9	17.4	
2	15.4	13.8	17.4	
3	16.4	17.4	15.1	
4	9.2	9.2	9.3	
≥ 5	38.5	36.7	40.8	.83
African American/Black	1.5	0.0	3.5	
Asian American	0.5	0.0	1.2	
European American/Caucasian /White	93.8	98.2	88.4	
Native Hawaiian/Other Pacific Islander	0.5	0.0	1.2	
Other	3.7	1.8	5.7	.06
Ethnicity				
Hispanic	2.1	1.9	2.4	
Non-Hispanic	97.9	98.1	97.6	.60
Mean Age	37.2 (SD=13.5)	38.9 (SD=13.6)	35.0 (SD=13.2)	**.04**

Table 2

Donation Measures, Items and Range

Measures	Items (response anchors)	Range
Blood Donor Identity Survey		+126
Amotivation	1. I really don't think about donating blood (not at all true/very true) 2. Blood donation is something I rarely even think about (not at all true/very true) 3. I really don't have any clear feelings about blood donation (not at all true/very true)	(3 to 21)
External Regulation	4. I donate blood for thank you gifts, such as T-shirts and water bottles (not at all true/very true) 5. I donate blood for the drinks and snacks (not at all true/very true) 6. I donate blood to get a donor sticker (not at all true/very true)	(3 to 21)
Introjected Regulation	7. I would feed guilty or ashamed of myself if I did not donate blood (not at all true/very true) 8. I would feel bad about myself if I did not donate blood (not at all true/very true) 9. I would regret it if I did not donate blood (not at all true/very true)	(3 to 21)
Identified Regulation	10. Donating blood is an important choice I really want to make (not at all true/very true) 11. Donating blood is very important for the health of others (not at all true/very true) 12. Blood donation is an important thing to do (not at all true/very true)	(3 to 21)
Integrated Regulation	13. I have carefully thought about it and believe donating blood is important for many aspects of my life (not at all true/very true) 14. Donating blood is consistent with my life goals (not at all true/very true) 15. Donating blood is very important to me (not at all true/very true)	(3 to 21)
Intrinsic Regulation	16. I enjoy donating blood (not at all true/very true) 17. For me, being a blood donor means more than just donating blood (not at all true/very true) 18. Blood donation is an important part of who I am (not at all true/very true)	(3 to 21)
Intention	1. I plan to donate blood in the next 8 weeks (disagree/agree) 2. How likely is it that you will donate blood in the next 8 weeks (unlikely/likely)	3 to 21

Table 2 (Continued)

	3. I will donate blood in the next 8 weeks (unlikely/likely)	
Attitude		6 to 42
Cognitive	1. For me, donating blood within the next 8 weeks would be (useless/useful) 2. For me, donating blood within the next 8 weeks would be (pointless/worthwhile) 3. For me, donating blood within the next 8 weeks would be (the wrong thing to do/the right thing to do)	(3 to 21)
Affective	4. For me, donating blood within the next 8 weeks would be (unpleasant/pleasant) 5. For me, donating blood within the next 8 weeks would be (unenjoyable/enjoyable) 6. For me, donating blood within the next 8 weeks would be (frightening/not frightening)	(3 to 21)
Subjective Norm		6 to 42
Injunctive	1. Most people who are important to me would recommend I give blood in the next 8 weeks (disagree/agree) 2. My family thinks I should give blood in the next 8 weeks (disagree/agree) 3. The people who are most important to me think I should give blood in the next 8 weeks (disagree/agree)	(3 to 21)
Descriptive	4. A lot of people I know plan to give blood in the next 8 weeks (disagree/agree) 5. My friends will give blood in the next 8 weeks (unlikely/likely) 6. Most people who are important to me will give blood in the next 8 weeks (unlikely/likely)	(3 to 21)
Perceived Behavioral Control		6 to 42
Self-Efficacy	1. How confident are you that you will be able to donate blood within the next 8 weeks (not very confident/very confident) 2. For me, donating blood in the next 8 weeks would be (difficult/easy) 3. If it were entirely up to me, I am confident that I would be able to donate blood in the next 8 weeks (disagree/agree)	(3 to 21)
Controllability	4. How much control do you have over whether you donate blood or not in the next 8 weeks(no control/complete control	(3 to 21)

Table 2 (Continued)

	within the next 8 weeks (disagree/agree) 5. I have complete control over whether I donate blood or not in the next 8 weeks (disagree/agree) 6. It is entirely up to me to donate blood (disagree/agree)	
Anxiety	1. I feel calm (not at all/very much) 2. I am tense (not at all/very much) 3. I feel upset (not at all/very much) 4. I am relaxed (not at all/very much) 5. I feel content (not at all/very much) 6. I am worried (not at all/very much)	6 to 24
Personal Moral Norm	1. I feel a moral obligation to give blood(strongly disagree/strongly agree) 2. I feel a personal responsibility to give blood(strongly disagree/strongly agree) 3. It is a social obligation to give blood (strongly disagree/strongly agree)	3 to 21

Table 3

Baseline Means (SD) of the Donation Measures for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) Group with p-values and Cohen's d values

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	44.6 (28.3)	49.8 (23.4)	0.20	0.20
Amotivation	8.8 (4.0)	7.6 (2.9)	**0.03**	0.34
External Regulation	5.4 (3.6)	5.7 (3.2)	0.58	0.09
Introjected Regulation	11.5 (5.1)	12.3 (4.9)	0.31	0.16
Identified Regulation	19.1 (2.2)	19.1 (2.1)	0.91	0.00
Integrated Regulation	15.8 (4.2)	16.3 (3.5)	0.41	0.13
Intrinsic Regulation	14.1 (4.3)	14.8 (4.3)	0.33	0.16
Intention	43.4 (19.8)	52.8 (14.6)	**0.00**	0.54
Attitude	33.7 (7.7)	36.1 (5.1)	**0.01**	0.37
Subjective Norm	21.8 (8.8)	23.4 (8.7)	0.19	0.18
Perceived Behavioral control	32.3 (10.1)	36.1 (8.0)	**0.00**	0.42
Anxiety	20.2 (3.9)	20.8 (3.5)	0.30	0.16
Personal Moral Norm	15.2 (4.2)	15.0 (4.5)	0.77	0.05

Table 4

Adjusted Follow-up Means (SD) of the Study Measures for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) Group with p-values and Cohen's d

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	45.1 (30.3)	50.5 (19.1)	**0.03**	0.21
Amotivation	8.8 (3.9)	7.9 (2.8)	**0.03**	0.27
External Regulation	5.6 (3.6)	6.4 (4.3)	0.09	0.20
Introjected Regulation	11.4 (5.4)	13.4 (4.8)	**0.00**	0.39
Identified Regulation	18.4 (3.0)	19.1 (2.1)	**0.04**	0.27
Integrated Regulation	15.7 (4.3)	17.0 (3.0)	**0.00**	0.35
Intrinsic Regulation	14.7 (4.6)	15.9 (3.4)	**0.00**	0.30
Intention	16.2 (6.8)	18.1 (3.9)	**0.01**	0.34
Attitude	35.5 (5.7)	37.0 (4.3)	**0.01**	0.30
Subjective Norms	23.7 (8.5)	24.0 (9.4)	0.76	0.03
Perceived Behavioral Control	35.9 (8.6)	37.4 (5.6)	0.10	0.21
Anxiety	20.4 (3.9)	20.6 (3.8)	0.71	0.05
Personal Moral Norm	15.2 (4.2)	16.6 (3.9)	**0.00**	0.35

Table 5

Donor Return (%) by Sex and Donor Experience for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) Group at 12 Months Follow-up

Sex	N	No-interview	MI+II	X^2	p
Female					
<5 Prior donations	94	74.1	80.0	0.45	0.50
≥5 Prior donations	48	70.8	100.0	8.2	**0.00**
Male					
<5 Prior donations	26	60.0	54.5	0.08	0.78
≥5 Prior donations	27	87.5	81.8	0.17	0.68

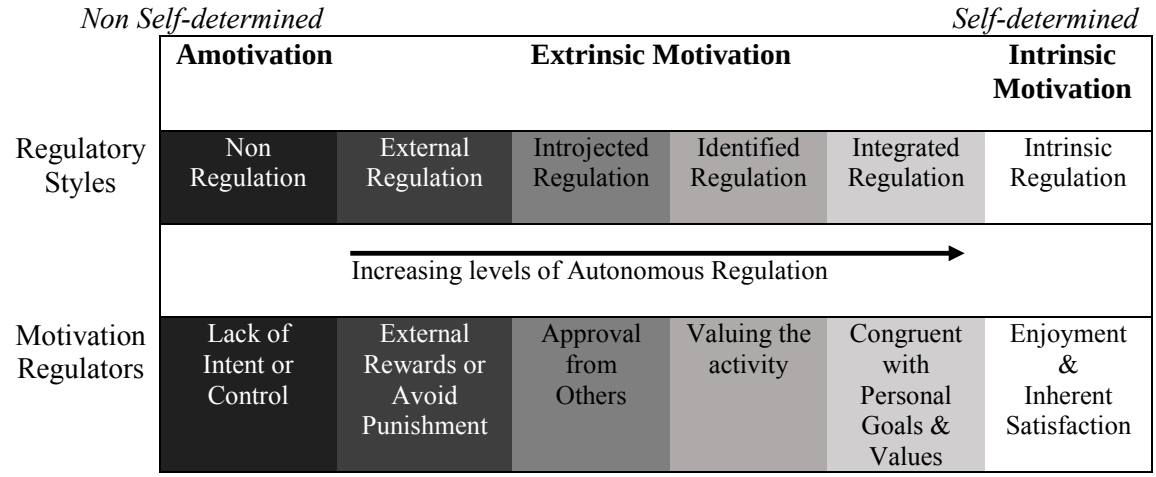


Figure 1. The Self-determination Theory Continuum of Motivation

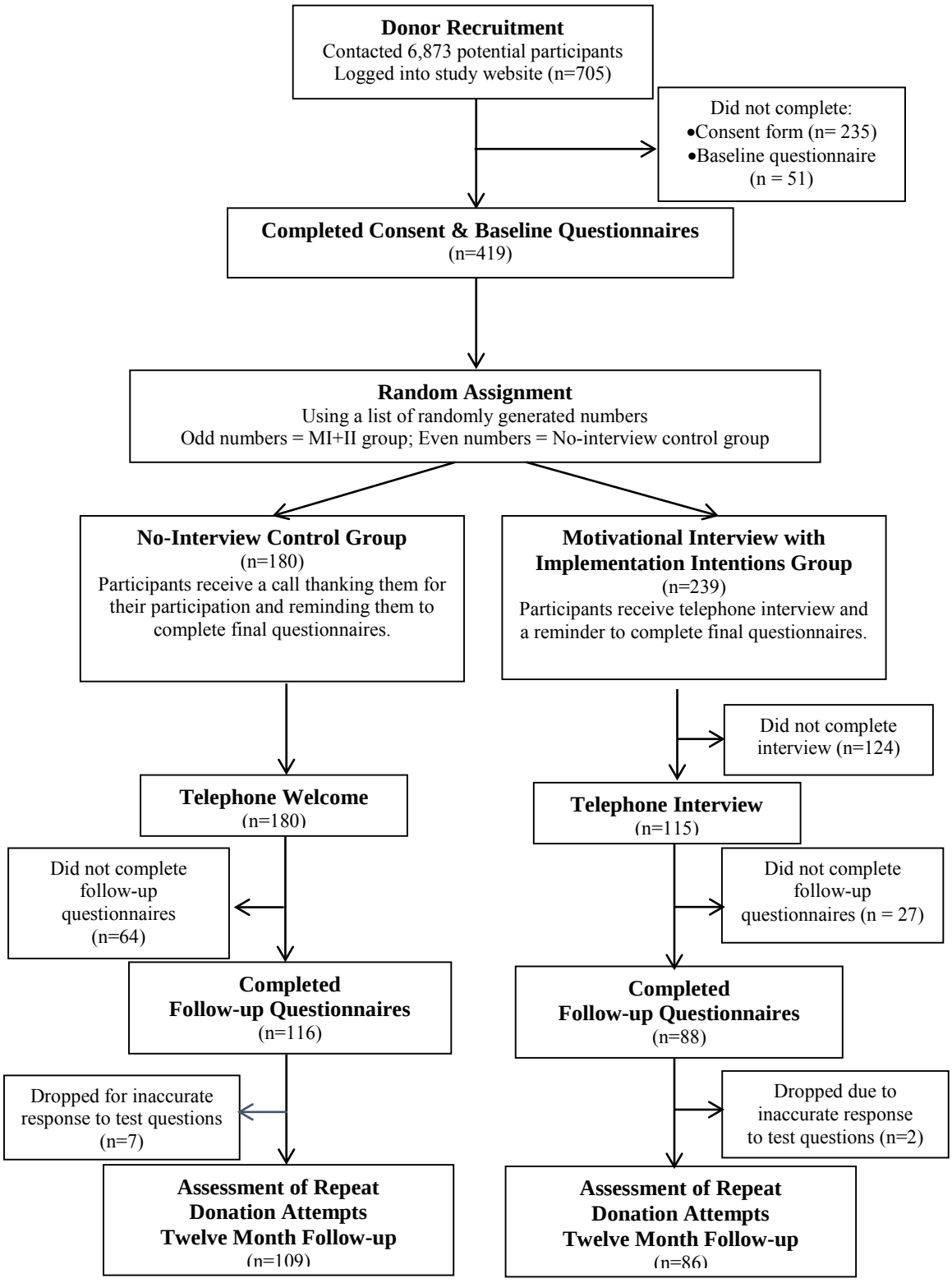


Figure 2. Overview of Participant Flow

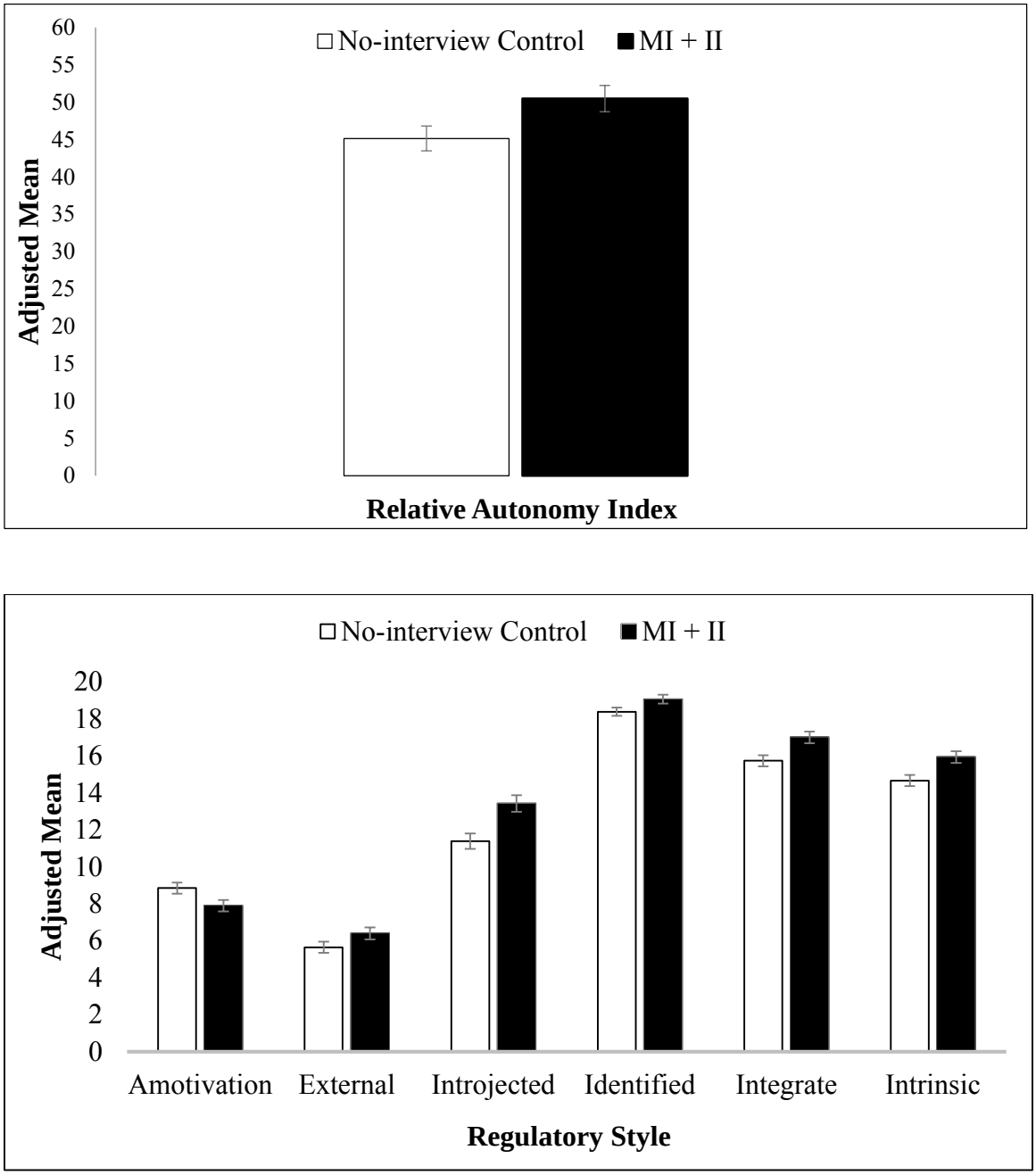
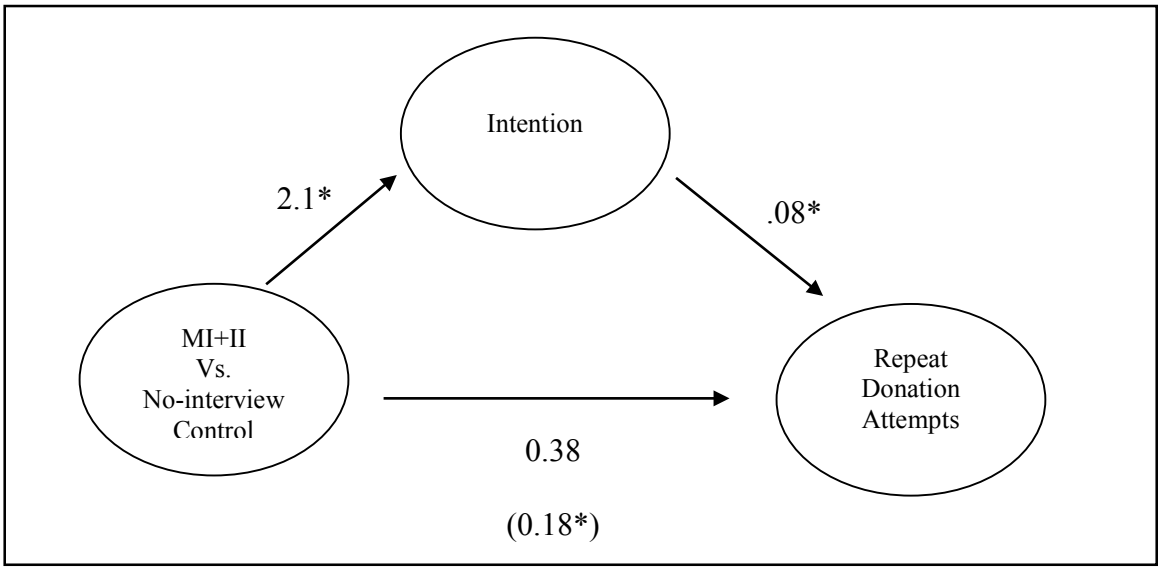


Figure 3. Baseline- adjusted means and standard errors for relative autonomy index (top) and the six regulatory styles (bottom) of the Blood Donor Identity Survey for the no-interview control and motivational interviewing with implementations intentions (MI+II) groups.



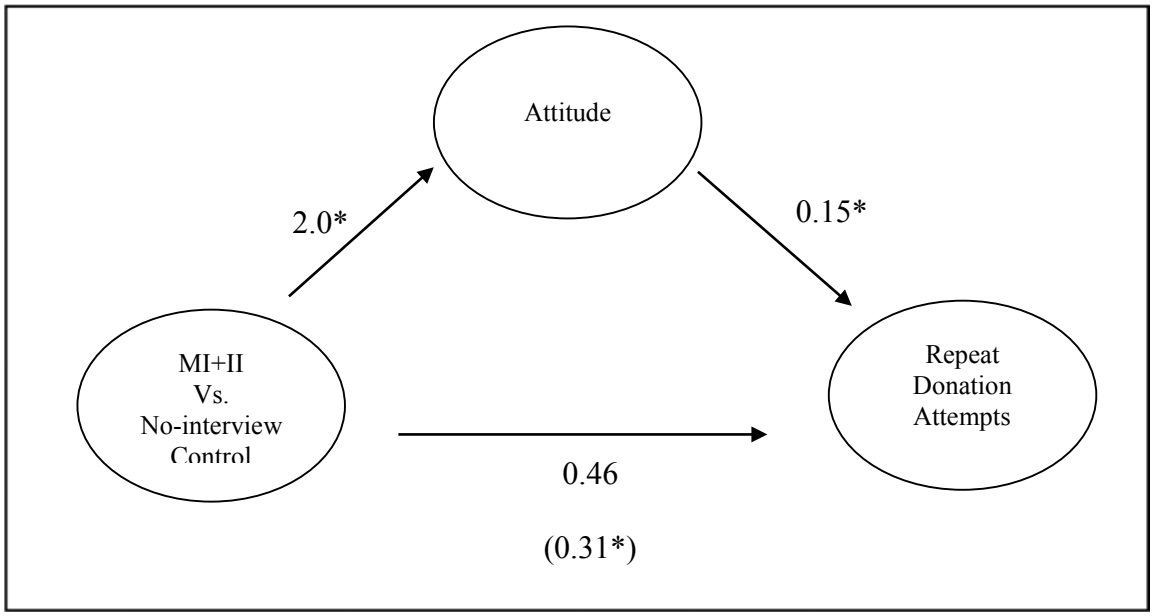


Figure 4. Separate models to examine donation intention (top) and donation attitude (bottom) as potential mediators of repeat donation attempts among Female Donors. Values on the arrows represent standardized path coefficients and the value inside the parenthesis is the standardized path coefficient of the overall indirect effect (* = $p < 0.05$).

Appendix A: Supplemental Text

Appendix A-1: Table 6: Baseline and Follow-up Internal Consistency for Attitude, Subjective Norm and Perceived Behavioral Control Subfactors.

Table 6

Baseline and Follow-up Internal Consistency and Test-retest Reliability for Attitude, Subjective Norm and Perceived Behavioral Control Subfactors

	Internal Consistency Reliability (α)	
Measure	Baseline	Follow-up
Attitude	0.85	0.80
Cognitive	0.88	0.82
Affective	0.87	0.88
Subjective Norm	0.88	0.90
Injunctive	0.94	0.97
Descriptive	0.90	0.91
Perceived Behavioral Control	0.91	0.91
Self-efficacy	0.87	0.90
Controllability	0.96	0.97

Appendix A-2: Table 7a. Demographic Characteristics (%) of Non-Completers and Completers

Table 7a

Demographic Characteristics (%) of Non-Completers and Completers by Group

	Non Completers (N = 224)	Completers (N = 195)	p
Sex			
Female	67.9	72.8	
Male	32.1	27.2	0.27
Past Donations			
1	29.9	20.5	
2	13.1	15.4	
3	10.0	16.4	
4	9.5	9.2	
≥ 5	37.6	38.5	0.12
Race			
African American or Black	4.9	1.5	
Asian American	3.2	0.5	
European American/Caucasian/ White	87.0	93.8	
Native Hawaiian/Other Pacific	0.0	0.5	
Islander	4.9	3.6	**0.05**
Other			
Ethnicity			
Hispanic	2.3	2.1	
Non-Hispanic	97.7	97.9	0.88
Mean Age	34.4 (SD=13.1)	37.2 (SD=13.5)	**0.03**

Appendix A-2: Table 7b. Demographic Characteristics (%) of Non-Completers and Completers by Group

Table 7b

Demographic Characteristics (%) of Non-Completers and Completers by Group

	Non-Completers (N=224)	Completers (N=195)		p
		No-interview (N=109)	MI+II (N=86)	
Sex				
Female	67.9	71.6	74.4	
Male	32.1	28.4	25.6	0.49
Past Donations				
1	29.9	22.9	17.4	
2	13.1	13.8	17.4	
3	10.0	17.4	15.1	
4	9.5	9.2	9.3	
≥ 5	37.6	36.7	40.7	0.37
Race				
African American or Black	4.9	0.0	3.5	
Asian American	3.2	0.0	1.2	
European American/ Caucasian/White	87.0	98.2	88.3	
Native Hawaiian/Other Pacific Islander	0.0	0.0	1.2	
Other	4.9	1.8	5.8	**0.04**
Ethnicity				
Hispanic	2.3	1.9	2.4	
Non-Hispanic	97.7	98.1	97.6	0.96
Mean Age	34.4 (SD=13.1)	39.0 (SD=13.6)	35.0 (SD=13.2)	**0.01**

Appendix A-3: Descriptives, Psychometrics and Group Analysis of the Blood Donor Self-Efficacy Measure

Various studies have highlighted the role of self-efficacy in enhancing the prediction of intention and behavior (Bandura, 1977; France, France, & Himawan, 2007; Giles, McClenahan, Cairns, & Mallet, 2004; Lemmens et al., 2005). Although closely related to perceived behavioral control, self-efficacy has been found to be the stronger correlate of intention (Giles et al., 2004) and suggests that both constructs should be included when examining intention and behavior. Within the blood donation literature, an important aspect impacting continued donation has been the experience of unpleasant physical reactions such as dizziness, weakness, and lightheadedness during or following donation (France et al., 2012; France, France, Roussos, & Ditto, 2004; France et al., 2013; France et al., 2005). The experience of these reactions are associated with reductions in donation intention and repeat donation behavior (France et al., 2012; France et al., 2004; France et al., 2013; France et al., 2005). As such, interventions which provide knowledge and strategies regarding the prevention of these reactions may enhance donor confidence in their ability to reduce potentially unpleasant physical reaction and thus impact intention and actual return behavior.

This added dimension impacting donor intention and return is examined in the present study. The blood donation self-efficacy (BDSE) measure consisted of nine items and assessed ones confidence that they could engage in behavior to reduce the possibility of vasovagal reactions (e.g., faintness, dizziness, weakness). Each item was rated on a five-point scale from 1 (strongly disagree) to 5 (strongly agree), with total scores ranging

from 9 to 45. An example item was, "I feel confident that I can do things to keep from having a bad blood donation experience." In the present sample strong internal consistency was found for each administration of the scale (baseline $\alpha = 0.86$; follow-up $\alpha = 0.87$). Acceptable levels of test-retest reliability were also observed between baseline and follow-up ($r=.68$, $p < .01$). The BDSE is positively correlated with other measures of behavior including intention, attitude and perceived behavioral control and negatively correlated with measures of blood donation anxiety providing of construct validity (France et al., 2010; Sinclair et al., 2010).

Analysis of intervention effects on blood donor self-efficacy. An independent-samples t-tests was conducted to identify any significant baseline differences between the study groups on blood donation self-efficacy. However, no significant group difference was observed at baseline. An Analysis of Variance was then used to examine any potential group difference at follow-up. No significant difference was found between the no-interview control and motivational interview with implementation intentions groups. Follow-up means (SD) were 36.3 (6.0) and 37.2 (6.1) for the no-interview control and the MI+II group, respectively. It is of note that the results did not change when age was included as a covariate in analysis of group differences in self-efficacy.

Appendix A-4: Three Month Follow-up

All participants were sent an additional email at 3 months inquiring whether they donated blood again (yes or no) (see Appendix C-16). In order to obtain the follow-up information, participants were sent up to two additional emails inquiring about repeat donations. Participant response was low as only 26.7% (25.7 % no-interview control;

27.9% of MI +II) of the final sample responded to the follow-up question at 3 months. Among those who responded, 58.3% of the MI+II group reported a repeat donation attempt compared to 57% of the no –interview control group.

Appendix A-5: Correlation between Study Measures and Repeat Donation

Correlation analyses were conducted to examine the relationship between blood donor identity (RAI, amotivation, external, introjected, identified, integrated, and intrinsic), theory of planned behavior measures (intention, attitude, subjective norm, perceived behavioral control, anxiety, personal moral norms) and repeat donation. As seen in Table 8, results reveal that donor return was significantly correlated with all study measures except personal moral norm, all $p < .05$. Intention had the strongest positive association with donor return, $r (195) = 0.32$, $p = .00$.

Appendix A-6: Table 8. Correlation Coefficients between Study Measures and Donor Return

Table 8. Correlation coefficients between study measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) RAI	--	**-0.80**	**-0.23**	**0.38**	**0.70**	**0.80**	**0.83**	**0.47**	**0.47**	**0.22**	**0.36**	**-0.33**	**0.44**	**0.18**
(2) Amotivation		--	.03	**-0.39**	**-0.48**	**-0.57**	**-0.54**	**-0.40**	**-0.34**	**-0.19**	**-0.29**	**0.19**	**-0.38**	**-0.27**
(3) External			--	0.11	0.06	0.10	0.13	0.05	0.03	0.10	0.00	-0.01	0.03	**0.17**
(4) Introjected				--	**0.46**	**0.60**	**0.49**	**0.38**	**0.22**	**0.27**	**0.24**	-0.08	**0.60**	**0.22**
(5) Identified					--	**0.74**	**0.63**	**0.51**	**0.42**	**0.21**	**0.32**	**-0.25**	**0.39**	**0.15**
(6) Integrated						--	**0.74**	**0.48**	**0.38**	**0.24**	**0.37**	**-0.25**	**0.49**	**0.23**
(7) Intrinsic							--	**0.45**	**0.49**	**0.28**	**0.32**	**-0.36**	**0.49**	**0.18**
(8) Intention								--	**0.59**	**0.36**	**0.67**	**-0.22**	**0.33**	**0.32**
(9) Attitude									--	**0.30**	**0.54**	**-0.49**	**0.24**	**0.31**
(10) Subjective Norms										--	**0.37**	-0.01	**0.22**	**0.15**
(11) Perceived Behavioral Control											--	**-0.21**	**0.19**	**0.28**
(12) Anxiety												--	0.08	**0.19**
(13) Personal Moral Norms													--	0.12
(14) Donor Return														--

Note. RAI = Relative Autonomy Index

Appendix A-7: Demographic Comparison of the Subsample of Donors with Four or Fewer Prior Donations versus those with Five or Greater Prior Donations

Demographic comparisons. As shown in Table 9, no significant differences were found between the subsamples with respect to age, race, and ethnicity. However, significant group differences were observed for sex, $\chi 2$ (1, N = 195) = 4.8, p = .03, $\eta 2$= .16, as the less experienced donor sample had a greater proportion of female donors compared to the more experienced donor sample. To account for the potential influence of sex, analyses of outcome measures included sex as a covariate.

Table 9

Demographic Characteristics (%) of Donors with Four or fewer versus Five and Greater Prior Donations

	≤ 4 Prior Donations	≥ 5 Prior Donations	p
Sex			
Female	78.3	64.0	
Male	21.7	36.0	**0.03**
Race			
African American or Black	2.5	0.0	
Asian American	0.8	0.0	
European American/Caucasian/ White	91.7	97.3	
Native Hawaiian/Other Pacific Islander	0.8	0. 0	
Other	4.2	2.7	0.47
Ethnicity			
Hispanic	2.5	1.3	
Non-Hispanic	97.5	98.7	0.57
Mean Age	35.9 (SD=12.4)	39.3 (SD=15.1)	0.09

Appendix A-8: Analysis for the Subsample of Donors with Four or Fewer Prior Donations on Study Outcome Measures and Return Behavior by Group

Similar to the primary analyses, secondary analyses were conducted to compare intervention effects, and differences in repeat donations between the motivational interview with implementation intentions (MI+ II) group and the no-interview control group for donors with less experience (i.e. those with four or fewer prior donations).

Baseline analyses. A series of independent-samples t-tests were conducted to identify any significant baseline differences among less experienced donors on each of the outcome measures. Group differences were found at baseline for the intention, attitude and perceived behavioral control measures. Specifically, at baseline less experienced participants in the MI+II group had significantly higher levels of intention, attitude and perceived behavioral control compared to the no-interview control group. There were no other significant group differences observed at baseline.

Analyses of intervention effects. Given the presence of baseline group differences on some measures, ANCOVAs were conducted to examine between group differences at follow-up while adjusting for baseline differences. Sex was included as a covariate in each analysis, however, results are presented without age as a covariate because this analytic approach did not alter the observed results in any meaningful way. As shown in Table 10, these analyses revealed significant post-intervention group differences on the overall relative autonomy index, and on the individual identified, integrated, intrinsic regulatory styles. Less experienced donors in the MI+ II group reported higher RAI scores, indicating more autonomous regulation compared to the no-

interview control group at follow-up, (M = 50.3; SD = 30.1) versus (M = 42.7; SD = 18.3), p = 0.01. Results for the individual regulatory styles showed that participants in the MI+ II group had significantly higher scores on the more self-determined factors (intrinsic, integrated, and identified regulation). Significant group differences were also observed for the theory of planned behavior measures of donation-related intention, attitude, and personal moral norm. Specifically, less experienced participants in the MI+ II group had significantly higher post-intervention levels of blood donation intention, attitude, and personal moral norms compared to the no-interview control group when controlling for pre-treatment baseline, all $p < .05$. There were no other significant main or interaction effects observed.

Analysis of donor return. Among less experienced donors with four or few prior donations, comparison of donor return behavior at 12 months follow-up revealed no significant difference between the MI+II and no-interview control group.

Table 10

Adjusted Follow-up Means (SD) for Donors with Four or Fewer Prior Donations on Study Measures for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) with p-values and Cohen's d.

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	42.7 (30.1)	50.3 (18.3)	**0.01**	0.31
Amotivation	8.8 (3.6)	8.1 (3.01)	0.21	0.21
External Regulation	5.5 (3.7)	6.1 (4.6)	0.33	0.14
Introjected Regulation	11.6 (5.3)	12.9 (5.1)	0.09	0.25
Identified Regulation	18.41 (3.0)	19.1 (2.2)	**0.03**	0.26
Integrated Regulation	15.4 (3.9)	16.9 (3.0)	**0.00**	0.43
Intrinsic Regulation	14.1 (4.8)	15.9 (3.1)	**0.00**	0.45
Intention	15.6 (6.8)	17.4 (4.5)	**0.04**	0.31
Attitude	35.1 (5.2)	36.8 (4.3)	**0.02**	0.36
Subjective Norms	24.2 (7.7)	24.4 (9.2)	0.87	0.02
Perceived Behavioral Control	35.4 (8.2)	36.8 (6.5)	0.21	0.19
Anxiety	19.6 (3.9)	20.4 (3.8)	0.91	0.21
Personal Moral Norm	14.5 (4.0)	16.3 (3.4)	**0.00**	0.48

Appendix A-9: Analysis for the Subsample of Donors with Five or Greater Prior Donations on Study Outcome Measures, Return Behavior and Exploratory

Mediation analysis. Similar to the primary analyses, secondary analyses were conducted to compare intervention effects, and differences in repeat donations between the motivational interview with implementation intentions (MI+ II) group and the no-interview control group for more experienced donors (i.e. those with five or greater prior donations).

Baseline analyses. A series of independent-samples t-tests was conducted to identify any significant baseline differences among more experienced donors on each of the outcome measures. Group differences were found at baseline for donation intention. Specifically, at baseline more experienced participants in the MI+II group had significantly higher levels of intention. There were no other significant group differences observed at baseline.

Analyses of intervention effects. Consistent with study the analytic approach used in the current study, ANCOVAs were conducted to examine between group differences at follow-up while adjusting for baseline differences. Sex was included as a covariate in each analysis, however, results are presented without age as a covariate because this analytic approach did not alter the observed results in any meaningful way. As shown in Table 11, these analyses revealed significant post-intervention group differences on the individual introjected regulation styles. Specifically, more experienced donors in the MI+ II group reported higher scores on introjected regulation (M= 14.1; SD = 4.4) compared to the no-interview control group, (M = 11.1, SD = 5.6) at follow-up, p = .00. This suggests that after going through the MI+II intervention more experienced donors would donate blood to avoid feelings of guilt shame or regret.

Analysis of donor return. Among more experienced donors with five or greater prior donations, comparison of donor return behavior at 12 months follow-up showed that 94.3% of participants in the MI+II group attempted to provide a repeat donation compared to 77.5% of no-interview control participants, $\chi 2$ (1, N = 75) = 4.2, p = .04, $\eta 2$= .24.

Mediation analysis. Although the MI+II intervention did not have a significant effect on repeat donation attempts for the sample as a whole but did promote retention among more experienced donors, exploratory mediation analyses were conducted for the subsample of donors with five or more prior donations. Given the presence of baseline group differences in the larger sample on some measures, ANCOVAs were conducted to examine between group differences on post-intervention levels of each of the potential mediators (i.e., relative autonomy index, donation related intention, attitude, subjective norm, perceived behavioral control, anxiety and personal moral norm), while adjusting for baseline differences. However, ANCOVAs controlling for baseline levels found no significant relationship between the MI+II group and potential mediators within the subsample of donors with five or more prior donations. As the first criterion was not met a mediation analysis could not be completed.

Table 11

Adjusted Follow-up Means (SD) for Donors with Five or More Prior Donations on Study Measures for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) with p-values and Cohen's d.

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	48.9 (30.1)	50.9 (20.4)	0.62	0.08
Amotivation	8.9 (4.3)	7.6 (2.6)	0.07	0.37
External Regulation	5.8 (3.5)	6.7 (3.9)	0.21	0.24
Introjected Regulation	11.1 (5.6)	14.1 (4.4)	**0.00**	0.60
Identified Regulation	18.8 (2.9)	19.0 (1.9)	0.63	0.08
Integrated Regulation	16.2 (4.8)	17.2 (3.1)	0.16	0.25
Intrinsic Regulation	15.6 (4.1)	15.9 (3.7)	0.62	0.08
Intention	17.4 (6.5)	19.0 (2.9)	0.09	0.32
Attitude	36.1 (6.3)	37.4 (4.3)	0.21	0.24
Subjective Norms	22.8 (9.7)	23.4 (9.7)	0.69	0.06
Perceived Behavioral Control	35.9 (8.6)	37.4 (5.6)	0.10	0.21
Anxiety	21.3 (3.0)	21.5 (3.3)	0.70	0.06
Personal Moral Norm	16.2 (4.2)	17.2 (4.5)	0.07	0.23

Appendix A-10: Frequency Information Regarding Barriers Addressed in the Motivational Interview with Implementation Intentions by Sex

Participants in the motivational interviewing with implementation intentions group reported between 0-4 barriers to donating blood in the future. However, no significant difference was found in the number of barriers reported by female versus male donors who received the motivational interview with implementation intentions.

Table 12

Range of Barriers Reported by Sex among Participants in the Motivational Interview with Implementation Intentions Group who Reported Any Barriers (n = 42).

Barriers	Male (n = 7)	Female (n = 35)
1	31.8%	39.1%
2	0.0%	10.9%
3	0.0%	3.1%
4	0.0%	1.6%

Table 13

Frequency of the Type of Barriers Reported by Sex among Participants in the Motivational Interview with Implementation Intentions Group who Reported Any Barriers (n = 42).

Barriers	Male (n = 7)	Female (n = 35)
Fear/Anxiety	13.7%	42.2%
Inadequate Incentives	9.1%	4.7%
Lack of Knowledge	4.5%	1.6%
Negative Service Experience	0.0%	4.7%
Low Self-Efficacy	4.5%	0.0%
Inconvenience	0.0%	1.6%

Appendix A-11: Initial Motivation and Donor Return

Logistic regression analysis was conducted to explore the relationship between blood donor return, initial level of motivation as measured by the relative autonomy index (RAI), group and group by RAI. There was no significant relationship between group or group by RAI and blood donor return. However, initial level of donor motivation was significantly related to donor return at 12-months follow-up. Specifically, the likelihood of returning to provide a repeat donation increases as level of motivation increases (odds ratio [OR], 1.02; 95% confidence interval [CI], 1.00 -1.04).

Appendix B: Supplemental Analyses

Appendix B-1: Table 14. Analyses of Group Differences on All Study Measures with Baseline Scores and Age as a Covariate

Table 14

Analyses of Group Differences on All Study Measures with Baseline Scores and Age as a Covariate

Variables	Source	F	df	p	η^2
Relative Autonomy Index	Baseline	277.4	3,166	**0.00**	0.63
	Age	0.34		0.56	0.00
	Group	5.1		**0.03**	0.03
Amotivation	Baseline	86.3	3,166	**0.00**	0.34
	Age	0.02		0.89	0.00
	Group	4.7		**0.03**	0.01
External	Baseline	128.2	3,167	**0.00**	0.43
	Age	4.2		0.43	0.02
	Group	2.0		0.16	0.01
Introjected	Baseline	113.7	3,166	**0.00**	0.41
	Age	4.8		**0.03**	0.03
	Group	9.0		**0.00**	0.05
Identified	Baseline	78.1	3,166	**0.00**	0.32
	Age	.00		0.95	0.00
	Group	4.2		**0.04**	0.02
Integrated	Baseline	130.4	3,166	**0.00**	0.44
	Age	1.3		0.25	0.01
	Group	7.4		**0.01**	0.04
Intrinsic	Baseline	178.5	3,166	**0.00**	0.52
	Age	0.50		0.48	0.00
	Group	7.7		**0.01**	0.04
Intention	Baseline	123.8	3,191	**0.00**	0.39
	Age	0.00		1.0	0.00
	Group	7.4		**0.01**	0.04

Table 14 (Continued)

Attitude	Baseline	107.4	3,191	**.00**	0.36
	Age	0.20		.65	0.00
	Group	6.6		**.01**	0.03
Subjective Norms	Baseline	156.5	3,191	**0.00**	0.45
	Age	3.0		0.08	0.02
	Group	0.00		0.99	0.00
Perceived Behavioral Control	Baseline	66.8	3,190	**0.00**	0.26
	Age	1.1		0.29	0.01
	Group	2.1		0.15	0.01
Anxiety	Baseline	158.0	3,190	**0.00**	0.45
	Age	0.23		0.63	0.00
	Group	0.09		0.77	0.00
Personal Moral Norm	Baseline	243.3	3,184	**0.00**	0.57
	Age	0.41		0.52	0.00
	Group	14.0		**0.00**	0.07

Appendix B-2: Table 15. Adjusted Follow-up Means (SD) of the Study Measures with subfactors for each Group with p-values and Cohen's d.

15

Adjusted Follow-up Means (SD) of the Study Measures with subfactors for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) with p-values and Cohen's d

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	45.1 (30.3)	50.5 (19.1)	0.29	0.21
Amotivation	8.8 (3.9)	7.9 (2.8)	**0.03**	0.27
External Regulation	5.6 (3.6)	6.4 (4.3)	0.09	0.20
Introjected Regulation	11.4 (5.4)	13.4 (4.8)	**0.00**	0.39
Identified Regulation	18.4 (3.0)	19.1 (2.1)	**0.04**	0.27
Integrated Regulation	15.7 (4.3)	17.0 (3.0)	**0.00**	0.35
Intrinsic Regulation	14.7 (4.6)	15.9 (3.4)	**0.00**	0.30
Intention	16.2(6.8)	18.1 (3.9)	**0.01**	0.34
Attitude	35.5 (5.7)	37.0 (4.3)	**0.01**	0.30
Cognitive	19.5 (2.8)	20.2 (1.5)	**0.02**	0.31
Affective	16.0 (4.2)	17.0 (3.6)	**0.04**	0.26
Subjective Norms	23.7 (8.5)	24.0 (9.4)	0.76	0.03
Injunctive	13.9 (5.3)	14.2 (5.4)	0.17	0.06
Descriptive	9.7 (4.8)	9.9 (5.1)	0.12	0.04
Perceived Behavioral Control	35.9 (8.6)	37.4 (5.6)	0.10	0.21
Self-Efficacy	17.4 (5.1)	18.4 (3.0)	0.06	0.24
Controllability	18.5 (4.8)	18.9 (3.3)	0.71	0.10
Anxiety	20.4 (3.9)	20.6 (3.8)	0.71	0.05
Personal Moral Norm	15.2 (4.2)	16.6 (3.9)	**0.00**	0.35

Appendix B-3: Table 16. Unadjusted Follow-up Means and SD of the Study Measures for each Group with p-values and Cohen's d

Table 16

Unadjusted Follow-up Means and SD of the Study Measures for the No-interview Control and Motivational Interviewing with Implementation Intentions (MI+II) with p-values and Cohen's d

Variable	No-Interview	MI+II	p	Cohen's d
Relative Autonomy Index	43.8 (30.5)	54.1 (20.1)	**0.00**	0.30
Amotivation	9.0 (3.9)	7.4 (2.9)	**0.00**	0.47
External Regulation	5.6 (3.6)	6.5 (4.3)	0.13	0.23
Introjected Regulation	11.2 (5.4)	13.9 (4.7)	**0.00**	0.53
Identified Regulation	18.5 (2.9)	19.2 (2.1)	0.06	0.28
Integrated Regulation	15.6 (4.3)	17.4 (3.1)	**0.00**	0.48
Intrinsic Regulation	14.5 (4.6)	16.4 (3.4)	**0.00**	0.47
Intention	15.4(6.8)	19.1 (3.9)	**0.00**	0.67
Attitude	35.0 (5.6)	37.6 (4.3)	**0.00**	0.52
Subjective Norms	23.2 (8.5)	24.6 (9.4)	0.27	0.16
Perceived Behavioral Control	35.1 (8.6)	38.2 (5.6)	**0.00**	0.43
Anxiety	20.3 (3.9)	20.8 (3.8)	0.37	0.13
Perceived Moral Norm	15.3 (4.2)	16.5 (3.9)	**0.03**	0.30

Appendix C: Study Measures and Forms

Appendix C-1: Donor Characteristics and Demographic Questionnaire.

Directions: Please answer each question below

Name *(please print)* _____ Date _____ ID_____
Age _____ *(you must be at least 18 to participate in this study)*
Gender _____

Height:feet_____inches

Weight: _____ pounds

Race: *(check all those that apply to you)*

□ African American or Black
□ American Indian or Alaska Native
□ Asian American
□ European American or White or Caucasian
□ Native Hawaiian or Other Pacific Islander
□ Other _____

Ethnicity: *(check one)*
□ Hispanic/Latino (a)
□ Non-Hispanic

Number of times that you have donated blood before (not including today): _____
How many times have you donated blood in your life?

_____
To the best of your knowledge, are you eligible to donate blood within the next 8 weeks?

_____
How many times have you donated blood in the past year?

_____
Do you intent to donate blood in the next 6 months?

_____
Do you intent to donate blood in the next month (or whenever you are next eligible)?

_____

Email
Address _____
City, State, Zip _____
Preferred Phone Number: (___) - _____ - _____
Preferred Contact Days (Circle): Mon Tues Wed Thurs Fri Sat Sun
Preferred Contact Hours: _____

Appendix C-2: Blood Donor Identity Survey

Directions: Below are a number of statements related to blood donation. Please read each statement carefully and use the following scale as a guide.		**NOT AT ALL TRUE**						**VERY TRUE**
1.	I would feel guilty or ashamed of myself if I did not donate blood.	①	②	③	④	⑤	⑥	⑦
2.	I really don't think about donating blood.	①	②	③	④	⑤	⑥	⑦
3.	I have carefully thought about it and believe donating blood is very important for many aspects of my life.	①	②	③	④	⑤	⑥	⑦
4.	I would feel bad about myself if I did not donate blood.	①	②	③	④	⑤	⑥	⑦
5.	Donating blood is an important choice I really want to make.	①	②	③	④	⑤	⑥	⑦
6.	Donating blood is consistent with my life goals.	①	②	③	④	⑤	⑥	⑦
7.	I would regret it if I did not donate blood	①	②	③	④	⑤	⑥	⑦
8.	Donating blood is very important to me.	①	②	③	④	⑤	⑥	⑦
9.	Donating blood is very important for the health of others.	①	②	③	④	⑤	⑥	⑦
10.	Blood donation is an important thing to do.	①	②	③	④	⑤	⑥	⑦
11.	I enjoy donating blood.	①	②	③	④	⑤	⑥	⑦
12.	I donate blood for thank-you gifts, such as T-shirts and water bottles.	①	②	③	④	⑤	⑥	⑦
13.	I donate blood for the drinks and snacks.	①	②	③	④	⑤	⑥	⑦
14.	I donate blood to get a donor sticker.	①	②	③	④	⑤	⑥	⑦
15.	Blood donation is something I rarely even think about.	①	②	③	④	⑤	⑥	⑦
16.	I really don't have any clear feelings about blood donation.	①	②	③	④	⑤	⑥	⑦
17.	For me, being a blood donor means more than just donating blood.	①	②	③	④	⑤	⑥	⑦
18.	Blood donation is an important part of who I am.	①	②	③	④	⑤	⑥	⑦

Appendix C-3: Blood Donation Intention

Directions: Below are a number of questions related to your intentions about donating blood. Please read each statement carefully and indicate where you fall on the scale.

1. I plan to donate blood in the next 8 weeks.

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

2. How likely is it that you will donate blood in the next 8 weeks?

①	②	③	④	⑤	⑥	⑦
Unlikely						**Likely**

3. I will try to donate blood in the next 8 weeks.

①	②	③	④	⑤	⑥	⑦
Unlikely						**Likely**

Appendix C-4: Blood Donation Attitude

Directions: Below are a number of statements related to your current feelings and thoughts about blood donation. Please read each statement carefully and indicate where you fall on the scale.

For me, donating blood within the next 8 weeks would be:

①	②	③	④	⑤	⑥	⑦
Useless						**Useful**

①	②	③	④	⑤	⑥	⑦
Pointless						**Worthwhile**

①	②	③	④	⑤	⑥	⑦
The wrong thing to do						**The right thing to do**

①	②	③	④	⑤	⑥	⑦
Unpleasant						**Pleasant**

①	②	③	④	⑤	⑥	⑦
Unenjoyable						**Enjoyable**

①	②	③	④	⑤	⑥	⑦
Frightening						**Not Frightening**

Appendix C-5: Blood Donation Subjective Norm

Directions: Below are a number of statements related to your current feelings about blood donation. Please read each statement carefully and indicate where you fall on the scale by circling the corresponding number.

1. Most people who are important to me would recommend I give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

2. My family thinks I should give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

3. The people who are most important to me think I should give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

4. A lot of the people I know plan to give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

5. My friends will give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Unlikely						**Likely**

6. Most people who are important to me will give blood in the next eight weeks

①	②	③	④	⑤	⑥	⑦
Unlikely						**Likely**

Appendix C-6: Blood Donation Perceived Behavioral Control

Directions: Below are a number of questions related to your confidence in donating blood. Please read each statement carefully .I feel a moral obligation to give blood.

1. How confident are you that you will be able to donate blood in the next 8 weeks:

①	②	③	④	⑤	⑥	⑦
Not very Confident						**Very Confident**

2. For me, donating blood in the next 8 weeks would be:

①	②	③	④	⑤	⑥	⑦
Difficult						**Easy**

3. If it were entirely up to me, I am confident that I would be able to donate blood in the next 8 weeks:

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

4. How much control do you have over whether you donate blood or not in the next 8 weeks:

①	②	③	④	⑤	⑥	⑦
No Control						**Complete Control**

5. I have complete control over whether I donate blood in the next eight weeks:

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

6. It is entirely up to me to donate blood within the next 8 weeks

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

Appendix C-7: Blood Donation Anxiety STAI-Y-short-form

Directions: Please think about yourself donating blood. Read the statements below and circle the number that corresponds with how you feel right now about donating blood.	**Not at all**	**Somewhat**	**Moderately**	**Very Much**
1. I feel calm	1	2	3	4
2. I am tense	1	2	3	4
3. I feel upset	1	2	3	4
4. I am relaxed	1	2	3	4
5. I feel content	1	2	3	4
6. I am worried	1	2	3	4

Appendix C-8: Blood Donation Personal Moral Norm

Directions: Below are a number of statements related to your current feelings about blood donation. Please read each statement carefully and indicate where you fall on the scale by circling the corresponding number.

1. I feel a moral obligation to give blood.

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

2. I feel a personal responsibility to give blood.

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

3. It is a social obligation to give blood.

①	②	③	④	⑤	⑥	⑦
Disagree						**Agree**

Appendix C-9: Blood Donation Related Self-Efficacy

Although the majority of people who give blood do not experience any reactions to blood donation, on occasion a donor may experience dizziness, weakness, lightheadedness, faintness, or nausea.

Directions: Below are a number of statements related to blood donation. Please read each statement carefully and indicate how much you agree or disagree with the statement by circling a number next to it. Use the following scale as a guide.	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1. I feel confident that I can do things to keep from having a bad blood donation experience.	1	2	3	4	5	6	7
2. Nothing I can do will change my donation experience.	1	2	3	4	5	6	7
3. I am able to reduce the intensity of a negative reaction such as faintness, dizziness, weakness, lightheadedness or nausea.	1	2	3	4	5	6	7
4. There are things I can do to reduce any uncomfortable blood donation reaction.	1	2	3	4	5	6	7
5. Once I am donating blood, there is nothing I can do to affect my reaction.	1	2	3	4	5	6	7
6. If I do certain things before donating blood, I can increase the chances of having a positive experience.	1	2	3	4	5	6	7
7. I can prevent negative reactions by changing the things that I do.	1	2	3	4	5	6	7
8. I can do things to control how much I am affected by negative reactions to donation.	1	2	3	4	5	6	7
9. I cannot control the way I react to donating blood.	1	2	3	4	5	6	7

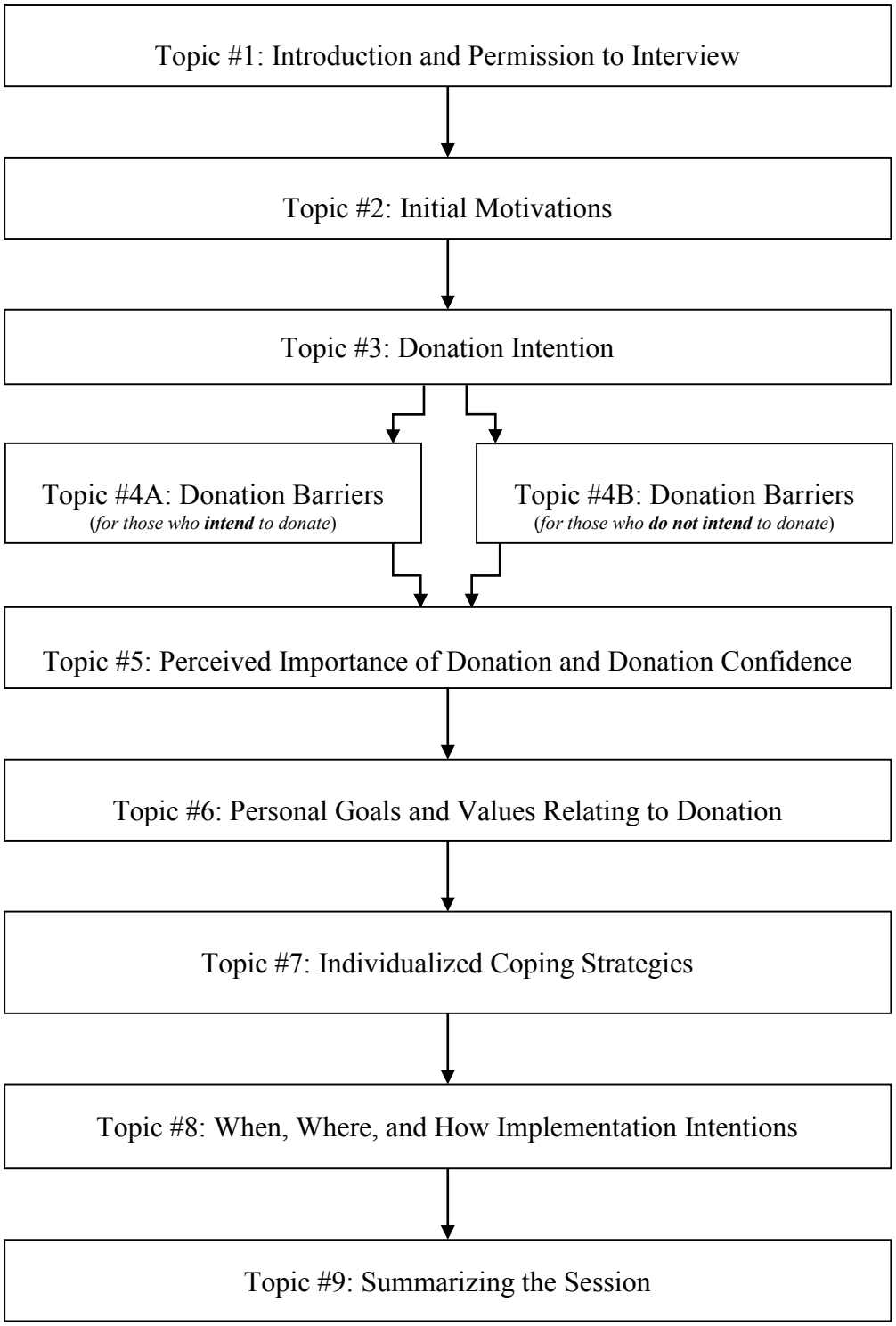
Appendix C-10: Interview Feedback Questionnaire

As part of this study, did you complete a telephone interview that lasted approximately 10-20 minutes?

- ☐ Yes
- ☐ No

Directions: Please rate the following statements about the telephone call that you completed.	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree or Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1. The telephone interview covered information that I found **useful.**	1	2	3	4	5	6	7
2. The telephone interview was a **good use of my time.**	1	2	3	4	5	6	7
3. The telephone interview **motivated me to donate again.**	1	2	3	4	5	6	7

Appendix C-11: Post-donation Motivational Interview with Implementation Intentions Script



Appendix C-12: Website Introduction & Study Introduction

Dear Valued Donor,

You are being asked to participant in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent.

This email describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this email and your questions about the study are answered, you will be asked to click on the link below to complete a brief survey about you.

Would you like to continue?

□ Yes

□ No

Appendix C-13: Ohio University Consent Form

Title of Research: **Using an Adapted Motivational Interview with Implementation Intentions to Enhance the Donation Attitude, Intention, and Self-Efficacy of Novice Blood Donors**

Researchers: Kadian Sinclair, M.S., Christopher France, Ph.D. and Janis France, Ph.D.

Explanation of Study
This study is being done to understand the factors that promote a positive donation experience and increase willingness to continue to give blood. If you agree to participate, you will be asked to complete some questionnaires about your opinions, experience and motivations toward blood donation and participate in a brief telephone call.

Your participation in the study will last the length of the study period.
Procedures

1. On the study website, you will be asked to complete a consent form.

2. After completing the consent form you will be asked to provide your contact information, and fill out a brief demographic questionnaire.
3. You will then complete a series of questionnaires on the study web site related to your attitude towards donating and intention to donate in the future. The questionnaires will take no more than 15 minutes to complete.
4. You will be randomly assigned to either a usual donation condition or an experimental condition based on a computerized list of randomly generated numbers.

a) Usual donation condition: Participants assigned to this condition will receive a telephone call thanking them for participating in the study and a reminder to complete the follow-up questionnaires.

b) Experimental condition: Participants assigned to this condition will receive a brief (10-15 minutes) telephone call to discuss their donation experience, their future donation plans and a reminder to complete the follow-up questionnaires. Unless you opt out, this call will be recorded for the purpose of quality control, interviewer training, and communication of the research findings. All original recordings will be erased by September 2018.

5. One month after your phone call, you will complete a brief follow-up questionnaire on the study website related to your attitude towards donating and intention to donate in the future. The questionnaire will take no more than 15 minutes to complete.
6. Three months after your phone call, you will be asked to respond via email to a single follow-up question about whether you donated blood in the previous three months.
7. We will ask Hoxworth Blood Center to let us know which of the donors in the study made a subsequent donation attempt in the year after the study.

Risks and Discomforts

There are no foreseeable risks to participating in this study. You will be asked to provide some basic demographic information, participate in a phone interview and complete two brief questionnaires regarding blood donation. Participation is completely voluntary, and you may discontinue the study at any time.

Benefits

This study is important to science and society by helping to develop strategies to increase blood donor retention. Individually, you may benefit by receiving information that is intended to improve your future blood donation experience.

Confidentiality and Records

Any information obtained from this study that can be used to identify you will be kept strictly confidential. In order to maintain confidentiality of participant information, all study information will be based on a subject code. The master code list with the paired subject code and the participants' information (i.e. name, age, and contact information) will be kept in a locked file cabinet in the lab of the principal investigator. Raw data will

only be available to immediate study personnel. The master code list will be destroyed by May, 2016.

Any publications resulting from this project data will be reported as an aggregate and no individual participants will be identified. You will not be identifiable in any public reports about the study. Information from the study will not be given to anyone except the research staff without your permission unless required by law.

Additionally, while every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:
* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU;
** Hoxworth Blood Center staff*

Compensation

As compensation for your time and effort, you will be entered in a drawing to receive one of two Google nexus 7 tablets, worth approximately $200.00. The drawing will be conducted at the end of participant recruitment and a single participant from each study condition will be selected as a winner. Each participant will have a 1/130 odds of winning the nexus tablet.

Contact Information

If you have any questions regarding this study, please contact Kadian Sinclair-Miracle, M.S., at (740) 274-5792 or ks577406@ohio.edu or Christopher France, Ph.D., at (740) 593-1079 or france@ohio.edu.

If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.

By endorsing YES, you are agreeing that:

- you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
- you have been informed of potential risks and they have been explained to your satisfaction.
- you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
- you are 18 years of age or older
- your participation in this research is completely voluntary
- You may leave the study at any time. If you decide to stop participating in the

study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Version Date: *[12/12/2013]*

Appendix C-14: Follow-up Questionnaire Email Template

Hello X,

Thank you for donating blood and participating in our study aimed at enhancing the blood donation experience for all donors. We want to hear from you.

As previously mentioned, I have included the link to the final questionnaire. Please enter your donor code XXXX to log in to the study website and complete the second and final questionnaire. Also, in 3-months you will receive an email inquiring about any additional donations you have made.

Link: CLICK HERE!

The information you provide is critical to our efforts at improving the blood donation experience, thank you again for your assistance. If you have any questions about the study, feel free to contact us by phone (740) 777-4771 or email projectamiii@gmail.com.

Sincerely,

Project AMIII
Ohio University
Department of Psychology
203 Porter Hall, Athens, OH 45701
Phone: (740) 777-4771
Email Address: projectamiii@gmail.com

Appendix C-15: Implementation Intentions Summary Template

Hello X,

Thank you again for participating in this research study, it was a pleasure to speak with you today. As we discussed, I am following up with a summary of your plan to donate. Based on our telephone talk you stated that:

1) If……., then you will know it is time to donate blood. (Reminder).

2) If……., then you will donate at …… on ……..…. (When and Where).

3) If you are concerned about …..... then ……. (Coping plan).

To find a donation site near you or make an appointment

Please visit https://donateblood.uc.edu/Donor/

OR

Call

(513) 451-0910 - For a neighborhood donor center

(513) 558-1280 - For a mobile community drive

The information you provide is critical to our efforts at improving the blood donation experience, so thank you again for your willingness to participate. If you have any questions about the study, feel free to contact us by phone (740) 777-4771 or email projectamiii@gmail.com.

Sincerely,

Project AMIII
Ohio University
Department of Psychology
203 Porter Hall, Athens, OH 45701
Phone: (740) 777-4771
Email Address: projectamiii@gmail.com

Appendix C-16: Three Month Follow-up Email Template

Hello X,

This is a final email from the Project AMIII study asking about your blood donation behavior in the last three months. Please reply to this email to let us know if you donated blood in the last 3 months. A simple yes or no is all that is required.

Thank you again for your participation in our study!

Sincerely,

Project AMIII
Ohio University
Department of Psychology
203 Porter Hall, Athens, OH 45701
Phone: (740) 777-4771
Email Address: projectamiii@gmail.com

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