Using Multimedia Blood Donation Education Materials to Enhance Individual Readiness

to Donate Blood and Increase Donation Behaviors

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Using Multimedia Blood Donation Education Materials to Enhance Individual Readiness

to Donate Blood and Increase Donation Behaviors

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Abstract

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Director of Dissertation: Christopher R. France

To date, the theory of planned behavior (TPB) and expanded constructs such as
self-efficacy and anticipated regret are most commonly applied to understanding blood
donation behavior. However, the TPB model appears more useful for focusing on single,
isolated acts rather than a developmental decision making process. Researchers have
begun to apply the transtheoretical model of behavior change (TTM) to conceptualize
blood donation behavior and the associated decision-making process.

The present study chose to use expanded TPB constructs and the TTM to evaluate
the effectiveness of a multi-module blood donation recruitment video (initially utilized by
France and colleagues in 2011) as a function of participant stage of change. Given
evidence that participants in Action/Maintenance may be motivated differently in their
decisions to donate blood, individuals in these stages were excluded. Participants in the
Precontemplation, Contemplation, and Preparation stages were randomly assigned to one
of three conditions: a study condition involving two of the intervention video modules, a
study condition involving all four of the video modules (testimonials, donor concerns,
coping strategies for donation, and vignette of donation process), or a control stress
management video. Responses to pre- and post-video questionnaires by participants were
assessed to determine changes in donation-related attitude, anxiety, self-efficacy,
subjective norm, decisional balance, use of processes of change, and donation intention.

In addition, donation sign-ups post-intervention and blood drive attendance 30-days after intervention was assessed as a function of stage of change and study condition. Results demonstrated that participants who viewed the four module video, regardless of stage of change, reported the highest increase in blood donation self-efficacy, attitude, intention, and decisional balance – pros whereas emphasis on the cons of donating demonstrated the greatest reduction after viewing the two module video compared to the other conditions. Changes in donation-related anxiety were more complex, with all participants in Preparation reporting an increase in anxiety, but those who viewed the two and four module intervention videos reported less of an increase in anxiety. In regard to blood donation behavior, participants in Preparation stage of change signed up to donate blood post-intervention at the highest rate and reported the highest blood drive attendance at follow-up compared to participants in the other two stages of change.

Overall, this study demonstrated that video-based donor educational materials can enhance blood donation attitudes, self-efficacy, and intention, and shift focus of pros and cons of blood donation in a direction that influences increased motivation to donate. Positive change in self-efficacy, in particular, may be especially important in directly affecting intention to donate and predicting future donation attempts. However, the present study also provided mixed evidence that an individual's stage of change will differentially affect their response to blood donation interventions. Changes in anxiety observed among participants in Preparation provide some support for the notion that specific interventions may help attenuate anxiety reactions. Further research is necessary to better understand the potential for tailoring anxiety interventions for those who are seriously considering donating blood. Better understanding of TTM constructs as they

apply to the blood donation decision process, how they can inform more effective interventions, and how they may be combined with additional theories such as the health action process approach, may further strengthen the positive influence of blood donor recruitment materials.

Dedication

I dedicate this work and give special thanks to my best friend and husband, Mathew

Barker, for his constant support and words of encouragement. I also thank my parents

and siblings – Colleen, Mark, Scott, Pam, Elizabeth, Graham, Katie, and Rob. Even

when I was questioning my own abilities, your belief in me never wavered.

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Introduction

The aging of the U.S. population and increasing demands for blood raise concerns about the assurance of a sufficient supply of blood in the future (Goodnough, Brecher, Kanter, & AuBuchon, 1999; Zuck Thompson, Schreiber, Gilcher, Kleinman, Murphy et al., 1995). Moreover, of the approximately 5% of eligible donors who donate annually, at least one half do not donate again (Schreiber, Schlumpf, Glynn, Wright, Tu, & King et al., 2006). With the increasing demand for blood and the low percentage of eligible donors who choose to donate or subsequently donate repeatedly, there is a clear need to continue to enhance both recruitment and retention of blood donors.

Several solutions to these issues have been proposed. For instance, focus has been placed on recruiting and retaining donors from younger age groups, which can serve to fill in gaps left by repeat donors who are no longer eligible for donation (Gillespie & Hillyer, 2002; Pindyck, Avorn, Kuriyan, Reed, Iqbal, & Levine, 1987). Efforts have also been made to tailor recruitment programs to target populations (Wu, Glynn, Schreiber, Wright, Lo, Murphy et al., 2001); preliminary evidence suggests that recruitment programs tailored to target populations, such as the Hispanic population in California (Wu et al., 2001), have been more successful than general recruitment programs. However, despite these encouraging findings, much more information is needed to understand how recruitment programs can best be tailored to specific populations. Specific constructs from the theory of planned behavior (Ajzen, 1991; Ferguson, 1996) and the transtheoretical model of behavior change (Prochaska & DiClemente, 1983) could help in the exploration and understanding of factors motivating individuals both to initially donate blood and to continue donating regularly.

Applying Theory to Decision-Making

To date, the theory of planned behavior (TPB) has been the model most commonly applied to understanding blood donation behavior (Armitage & Conner, 2001a; Burditt, Robbins, Paiva, Velicer, Koblin, & Kessler, 2009; Ferguson, 1996; France, France, & Himawan, 2007 & 2008). As a model, TPB proposes that intention is the key determinant of behavior; intention, in turn, is theoretically influenced by three variables: attitude, subjective norm, and perceived behavioral control (Azjen, 1991). Recent blood donation studies generally include at least one expanded TPB construct beyond these initial three variables, such as self-efficacy, anticipated regret, personal moral norm, self identity, and past donation behavior (Armitage & Conner, 2001b; France et al., 2007; 2008; Godin, Conner, Sheeran, Belanger-Gravel, & Germain, 2007). Studies exploring these expanded TPB models in predicting blood donation intentions found that they accounted for between 43% and 73% of the variance in intention to donate blood (Armitage & Conner, 2001b; France et al., 2007; Giles, McClenahan, Cairns, & Mallet, 2004; Godin et al., 2005), which is higher than the 31% to 61% accounted for by the original TPB model (Amponsah-Afuwape, Myers, & Newman, 2002; Giles & Cairns, 1995; Lemmens, Abraham, Hoekstra, Ruiter, DeKort, Brug et al., 2005).

Although the TPB is useful in predicting blood donation behavior, even recently expanded versions of this model appear more useful for focusing on single, isolated acts rather than a developmental process of coming to the decision to donate (Burditt et al., 2009; Masser, White, Hyde, & Terry, 2008). To address the developmental process researchers have begun to apply the transtheoretical model of behavior change (TTM) to

conceptualize blood donation behavior and the associated decision-making process (Burditt et al., 2009; Ferguson & Chandler, 2005). The TTM is a well-established approach to understanding intentional behavior change and developing tailored behavior change interventions (Prochaska & DiClemente, 1983; Prochaska, Diclemente, & Norcross, 1992; Prochaska, Velicer, Rossi, Goldstein, Marcus, Rakowski et al., 2004). Randomized controlled trials have demonstrated that TTM-based interventions are more effective than other interventions in changing numerous health behaviors (e.g., smoking cessation: Prochaska, Velicer, Fava, Rossi, & Tsoh, 2001; exercise adoption and weight management: Johnson, Paiva, Cummins, Johnson, Dyment, Wright et al., 2007; Marshall & Biddle, 2001). The central construct of the TTM is the temporal dimension, represented by the five stages of change (Precontemplation, Contemplation, Preparation, Action, and Maintenance) that individuals progress through linearly when intentionally changing their own behavior (Prochaska, DiClemente, & Norcross, 1992).

The TTM constructs of decisional balance, processes of change, and self-efficacy help indicate how change may occur within the stages of change. Decisional balance is the pros and cons of changing or engaging in a behavior (Velicer, DiClemente, Prochaska, & Brandenburg, 1985), whereas processes of change are five behavioral and five cognitive-affective experiences that individuals engage in when attempting to initiate behavior modification or adoption (Prochaska, DiClemente, & Norcross, 1992). Within the context of blood donation, Ferguson and Chandler (2005) found a pattern of shifting focus on pros versus cons of blood donation across stages consistent with research on other behavior change; specifically, individuals in Precontemplation reported the cons of donating outweighed the pros, whereas a shift occurred between the Contemplation and

Preparation stages, as individuals' relative weighting of the pros increased and cons decreased. Ferguson and Chandler (2005) also found that use of the cognitive-affective processes of change increased more rapidly as persons transitioned from Precontemplation to Contemplation, as compared to later stages, and behavioral processes of change gradually increased as individuals progressed through all the stages. This same study indicated that self-efficacy as a TTM construct can be applied to blood donation behavior, consistent with findings in the TPB literature (France et al., 2007; 2008).

Initial evidence regarding shifts in decisional balance and processes of change as individuals' become more ready to donate blood may aid in tailoring interventions. For example, interventions that focus more on cognitive processes versus behavioral processes of change would be appropriate for persons in Precontemplation, whereas an intervention focusing on both cognitive and behavioral processes may be most appropriate for persons in Contemplation and later stages of change.

Blood Donation Intervention Materials

To date, expanded TPB constructs, but not TTM constructs, have informed blood donation recruitment interventions. A blood donation brochure developed by France and colleagues (2008) included information regarding the donation process with empirically-supported suggestions for coping with concerns about pain, needles, and potential syncopal reactions, as well as behavioral strategies to use before, during, and after donating to improve the donation experience. Consistent with TPB theory, researchers found that exposure to this brochure was more effective at improving attitudes toward blood donation, self-efficacy, and donation intention, as well as decreasing donation-

related anxiety compared to standard American Red Cross and a healthy lifestyle brochures. Furthemore, these changes persisted at one-week follow-up (France, Montalva, France, & Trost, 2008; France, France, Kowalsky, & Cornett, 2010).

France and colleagues (2011) expanded upon theses promising findings by developing a blood donation recruitment video based on evidence that audiovisual interventions may reduce anxiety and increase coping in a variety of medical contexts (Albert, Buschbaum, & Li, 2007; Luck, Pearson, Maddern, & Hewett, 1999; Pearson, Maddern, & Hewett, 2005). The 7-minute video includes four modules corresponding with components of the recruitment brochure: a testimonial, discussion of donor concerns, behavioral coping strategies for blood donation, and a vignette of the donation process. Preliminary findings revealed that viewing the video, reading the blood donation brochure, or a combination of the brochure and video all produced larger reductions in anxiety, more positive changes in attitude, and greater increases in self-efficacy and donation intention relative to a healthy lifestyle brochure. The study also demonstrated that individuals with more negative initial attitudes about blood donation reported greater anxiety, lower self-efficacy, and lower intention to donate before and after intervention, compared to participants with more positive attitudes. These findings leave open the possibility that participants in the study were at different stages of change, which may have differentially influenced the observed outcomes.

The Present Study

To expand on the France et al. (2011) video intervention study, the current study focused on individual responses as a function of participant stage of change. Because individuals in the Action/Maintenance stage are believed to be motivated differently than

those in earlier stages (e.g., focus on different processes of change, influenced by different factors in their decision to donate; Piliavin, Evans, & Callero, 1984; Gillespie & Hillyer, 2002; Burditt et al., 2009), the present study focused exclusively on those in the three early stages of change (Precontemplation, Contemplation and Preparation). Participants were randomly assigned to one of three conditions: a study condition involving two of the video modules (i.e., testimonials and discussion of donor concerns), a study condition involving all four of the video modules (i.e., testimonials, donor concerns, coping strategies for donation, and vignette of donation process), or a control video condition (i.e., a stress and relaxation video). A two module condition was chosen as a study condition to assess if the testimonial and donor concerns modules alone could produce change in participants in Precontemplation because they focus primarily on cognitive processes of change and minimizing the cons of donating, concepts especially relevant for persons in Precontemplation (Prochaska et al., 1992; Ferguson & Chandler, 2005). Responses to pre- and post-video questionnaires by participants at each stage of change were assessed across all conditions to determine changes in donation-related attitude, anxiety, self-efficacy, subjective norm, decisional balance, use of processes of change, and donation intention. In addition, donation behavior 30-days after each intervention was assessed as a function of stage of change and study condition.

It was hypothesized that participants would demonstrate differential effects based on study conditions and initial stage of change. Specifically, participants in the Precontemplation stage were expected to demonstrate the greatest change in donation attitude, anxiety, self-efficacy, subjective norm, decisional balance, processes of change, and intention after viewing the two module video (compared to the two other conditions),

whereas participants in the Contemplation and Preparation stages would demonstrate the greatest change in the outcome variables after viewing the four module donation video (compared to the other videos). The original theoretical argument behind tailoring smoking cessation interventions to stage of change was to focus on what prospective quitters were willing to listen to and be aware of without overwhelming and ostracizing clients. The idea was that clients would focus on certain cognitive and behavioral processes in early stages, whereas other processes may only be relevant at later stages. For example, a person in Precontemplation may not be ready to hear about substituting alternatives for smoking behaviors (e.g., chewing gum, distraction) nor to adhere to those suggestions. S/he may still be learning about negative effects of smoking and may not even be aware that certain stimuli in the environment can trigger cravings (Prochaska et al., 1992). The same could be true for people not yet committed to being blood donors. Thus, the current study proposes that persons in Precontemplation would benefit most from an intervention consisting of the Testimonials and Concerns video modules, as they involve primarily cognitive-affective processes and persons in Contemplation and Preparation would benefit most from an intervention consisting of all four video modules because it incorporates both behavioral and cognitive-affective processes into the intervention.

With regard to donation behavior, it was hypothesized that participants in Preparation would report the highest rate of donation sign-ups and donation attempts at the 30-day follow-up as compared to participants in the other stages. Additionally, it was expected that participants who viewed the four module video would demonstrate the

greatest proportion of donation sign-ups and highest blood drive attendance compared to

the other conditions.

Methods

Participants

Participants (N=433) were recruited from an online experiment sign-up system at Ohio University and randomly assigned to one of three viewing groups. Participants who reported they were ineligible to donate blood (n = 24) or who were place in the Action/Maintenance stage of change (n=17) were excluded from the study. Two outliers were also removed because review of their responses indicated they most likely put no consideration into their responses, as they provided identical answers to almost all questions. The final sample included 390 participants (57% female, 83.9% between ages 18 and 20, 79.6% Caucasian, and 11.9% Asian); however, number of participants included in analyses for each measure varied because individual survey items were occasionally left blank. Mean number of prior blood donations [±SD] was 0.97 [±1.7], with 59.2% of participants having never donated blood and 27.9% having donated once or twice.

Materials

Videos.

Donation video. A blood donation video that was developed for prior donor education studies (France et al., 2011; 2013) was modified for use here. The 7-minute video contains four modules: 1) Testimonial (40 seconds): a testimonial from an individual with sickle cell anemia describing the illness and the reasons why he has needed transfusions several times in the past and will continue to need them during his life, 2) Donor Concerns (1 minute 40 seconds): responses to common donor concerns about needles, pain, and potential physiological reactions as a result of donating blood, 3)

Coping Strategies (1 minute 35 seconds): suggestions of empirically validated coping strategies to use before (eating before coming to donate, hydration, distraction), during (muscle tensing, distraction), and after donation (hydration, muscle tensing), and 4) Donation Process (3 minutes 6 seconds): a vignette following a woman through a typical donation experience. The videos were embedded within an informational blood donation website that included some text re-stating the main points of each video module in addition to the videos. Half of the participants who were randomly assigned to the video condition viewed all four modules and the other half viewed only the first two modules (i.e., Testimonial and Donor Concerns).

Control video. The video selected for the control condition is a publicly available online video (Howdini.com, 2010). It is 3 minutes 37 seconds in length and details several stress management techniques (e.g., deep breathing, shoulder stretches for muscle tension, and distraction).

Questionnaires.

Stage of change. A series of five questions regarding past and present blood donation behavior, based on the algorithm designed by Burditt et al. (2009), was used to place participants in one of four mutually exclusive categories for stage of change. Questions included, "To the best of your knowledge, are you eligible to donate blood?", "Have you donated blood in the past 12 months?", "How many times did you donate blood in the past 12 months?", "Do you intend to donate blood in the next six months?" and "Do you intend to donate blood in the next 30 days or whenever you are next eligible?". Participants who answered "No" to the first question were removed from further assessment, as were participants whose responses placed them in the Action-

Maintenance stage. Within this data set, 245 participants were placed in the

Precontemplation stage of change, 62 in Contemplation, and 83 in Preparation.

State Anxiety Inventory. Anxiety was assessed using a questionnaire modified

from the State Trait Anxiety Inventory (STAI-Y; Spielberger, Gorsuch, Lushene, Vagg,

& Jacobs, 1983). This 20-item scale allowed for self-report of anxiety specific to blood

donation. Total scores range from 20 to 80. Items were rated on a Likert-type scale,

ranging from 1 (not at all) to 4 (very much). Consistent with previous blood donation

research (France et al., 2008; 2010), this scale demonstrated high internal consistency (α

= 0.95) at pre- and post-video assessments.

Blood Donation Attitudes Scale. The Blood Donation Attitude Scale was

developed by Lemmens and colleagues (2005) to measure an individual's attitudes about

blood donation. It consists of five questions each rated from 1 to 7, such as "The idea of

donating blood in the next 8 weeks seems good/bad." Internal consistency for the scale

was high at both pre- and post-video assessment ($\alpha = 0.92$ and $\alpha = 0.93$, respectively),

similar to prior studies (France et al., 2008; 2010).

Blood Donation Self-Efficacy Scale. Self-efficacy was evaluated using a 9-item

measure of participants' confidence that they could engage in behavior that would reduce

the possibility of presyncopal reactions (e.g., faintness, dizziness, weakness). Items were

rated on a 7-point scale and total scores ranged from 9 to 63. An example item, rated

from 1 (strongly disagree) to 7 (strongly agree), was "I feel confident that I can do things

to keep from having a bad blood donation experience." Consistent with previous studies

(France et al., 2008; 2010), high levels of internal consistency were observed for both

pre- and post-video assessment (α =0.86 and $\alpha = 0.92$, respectively).

Subjective norm. This construct was assessed using a five-item measure adapted from Giles and Cairns (1995). Participants were asked to respond to the statement "Most people who are important to me think I should give blood" using a seven-point Likert-type scale ranging from 1 = extremely unlikely to 7 = extremely likely. In addition, respondents were asked to assess if parents and close friends want them to give blood, using the same seven-point scale. Respondents were then asked to indicate their motivation to comply with each referent (people important to me, parents, and family) on the seven-point scale (e.g., "Generally speaking, I want to do what most members of my family think I should do"). Internal consistency in this study was adequate and consistent with that described by Giles and Cairns (1995) at pre-video ($\alpha = 0.79$) and post-video assessment ($\alpha = 0.84$).

Blood Donation Intention Scale. The Blood Donation Intention Scale was developed by Schreiber and colleagues (2006) and consists of five questions that assess participants' future intent to donate blood. An example item, rated from 1 (probable) to 7 (improbable), is "I will try to give blood in the next 30 days." This scale showed good internal consistency in the current study at pre-video and post-video intervention ($\alpha = 0.91$), similar to recent related studies (France et al., 2008; 2010; 2013).

Decisional balance. The decisional balance measure is a twelve-item scale designed to represent the pros and cons of blood donation (Burditt et al., 2009). The measure contains three subscales – Pros (six items), Physical Cons (three items), and Eligibility Cons (three items). In scoring, the Physical and Eligibility Cons were combined for one Cons score. Participants were asked to rate how important each item was in their decision whether or not to donate blood (e.g., "I may save someone's life")

on a 5-point scale, ranging from 1 = ''not at all important'' to 5 = ''extremely

important.'' Internal consistency was high for the pros scale ($\alpha = 0.89$ pre-video and $\alpha =$

0.92 post-video) and adequate for the cons scale ($\alpha = 0.69$ pre-video and $\alpha = 0.76$ post-

video).

     Processes of change. The processes of change questionnaire (Ferguson &

Chandler, 2005) is a 34-item measure representing the ten processes of change for blood

donation. Participants were asked to respond on six-point Likert-type scales measuring

the frequency of occurrence of each statement (0 = not applicable, 1 = never to 5 =

repeatedly). Items included statements such as "I have at least one good friend I can go

give blood with" (helping relationship) and "Giving blood is a rewarding experience"

(reinforcement management). Total scores were obtained for the five behavioral and five

cognitive processes. Internal reliability for this scale was $\alpha = 0.85$ for both the cognitive

and behavioral processes at the pre-video assessment and $\alpha = 0.89$ for both behavioral

and cognitive processes at post-video assessment, consistent with Ferguson and

Chandler's (2005) findings.

     Marlowe-Crowne Social Desirability Scale, short form. (MCSDS) The short

form of the MCSDS is a 13-item scale developed by Reynolds (1982) from the original

33-item scale (Crowne & Marlowe, 1960). Concurrent validity is high for the short form;

it is 93% correlated with the original. The short form of the MCSDS was used to

compare participants across study conditions to assess for differences in participants'

desire for social approval. Of particular interest were differences observed among groups

who respond to the follow-up questionnaire. Internal reliability for this scale was

adequate ($\alpha = 0.68$).

Demographics and blood donation sign-up. As part of the post-video questionnaire packet, participants were asked to provide demographic information (age, sex, race, ethnicity, college rank, blood donation history). In addition, participants were asked if they were willing to sign up to donate blood. Two blood drives occurring on campus within two weeks of the study date were listed on the questionnaire (date, time, and location) along with instructions informing students to sign up for a specific time slot during one of the upcoming blood drives. Participants who wanted to sign up for a blood drive could do so at that time; however, it was presented as voluntary and not a requirement for study participation.

Procedure

Participants proceeded through the experiment individually. The Stage of Change questionnaire was given to participants after they completed the informed consent. It was scored on the spot and participants were randomized after being placed in a stage of change. Although after randomization the number of participants in each group was not uniform, the groups were not statistically different ($\chi^2(4) = 4.51$, p = 0.34). After participants were randomized to a study condition they were taken to a computer where they filled out pre-video questionnaires (State Anxiety, Blood Donation Attitude, Blood Donation Self-Efficacy, Subjective Norm, Decisional Balance, Processes of Change, Blood Donation Intention, and Marlowe-Crowne Social Desirability Scales), and viewed their assigned video. After viewing a video, they completed the same set of questionnaires (minus the social desirability scale), provided demographic information, and were given the opportunity to sign up for a campus blood drive.

All participants, regardless of their decision to sign-up for a drive, were asked to provide an email address so that a follow-up survey could be emailed to them thirty days later. The follow-up email provided a link to an online survey about their participation in a campus blood drive. A reminder email was sent one week later. In light of low response rates to the follow-up survey, half way through data collection IRB permission was obtained to collect participants' cell phone numbers in addition to email addresses. In conjunction with the email, participants were sent text messages asking if they attended a blood drive in the past thirty days with the intention to donate and reminding them to complete the follow-up survey. Participants who responded were entered into a drawing for one of two fifty dollar gift cards. Combined online and text responses to the question regarding participants' attendance at a blood drive was 42% (n = 164).

Results

Participant Demographics and Preliminary Analyses

Table 1 provides means and standard deviations (SD) for age, mean number of prior blood donations, and social desirability ratings as well as percent of female participants and percent of Caucasian participants at each stage of change. Average age (F(2, 387) = 0.20, p 0.82), percent Caucasian (χ^2(10) = 4.45, p = 0.93), and percent female (χ^2(2) = 4.98, p = 0.08) did not differ by stage of change. However, number of prior blood donations did differ across stage of change (F(2, 387) = 13.69, p < 0.005), with follow-up analyses revealing that participants in Precontemplation reported fewer prior donations than participants in Preparation (p < 0.01).

A one-way ANOVA conducted to compare participants' social desirability ratings revealed no significant differences in participants' ratings between stages of change (F(2, 387) = 1.90, p = 0.15). There was also no significant difference in social desirability ratings between participants who reported that they attended a blood drive within the 30 day follow-up as compared to those who reported they did not, t(162)= - 0.535, p = 0.593.

Table 2 provides the baseline means and SDs for each dependent measure as a function of stage of change. Comparison of baseline values across stage of change revealed significant differences in all but one of the measures (i.e., processes of change – behavioral). Follow-up analyses indicated that participants in Precontemplation reported significantly lower initial donation self-efficacy, attitudes, subjective norm, and intentions as well as higher donation-related anxiety, higher focus on cons of donating, lower focus on pros of donating, and less use of cognitive processes of change as

compared to both Contemplation ($p < 0.001$) and Preparation ($p < 0.001$). There were no baseline differences in any measure as a function of study condition.

Responses to Donation Video

To examine changes in each dependent variable as a function of study condition and stage of change, several 3 stage (Precontemplation, Contemplation, Preparation) x 3 condition (four module, two module, control) ANOVAs were conducted using change scores from participants' pre- and post-video ratings. Follow up analyses of significant interactions and main effects were conducted using Bonferroni-corrected pairwise comparisons. The family-wise Bonferroni value used was $p = 0.017$ because three comparisons were possible in each post hoc analysis. Table 3 provides mean change scores (post-intervention minus pre-intervention) and standard deviations (SD) for each of the dependent variables separated by stage of change.

Donation self-efficacy. Results of the 3 stage x 3 condition ANOVA of participants' reported blood donation self-efficacy revealed an effect of study condition ($F(2, 365) = 13.13$, $p < 0.001$, partial $\eta^2 = 0.067$), but no significant effect of stage of change ($F(2, 365) = 0.74$, $p = 0.48$, partial $\eta^2 = 0.004$) or interaction effect ($F(4, 365) = 0.53$, $p = 0.71$, partial $\eta^2 = 0.006$). As shown in Figure 1, follow-up analyses of the study condition effect indicated that exposure to the four module video produced a larger increase in self-efficacy than exposure to the two-module ($p < 0.01$) and control ($p < 0.01$) videos. The two-module video also produced a larger increase in self-efficacy relative to the control video ($p < 0.01$).

Donation attitude. Examination of the data revealed an extreme outlier in the control condition (i.e., change score > 4 SD from the mean), hence this data point was

excluded for this analysis. Results of a 3 stage x 3 condition ANOVA demonstrated an effect of study condition ($F(2, 368) = 3.70$, $p < 0.05$, partial $\eta^2 = 0.02$), but no effect of stage of change ($F(2, 368) = 0.55$, $p = 0.58$, partial $\eta^2 = 0.003$), or interaction effect ($F(4, 368) = 0.59$, $p = 0.26$, partial $\eta^2 = 0.003$). As illustrated in Figure 2, follow-up analyses of the condition effect indicated that exposure to the four module and two module videos produced greater increases in donation attitude than exposure to the control video ($p < 0.01$). However, the four and two module video conditions did not differ.

Decisional balance-pros subscale. Results of the 3 stage x 3 condition ANOVA of participants' reported emphasis on the pros of blood donation revealed a main effect of study condition ($F(2, 372) = 3.29$, $p < 0.05$, partial $\eta^2 = 0.017$), but no main effect of stage of change ($F(2, 372) = 0.20$, $p = 0.82$, partial $\eta^2 = 0.001$) or interaction effect ($F(4, 372) = 0.85$, $p = 0.50$, partial $\eta^2 = 0.009$). As illustrated in Figure 3, follow-up analyses of the condition effect indicated that exposure to the four module video produced a larger emphasis on the pros of blood donation than exposure to the control video ($p < 0.01$). The two-module video did not differ from either the four module video or control conditions ($p > 0.10$). Review of average change scores for each item of the Pros subscale through several t-tests indicated five items increased significantly ($p < 0.01$) among participants who viewed the four module video, four items increased among participants who viewed the two module video, and three items decreased among participants who viewed the control video.

Decisional balance-cons subscale. Results of the 3 stage x 3 condition ANOVA of participants' reported emphasis on the cons of blood donation revealed a significant effect of study condition ($F(2, 369) = 5.20$, $p < 0.01$, partial $\eta^2 = 0.027$), but no

significant effect of stage of change ($F_{(2, 369)} = 1.99$, $p = 0.14$, partial $\eta^2 = 0.011$) or

interaction effect ($F_{(4, 369)} = 1.35$, $p = 0.252$, partial $\eta^2 = 0.014$). As illustrated in

Figure 4, follow-up analyses of the effect of condition indicated that exposure to the two

module video produced a greater reduction in reported cons of blood donation than

exposure to the control video ($p < 0.01$); there were no other significant differences.

Figure 4 shows that exposure to the four module condition produced an effect that was

intermediate between the control and two module condition. Review of average change

scores for each item in the Cons subscale through several t-tests indicated that scores on

the same one item decreased among participants exposed to the two module and four

module videos ($p < 0.05$), and two items increased among controls ($p < 0.05$).

Blood donation intention. A 3 condition x 3 stage ANOVA of participants'

reported change in intention to donate from pre- to post-video intervention revealed a

main effect of study condition ($F_{(2, 373)} = 6.47$, $p < 0.01$, partial $\eta^2 = 0.034$), and stage

of change ($F_{(2, 373)} = 4.58$, $p < 0.05$, partial $\eta^2 = 0.024$), but not their interaction ($F_{(4, }$

$_{373)} = 0.97$, $p = 0.43$, partial $\eta^2 = 0.01$). As illustrated in Figure 5, follow-up analyses of

the effect of condition revealed that participants exposed to the four module and two

module videos reported greater increases in donation intention than participants exposed

to the control video (both $p < 0.001$). However, the four and two module video

conditions did not differ. As illustrated in Figure 6, follow-up analyses of the effect of

stage of change indicated that participants in Precontemplation reported a greater increase

in intention to donate than participants in Preparation ($p < 0.01$); no other comparisons

among stages were significant. However, as noted above, participants in

Precontemplation reported significantly lower initial donation intentions as compared to

both Contemplation ($p < 0.001$) and Preparation ($p < 0.001$); hence, the larger increases observed in Precontemplation versus Preparation may be a reflection of more room for change on the scale among those in the Precontemplation stage.

Blood donation anxiety. Results of the 3 stage x 3 condition ANOVA of donation anxiety revealed an effect of stage of change ($F(2, 335) = 21.50$, $p < 0.05$, partial $\eta^2 = 0.114$) on average change in anxiety, but no effect of study condition ($F(2, 335) = 0.01$, $p = 0.99$, partial $\eta^2 = 0.00$). However, the main effect of stage was qualified by a stage by condition interaction ($F(4, 335) = 2.69$, $p < 0.05$, partial $\eta^2 = 0.031$). Analysis of the simple main effects of study condition within stage of change indicated a marginally significant effect of condition within Preparation ($F(2, 71) = 2.87$, $p = 0.06$, partial $\eta^2 = 0.08$) and no effect in Precontemplation ($F(2, 214) = 2.25$, $p = 0.11$, partial $\eta^2 = 0.02$) or Contemplation ($F(2, 50) = 1.56$, $p = 0.22$, partial $\eta^2 = 0.06$). As illustrated in Figure 7, follow-up analyses demonstrated that participants in Preparation reported a significantly smaller increase in anxiety after viewing the two module video relative to the control video ($p < 0.01$), and a marginally smaller increase in anxiety after viewing the four module video compared to the control video ($p = 0.09$). No difference was indicated between participants who viewed the two and four module videos.

Subjective norm. Results of the 3 stage x 3 condition ANOVA of participants' reported subjective norm indicated no effects of study condition ($F(2, 377) = 1.58$, $p = 0.21$, partial $\eta^2 = 0.008$), stage of change ($F(2, 377) = 0.44$, $p = 0.65$, partial $\eta^2 = 0.002$), or their interaction ($F(4, 377) = 0.93$, $p = 0.44$, partial $\eta^2 = 0.01$). (An illustration of these non-significant effects is provided in Figure 8 of Appendix C.)

Cognitive processes of change. Results of the 3 stage x 3 condition ANOVA of participants' reported use of cognitive processes of change indicated no significant effects for study condition ($F(2, 357) = 2.34$, $p = 0.09$, partial $\eta^2 = 0.013$), stage of change ($F(2, 357) = 0.03$, $p = 0.96$, partial $\eta^2 = 0.00$), or their interaction ($F(4, 357) = 0.90$, $p = 0.46$, partial $\eta^2 = 0.01$). (An illustration of these non-significant effects is provided in Figure 9 of Appendix C.)

Behavioral processes of change. Analysis of participants' reported use of behavioral processes of change using a 3 stage x 3 condition ANOVA demonstrated non-significant results for study condition ($F(2, 331) = 2.67$, $p = 0.07$, partial $\eta^2 = 0.016$), stage of change ($F(2, 331) = 1.45$, $p = 0.24$, partial $\eta^2 = 0.009$), and their interaction ($F(4, 331) = 0.37$, $p = 0.83$, partial $\eta^2 = 0.04$). (An illustration of these non-significant effects is provided in Figure 10 of Appendix C.)

Blood Donation Behavior

To examine differences in blood donation behavior between participants, Chi-square analyses were conducted to compare (a) donation sign-ups post-intervention and (b) donation attempts within a 30-day follow-up. These analyses were conducted to examine the main effects of study condition and stage of change for both behavioral variables, but the effect of study condition within stage of change was only examined for individuals in Preparation as there were too few participants in Precontemplation and Contemplation who either signed up to donate (5.3%, 13/245 participants and 14%, 9/62 participants, respectively) or reported attending a blood drive (6.4% , 7/209 participants; 10%, 2/20 participants, respectively). With such low numbers most cells contained less than 5 participants.

Blood donation sign-up. As would be expected, chi-square analysis of the association between participants' reported initial stage of change and donation sign-ups revealed a statistically significant association (χ^2 (2) = 64.10, p < 0.001, n = 390), with 5.3% of participants in Precontemplation, 14.5% in Contemplation, and 41.0% in Preparation signing up to donate blood. Overall, study condition was not related to donation sign-up behavior, χ^2 (2) = 0.07, p = 0.97, n = 390. There was also no relationship between study condition and sign-up behavior among participants in the Preparation stage, χ^2 (2) = 1.79, p = 0.41, n = 83.

Blood drive attendance. A Chi-square test of association between stage of change and blood drive attendance was significant (χ^2 (2) = 21.76, p < 0.001, n = 164), with 6.4% of participants in Precontemplation, 10.0% of participants in Contemplation, and 37.1% of participants in Preparation reporting blood drive attendance. Overall, study condition was not related to reported blood drive attendance , χ^2 (2) = 3.23, p = 0.20, n = 164. There was also no relation between blood drive attendance and study condition among participants in the Preparation stage, χ^2 (2) = 1.02, p = 0.60, n = 35.

Discussion

Table 4 provides an overview of the significant main effects and interaction observed across the study dependent measures.

Cognitive/Affective Changes

Overall, results of the present investigation demonstrate that the study conditions and participant stage of change influenced cognitive and affective variables associated with blood donation, although initial stage of change had less influence than the study conditions. Across stage of change, the four module and two module videos enhanced individuals' blood donation self-efficacy, attitude, and intention more than the control video, with exposure to the four module video also producing a larger increase in self-efficacy than the two module video. In addition, participants who viewed the four module video increased the emphasis that they placed on the benefits of blood donation more than control participants, whereas the two module video produced intermediate effects on the benefits of donation that did not differ from either the four module or control conditions. Together, these findings confirm previous evidence that even brief exposure to specific information about blood donation increases people's confidence about donating, their attitude about the process, and their donation intention (France et al., 2010; 2011; France, France, Kowalsky, Copley, Lewis, Ellis et al., 2013) and provide initial support that blood donation interventions also increase awareness of the benefits of donating. Additionally, participants who viewed the four module video felt better prepared to donate, suggested by their greater increase in self-efficacy compared to individuals who viewed the two module video. This provides an argument for using the longer video despite the potentially greater time and money cost compared to the shorter

intervention. Individuals who view the full four module video will have knowledge of coping strategies for blood donation and know what to expect from the donation process, knowledge participants who viewed the shorter two module video will not have.

A different condition effect was observed when looking at the influence of intervention on participants' emphasis of the cons of blood donation. Exposure to the two module video resulted in a decreased emphasis on the cons of donating relative to controls, whereas the four module video produced intermediate effects on the cons of donation that did not differ from either the two-module or control conditions. Examination of mean change in individual items of the cons subscale indicate that participants who viewed the two module video reported a reduction in all six items; however, persons who viewed the four module video reported a reduction in three items, but an increase in one item focusing on the potential physical consequences of donating (e.g., fainting) and an increase in two items focusing on eligibility to donate (i.e., may be told they are ineligible to donate or the blood bank may reject their blood). These findings indicate that both the two and four module videos decreased the emphasis participants placed on the costs of donating, but the smaller observed effect of the four module condition suggests some of the potential costs of donating (e.g., fainting, being told they are ineligible to donate, having the blood bank reject their blood) may have become more salient when participants watched videos of people going through the donation process and talking about strategies for coping with the consequences of donating. This may have minimized the beneficial effects experienced after watching the first two video modules (testimonial and Q & A of donation concerns).

With respect to donation-related anxiety, changes appeared more complex in that they demonstrated combined effects of condition and stage of change. Participants in Preparation reported an increase in anxiety after watching both the two module and four module videos, but these increases were smaller than the increase reported by participants who watched the control video. Although not significant, this effect is noticeably different than the change in anxiety demonstrated by participants in Precontemplation, who reported a reduction in anxiety after viewing all three videos. The change reported by participants in Precontemplation may reflect the baseline differences in anxiety within stage of change, in that participants in Precontemplation reported the highest initial donation-related anxiety and so had the greatest room for reduction in their anxiety scores. Nonetheless, these findings indicate that persons who view blood donation as a more realistic possibility experience an increase in anxiety when they are asked to think directly about blood donation, as opposed to people who are not even contemplating donation who do not experience significant increases in anxiety when asked to think about blood donation. This is also supported by a recent study that demonstrated that anxiety increases when people are exposed to blood donation paraphernalia (e.g., Red Cross promotional posters, gloves, blood collection tubes, band-aids, tourniquets; Clowes & Masser, 2012). On the other hand, encouragingly, participants in the current study reported less of an increase in anxiety after viewing videos speaking directly to common concerns about donating, seeing someone successfully go through a blood donation, and learning strategies for coping with donating. These factors may serve to minimize the increase in anxiety that can occur when people who are contemplating donating in the

near future are asked to think about blood donation and attend to their affective response; such information can potentially be beneficial when recruiting donors.

The observed effect of stage of change on donation intention, where persons in Precontemplation reported the largest increase in intention after intervention compared to those in Contemplation and Preparation, appears promising on the surface. However, this effect may be influenced by differences in initial donation intentions. Not surprisingly, participants in Precontemplation reported the lowest pre-intervention donation intention of the three groups (mean = 11.1), while those in Preparation reported the highest pre-intervention donation intention (mean = 23.1). Given the pre-intervention differences among the three stages examined, the observed changes may reflect a larger increase in intention among Precontemplators not as a function of intervention, but because they had more room to increase on the intention scale. Further assessment is necessary to understand if specific blood donation interventions differentially affect increases in intention among Precontemplators, or if the effect demonstrated here is the result of persons in Precontemplation simply having relatively more room for change regardless of the type of blood donation materials they encounter.

Taken together, the present findings do not support the first hypothesis, which stated that participants in each study condition would demonstrate differential effects based on their stage of change. An effect of study condition was demonstrated among several variables, but only anxiety demonstrated an effect of condition within stage. The effect observed was not in the hypothesized direction; it was hypothesized that participants in Precontemplation would demonstrated the greatest reduction in anxiety after viewing the two module video and participants in the other two stages would

demonstrate the greatest reduction in anxiety after viewing the four module video. The

largest effect demonstrated was an increase in anxiety, not a reduction, and it was

demonstrated by participants in Preparation after viewing both the two and four module

videos. Although these findings were not as hypothesized, they were informative about

the magnitude and direction of the effect of intervention on anxiety among participants in

a specific stage of change.

Behavioral Changes

In partial support of the hypothesis regarding blood donation behavior,

participants demonstrated an association between stage of change and blood donation

behavior, in that participants in Preparation at pre-intervention signed up to donate blood

post-intervention at the highest rate and reported the highest blood drive attendance

compared to participants in Contemplation and Precontemplation. The findings that

persons in Preparation reported the highest rates of donation sign-up and blood drive

attendance is consistent with the definition of the stages of change, in that among persons

in the first three stages of change, those in Preparation are the most informed about blood

donation and the only ones actively considering donating. Although analyses did not

indicate a significant effect of condition on blood donation behavior, evidence of

differences in participants' behavior across stage of change may also indicate that some

participants were in too early a stage of change (i.e., Precontemplation and

Contemplation) to observe a behavioral effect of study condition. Given that participants

in Precontemplation reported the greatest increase in intention after intervention and a

very small percentage reported attempting to donate blood ($< 3\%$), they may require

multiple interventions before their intention is strong enough to translate into donation

behavior. Unfortunately, the sample size at follow-up was too small to assess for motivational changes suggested by forward movement along the stages of change.

Still, even in Preparation, blood donation sign-up and attendance rates were quite low. Participants in Preparation reported the highest rates of intention to donate, but intention does not always translate into action. According to Orbell and Sheeran (1998), the intention-behavior gap is mainly due to individuals who form intentions, but subsequently fail to act on them, indicating that intention formulation and intention implementation are different processes (Sniehotta, Schwarzer, Scholz, & Schuz, 2005). This gap may be due to lack of planning, such as coping planning or action planning (Sniehotta et al., 2005), which lead to difficulty translating intention to behavior. The video interventions lacked information on when, where, and how to donate, which may be important components of recruitment materials for individuals in Preparation (e.g., considering donating in the near future) to help them translate donation intention into action. Interventions that include planning information have demonstrated effectiveness with other volitional behaviors. For example, interventions using constructs from the health action process approach, which focuses on strengthening the translation of intention into action using action plans and coping plans, were effective in increasing rates of self-reported organ donor registration (Hyde & White, 2013). Incorporating components of the health action process approach into interventions focused on individuals in Preparation or later stages of change may increase donation behavior through increasing individuals' planning resources.

Some limitations to the methodology in collecting the behavioral data should be acknowledged. The follow-up data regarding blood drive attendance relied solely on

self-report. Although the groups did not differ in social desirability, self-report can be

inaccurate for a variety of reasons and the methodology for the current study did not

provide a way to verify participants' responses (e.g., through the Red Cross database of

blood drive attendees or placing study investigators at campus blood drives). In addition

to use of self-report measures, the current study had a poor response rate to the 30-day

follow-up survey, limiting the analyses that were possible with the current data. With

these limitations in mind, the behavioral data should be interpreted with caution.

Future Directions

Even though this study provides promising support for educational video- and

web-based interventions as a tool to encourage blood donor recruitment, further research

is needed to better understand this potential. Currently, there is a paucity of empirical

information regarding the characteristics of the TTM constructs, such as decisional

balance and processes of change, when applied to blood donation. Better understanding

of the constructs can inform tailored blood donation interventions. The current study

applied TTM constructs to an existing video intervention; in the future, using the TTM

constructs to guide selection of empirically supported strategies for intervention may be

more effective. For example, a study published in 2013 described development and

validation of a blood donor processes of change measure among African Americans in an

effort to understand constructs that will inform tailored interventions. In this study,

Amoyal and colleagues (2013) found that use of all ten processes of change varied by

stage of change. Specifically, participants in Precontemplation used eight of the ten

processes of change less frequently than participants in all other stages, use of two

behavioral strategies (counter conditioning and helping relationships) peaked in the

Preparation stage, and participants in Action/Maintenance reported using self-reevaluation, stimulus control, and self-liberation more often than the other seven processes. The authors suggest that understanding strategies that are most used in specific stages can help direct theoretically based interventions to increase readiness to donate blood. This same concept can be applied to the video interventions used in the present study; future research can involve empirically identifying the processes of change that are involved in the current blood donor recruitment video and selecting modules to correspond with processes that are most appropriate for participants in each stage of change. As Amoyal and colleagues (2013) suggest, future research could also evaluate community-based stage matched interventions. One option for stage matched interventions is to tailor the message provided. Amoyal and colleagues (2013) suggested the following tailored message based on their findings: "although you are not yet ready to make the decision to donate blood, it may be helpful to start thinking about how you would feel if you were a blood donor. Many individuals find it helpful to think of themselves as someone who is doing the right thing for others" (i.e., self-reevaluation; p. 1287). With this in mind, the intended outcome of tailored interventions should be considered carefully in the future. In the current study, blood donation behaviors (donation sign-ups and blood drive attendance) were related to participant stage of change, but not study condition. This suggests that stage of change does influence behavior. Potentially, expecting participants in Precontemplation or Contemplation to engage in blood donation behavior after one intervention may be unrealistic. A more appropriate expectation may be movement to another stage of change as well as changes in cognitive/affective variables such as donation self-efficacy, processes of change,

decisional balance, and attitude. Unfortunately, in the current study, the response rates to

the complete follow-up survey were too low to assess motivational changes suggested by

progression to another stage of change.

Moreover, while the present sample included individuals from the first three

stages of change (Precontemplation, Contemplation, and Preparation), it did not include

persons in Action and Maintenance (or a combined stage noted by Burditt et al., 2009 and

Ferguson & Chandler, 2005). Individuals in the latter stages of change are most likely to

sign up to donate; future examination of interventions that influence their decision to

donate can shed more light on interaction between readiness to donate and other

motivational variables such as attitude, anxiety, and self-efficacy (Amoyal, Robbins,

Paiva, Burditt, Kessler, & Shaz, 2013). Incorporating additional theoretical approaches,

such as the health action process approach (Hyde & White, 2013; Sniehotta et al., 2005),

to increase the likelihood of translating intention to behavior at later stages of change

(e.g, Preparation, Action) should also be explored.

The present sample was also limited to a relatively homogenous population. The

current study was intended to reach a college-aged audience, as recruitment efforts are

focusing on younger age groups (Eder, Hillyer, Dy, Notari, & Benjamin, 2008; Gillespie

& Hillyer, 2002), but future research of the potential impact of educational donor

interventions should include samples that are more diverse with respect to age, education,

prior donation history, race, and ethnicity to better assess effectiveness of recruitment

tools on other populations. In addition, field testing would aid in determining if the

interventions are effective in producing positive changes outside a laboratory setting. For

example, a recent study of a web-based donor recruitment intervention suggested that

future research could include an Internet-based trial targeting nondonors who are considering blood donation or a community-based recruitment event for nondonors that provides free access to the materials in a web-based format (France et al., 2013).

Summary

Overall, this study demonstrated that video-based donor educational materials can enhance blood donation attitudes, self-efficacy, and intention, and shift focus of pros and cons of blood donation in a direction that influences increased motivation to donate. Positive change in multiple variables may be especially important in producing meaningful change in intention and, ultimately, donation behavior. Additionally, self-efficacy, in particular, may be especially important in directly affecting intention to donate and predicting future donation attempts (Masser, Bednall, White, & Terry, 2012; Masser, White, Hyde, Terry, & Robinson, 2009; France et al, 2013). Thus, the larger reported increase in self-efficacy among participants who viewed the four module video is important in that it may have the greatest impact by strengthening one's confidence about donating and increasing the likelihood that an individual will re-donate. However, the present study also provided mixed evidence that an individual's stage of change will differentially affect their response to blood donation interventions. The increases in anxiety observed among participants in Preparation after viewing donation-related videos is consistent with recent evidence regarding anxiety reactions to blood donation cues (Clowes & Masser, 2012) and provides some support for the notion that specific interventions may help attenuate anxiety reactions. Further research is necessary to better understand the potential for tailoring anxiety interventions for those who are seriously considering donating blood. Better understanding of TTM constructs as they apply to the

blood donation decision process, how they can inform more effective interventions, and how they may be combined with additional theories such as the health action process approach, may further strengthen the positive influence of blood donor recruitment materials on variables such as attitude, self-efficacy, and intention and, ultimately, on behavior.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Albert, N. M., Buchsbaum, R., and Li, J. (2007). Randomized study of the effect of video education on heart failure healthcare utilization, symptoms, and self-care behaviors. *Patient Educational Counseling, 69*, 129-39.

Amoyal, N. R., Robbins, M. L., Paiva, A. L., Burditt, C., Kessler, D., and Shaz, B. H. (2013). Measuring the processes of change for increasing blood donation in black adults. *Transfusion, 53*, 1280-1290.

Amponsah-Afuwape, S. A., Myers, L. B., and Newman, S. P. (2002). Cognitive predictors of ethnic minorities' blood donation intention. *Psychology, Health, & Medicine, 7*(3), 357-361.

Armitage, C. J. and Conner, M. (2001a). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology, 40*, 471-499.

Armitage, C. J. and Conner, M. (2001b). Social cognitive determinants of blood donation. *Journal of Applied Social Psychology, 31*(7), 1431-1457.

Burditt, C., Robbins, M. L., Paiva, A., Velicer, W. F., Koblin, B., and Kessler, D. (2009). Motivation for blood donation among African Americans: Developing measures for stage of change, decisional balance, and self-efficacy constructs. *Journal of Behavioral Medicine, 32*, 429-442.

Clowes, R. and Masser, B. M. (2012). Right here, right now: The impact of the blood donation context on anxiety, attitudes, subjective norms, self-efficacy, and intention to donate blood. *Transfusion, 52*, 1560-1565.

Crowne, D. P. and Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*(4), 349-354.

Eder, A. F., Hillyer, C. D., Dy, B. A., Notari, E. P., and Benjamin, R. J. (2008). Adverse reactions to allogenic whole blood donation by 16- and 17-year-olds,. *JAMA, 299*(19), 2279-2286. doi:10.1001/jama.299.19.2279

Ferguson, E. (1996). Predictors of future behavior: A review of the psychological literature on blood donation. *British Journal of Health Psychology, 1*, 287-308.

Ferguson, E. and Chandler, S. (2005). A stage model of blood donor behavior: Assessing volunteer behavior. *Journal of Health Psychology, 10*(3), 359-372.

France, J. L., France, C. R., and Himawan, L. K. (2007). A path analysis of intention to redonate among experienced blood donors: an extension of the theory of planned behavior. *Transfusion, 47,* 1006-1013.

France, J. L., France, C. R., and Himawan, L. K. (2008). Redonation intentions among experienced blood donors: Does gender make a difference?. *Transfusion and Apheresis Science, 38,* 159-166.

France, C. R., France, J. L., Kowalsky, J. M., Copley, D. M., Lewis, K. N., Ellis, G. D., McGlone, S. T., and Sinclair, K. S. (2013). A Web-based approach to blood donor preparation. Transfusion, 53, 328-336.

France, C. R., France, J. L., Kowalsky, J. M., and Cornett, T. L. (2010). Education in donation coping strategies encourages individuals to give blood: Further evaluation of donor recruitment brochure. *Transfusion, 50,* 85-91.

France, C. R., France, J. L., Wissel, M. E., Kowalsky, J. M., Bolinger, E. M., and Huckins, J. L. (2011). Enhancing blood donation intentions using multimedia

donor education materials. *Transfusion, 51*: no. doi: 10.1111/j.1537-2995.2010.03033.x

France, C. R., Montalva, R., France, J. L., and Trost, Z. (2008). Enhancing attitudes and intentions in prospective blood donors: Evaluation of a new donor recruitment brochure. *Transfusion, 48,* 526-530.

Giles, M. and Cairns, E. (1995). Blood donation and Ajzen's theory of planned behavior: An examination of perceived behavioral control. *British Journal of Social Psychology. 34*, 173-188.

Giles, M., McClenahan, C., Cairns, E., and Mallet, J. (2004). An application of the Theory of Planned Behaviour to blood donation: The importance of self-efficacy. *Health Education Research, 19*(4), 380-391.

Gillespie, T. W. and Hillyer, C. D. (2002). Blood donors and factors impacting the blood donation decision. *Transfusion Medicine Reviews, 16*(2), 115-130.

Godin, G., Conner, M., Sheeran, P., Belanger-Gravel, A., and Germain, M. (2007). Determinants of repeated blood donation among new and experienced donors. *Transfusion, 47*, 1607-1615.

Goodnough, L. T., Brecher, M. E., Kanter, M. H., and AuBuchon, J. P. (1999). Transfusion medicine. First of two parts-blood transfusion. *The New England Journal of Medicine, 340*(6), 438-447.

Howdini. (2010). *How to Relieve Stress.* Video retrieved September 12, 2010 from http://www.howdini.com/howdini-video-6638754.html

Hyde, M. K. and White, K. M. (2013). A test of three interventions to promote people's communication of their consent for organ donation. *Psychology & Health, 28*(4), 399-417.

Johnson, A. S., Paiva, A. L., Cummins, C. O., Johnson, J. L., Dyment, S. J., Wright, J. L., Prochaska, J. O., Prochaska, J. M., and Sherman, K. (2007). Transtheoretical Model-based multiple behavior intervention for weight management: Effectiveness on a population basis. *Preventive Medicine, 46*, 238-246.

Lemmens, K., Abraham, C., Hoekstra, T., Ruiter, R., De Kort, W., Brug, J., and Schaalma, H. (2005). Why don't young people volunteer to give blood? An investigation of the correlates of donation intention among young donors. *Transfusion, 45*, 945-955.

Luck, A., Pearson, S., Maddern, G., and Hewett, P. (1999). Effects of video information on precolonoscopy anxiety and knowledge: A randomised trial. *Lancet, 354*, 2032-2035.

Marshall, S. J. and Biddle, S. J. (2001). The Transtheoretical Model of behavior change: A meta-analysis of applications to physical activity and exercise. *Annals of Behavioral Medicine, 23*(4), 229-246.

Masser, B. M., Bednall, T. C., White, K. M., and Terry, D. (2012). Predicting the retention of first-time donors using an extended Theory of Planned Behavior. *Transfusion, 52*, 1303-1310.

Masser, B. M., White, K. M., Hyde, M. K., and Terry, D. J. (2008). The psychology of blood donation: Current research and future directions. *Transfusion Medicine Reviews, 22*(3), 215-233.

Masser, B. M., White, K. M., Hyde, M. K., Terry, D. J., and Robinson, N. G. (2009). Predicting blood donation intentions and behavior among Australian blood donors: testing an extended theory of planned behavior model. *Transfusion, 49,* 320-329.

Orbell, S. and Sheeran, P. (1998). ''Inclined abstainers'': A problem for predicting health-related behaviour. *British Journal of Social Psychology, 37*, 151–165.

Pearson, S., Maddern, G. J., and Hewett, P. (2005). Interacting effects of preoperative information and patient choice in adaptation to colonoscopy. *Diseases of the Colon and Rectum, 48*, 2047-2054.

Piliavin, J. A., Evans, D., and Callero, P. L. (1984). Learning to give to unnamed strangers: The process of commitment to regular blood donation. In Staub, E., Bar-Tal, D., Karylowski, J., and Reykowski, J. (Eds.) *Development and Maintenance of Prosocial Behavior.* New York: Plenum Press.

Pindyck J., Avorn J., Kuriyan M., Reed, M., Iqbal, M. J., and Levine, S. J. (1987). Blood donation by the elderly. Clinical and policy considerations. *JAMA, 257,* 1186-1188.

Prochaska, J. O. and DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology, 51*(3), 390-395.

Prochaska, J. O., DiClemente, C. C., and Norcross, J. C. (1992). In search of how people change: Applications to addictive behavior. *American Psychologist, 47*(9), 1102-1114.

Prochaska, J. O., Velicer, W. F., Fava, J. L., Rossi, J. S., and Tsoh, J. Y. (2001).
Evaluating a population-based recruitment approach and a stage-based expert
system intervention for smoking cessation. *Addictive Behaviors, 26*, 583-602.

Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. J., Marcus, B. H., Rakowski,
W., Fiore, C., Harlow, L. L., Redding, C. A., Rosenbloom, D., and Rossi, S.
(2004). Stages of change and decisional balance for 12 problem behaviors. *Health
Psychology, 13*(1), 39-46.

Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlow-
Crowne Social Desirability Scale. *Journal of Clinical Psychology, 38,* 119-125.

Schrieber, G. B., Schlumpf, K. S., Glynn, S. A., Wright, D. J., Tu, Y., King, M. R.,
Higgins, M. J., Kessler, D., Gilcher, R., Nass, C. C., and Guiltinan for REDS.
(2006). Convenience, the bane of our existence, and other barriers to donating.
Transfusion, 46, 545-553.

Sniehotta, F. F., Schwarzer, R., Scholz, U., and Schüz, B. (2005). Action planning and
coping planning for long-term lifestyle change: Theory and assessment. *European
Journal of Social Psychology, 35*, 565–576.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., and Jacobs, G.A. (1983).
Manual for the state-trait anxiety inventory (formY). Palo Alto (CA): Consulting
Psychologists Press.

Velicer, W. F., DiClemente, C. C., Prochaska, J. O., and Brandenburg, N. (1985).
Decisional balance measure for assessing and predicting smoking status. *Journal
of Personality and Social Psychology, 48*(5), 1279-1289.

Wu, Y., Glynn, S. A., Schrieber, G. B., Wright, D. J., Lo, A., Murphy, E. L., Kleinman,

    S. H., and Garrattay, G. for REDS. (2001). First-time blood donors: Demographic

    trends. *Transfusion, 41,* 360-364.

Zuck, T. F., Thompson, R. A., Schreiber, G. B., Gilcher, R. O., Kleinman, S. H., Murphy,

    E. L., Ownby, H. E., Williams, A. E., Busch, M. P., and Smith, J. W. (1995). The

    Retrovirus Epidemiology Donor Study (REDS): Rationale and methods.

    Transfusion, 35(11), 944-951.

Tables

Table 1

Demographic Information by Stage of Change

Demographics	Units	Precontemplation (n=245)	Contemplation (n=62)	Preparation (n=83)
Age	M (SD) Years	19.2 (1.6)	19.1 (1.3)	19.3 (1.5)
Sex	% female	55.5	48.4	66.3
Race	% Caucasian	77.4	82.3	84.3
Past Donations	M (SD) Number	0.7 (1.4)	1.2 (1.7)	1.7 (2.2)
MCSDS[a]	M (SD) Score	6.1 (2.9)	6.1 (2.7)	6.8 (2.8)

[a] MCSDS = Marlowe-Crowne Social Desirability Scale.

Table 2

Mean Pre-Intervention Scores (and Standard Deviations) for Each Dependent Measure with Significant Baseline Differences as a Function of Stage of Change

Measure	Stage of Change	Mean (Standard Deviation)	F-values and significance as function of stage
Self-Efficacy	Precontemplation Contemplation Preparation	39.4 (9.1) 43.3 (7.4) 46.9 (8.7)	24.19**
Attitude	Precontemplation Contemplation Preparation	18.2 (6.9) 24.4 (6.2) 28.4 (6.1)	80.17**
Decisional Balance-Pro	Precontemplation Contemplation Preparation	22.0 (5.0) 24.5 (3.7) 26.1 (3.6)	27.63**
Decisional Balance-Con	Precontemplation Contemplation Preparation	14.7 (4.8) 12.5 (4.3) 11.4 (4.4)	17.87**
Intention	Precontemplation Contemplation Preparation	11.1 (6.1) 18.5 (5.8) 23.1 (8.9)	108.21**
Anxiety	Precontemplation Contemplation Preparation	45.7 (13.8) 41.7 (11.8) 35.1 (10.5)	20.09**
Subjective Norm	Precontemplation Contemplation Preparation	18.3 (5.9) 21.5 (5.7) 20.9 (5.6)	10.74**
POC[a]-Cognitive	Precontemplation Contemplation Preparation	44.12(10.4) 49.9 (9.7) 52.2 (10.5)	21.46**
POC[a]-Behavioral	Precontemplation Contemplation Preparation	64.1 (16.2) 64.3 (12.9) 65.3 (12.4)	0.19

**$p < 0.01$

[a] POC = Processes of Change

Table 3

Mean Post-intervention minus Pre-intervention Change Scores (and Standard Deviations) for Each of the Dependent Measures as a Function of Study Condition and Stage of Change.

Measure	Stage of Change	Study Condition		
		Four Module Video	Two Module Video	Control Video
Self-Efficacy	Precontemplation	5.3 (7.2)	3.1 (6.5)	-0.6 (4.8)
	Contemplation	4.0 (7.6)	0.8 (5.4)	-0.3 (5.3)
	Preparation	5.1 (7.3)	2.0 (5.1)	0.5 (4.6)
Attitude	Precontemplation	2.4 (4.8)	2.1 (4.7)	0.2 (3.3)
	Contemplation	2.6 (4.1)	1.9 (2.7)	2.1 (3.5)
	Preparation	1.6 (3.0)	1.9 (3.7)	0.2 (2.1)
Decisional Balance-Pro	Precontemplation	1.0 (3.5)	1.3 (3.7)	0.3 (2.8)
	Contemplation	1.7 (1.8)	0.2 (2.3)	0.1 (2.8)
	Preparation	1.4 (2.8)	0.6 (2.7)	0.03 (1.8)
Decisional Balance-Con	Precontemplation	-0.5 (3.3)	-0.4 (4.0)	0.3 (2.8)
	Contemplation	-0.1 (2.4)	-0.4 (3.1)	2.4 (4.3)
	Preparation	0.04 (2.7)	-1.3 (2.0)	-0.2 (1.7)
Intention	Precontemplation	3.9 (5.0)	3.9 (5.3)	0.7 (3.5)
	Contemplation	3.7 (5.5)	2.4 (3.0)	1.3 (3.5)
	Preparation	1.0 (3.7)	2.3 (4.8)	-0.1 (3.1)
Anxiety	Precontemplation	-0.8 (17.4)	-5.4 (16.5)	-6.1 (16.8)
	Contemplation	-0.8 (16.4)	6.8 (14.9)	-1.3 (18.0)
	Preparation	8.6 (13.4)	6.6 (13.3)	15.0 (13.0)
Subjective Norm	Precontemplation	0.9 (3.6)	0.9 (3.3)	0.5 (2.6)
	Contemplation	-0.7 (5.0)	1.9 (2.6)	0.7 (2.9)
	Preparation	0.6 (3.2)	1.0 (2.0)	0.1 (1.9)
POC[a]-Cognitive	Precontemplation	3.1 (12.5)	1.3 (8.8)	-1.5 (8.3)
	Contemplation	2.8 (6.0)	4.4 (5.8)	0.4 (5.6)
	Preparation	4.6 (8.1)	2.6 (6.3)	1.2 (4.9)
POC[a]-Behavioral	Precontemplation	1.6 (6.2)	3.1 (6.4)	-0.7 (6.3)
	Contemplation	1.9 (4.9)	0.9 (5.6)	0.7 (6.7)
	Preparation	2.2 (6.5)	1.8 (6.5)	0.3 (5.1)

[a] POC = Processes of Change.

Table 4

Significant Statistical Analyses for Individual Outcome Variables

Measure/Behavior	Study Condition	Stage of Change	Interaction Effect	Explanation
Self-Efficacy	X			Increase larger for four module video than other conditions
Attitude	X			Increase larger for four and two module videos compared to control video
Decisional Balance-Pros	X			Increase larger for four module video than control video
Decisional Balance-Cons	X			Two module reduced focus on cons more than control
Intention	X	X		Increase larger for four and two module videos compared to control; Increase larger in Precontemplation than Preparation
Anxiety		X	X	Increase larger in Preparation than Precontemplation after viewing all videos and larger than Contemplation after viewing control; increase larger in Contemplation than Precontemplation after viewing two module video
Subjective Norm				
POC-Cognitive				
POC-Behavioral				
BloodDonation Sign-Up		X		Association between sign-up rate and initial stage of change
Blood Drive Attendance		X		Association between attendance and initial stage of change

Figures
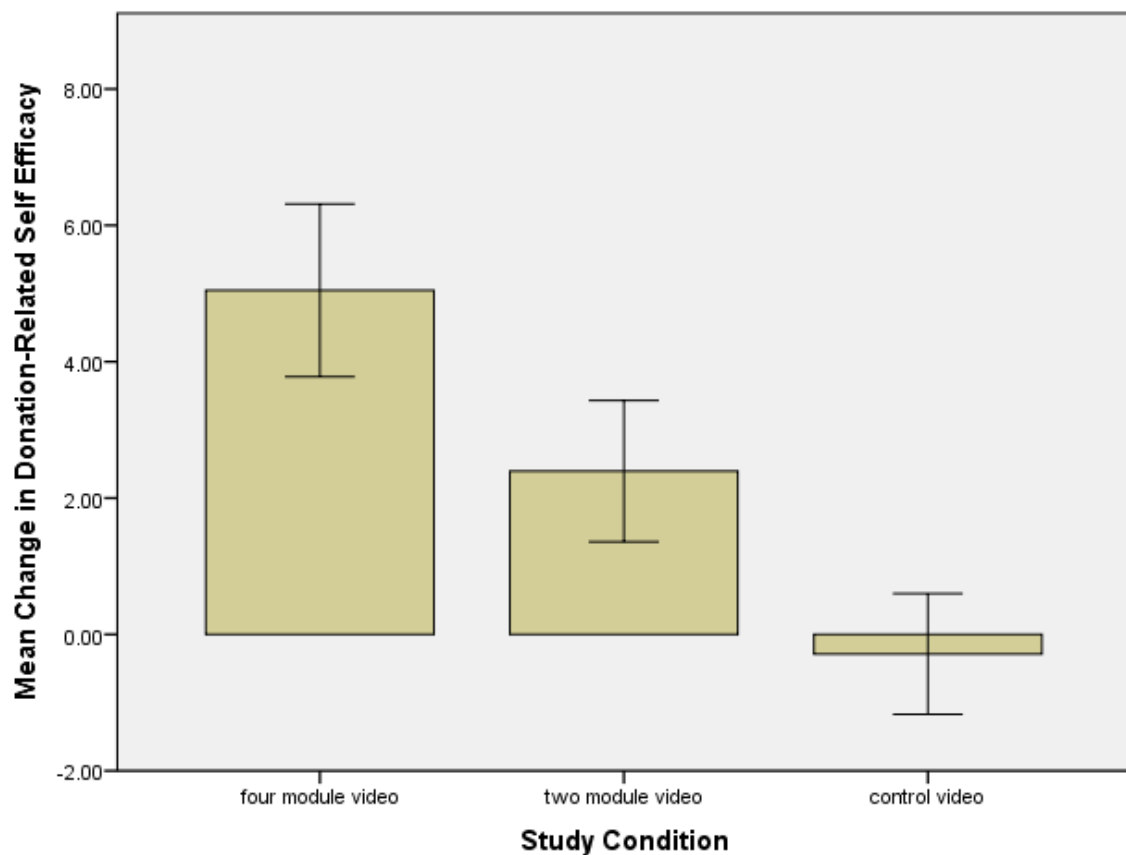
Figure 1. Mean (±95% CI error bars) for Change in Blood Donation Self-Efficacy from Pre- to Post-Intervention by Study Condition.
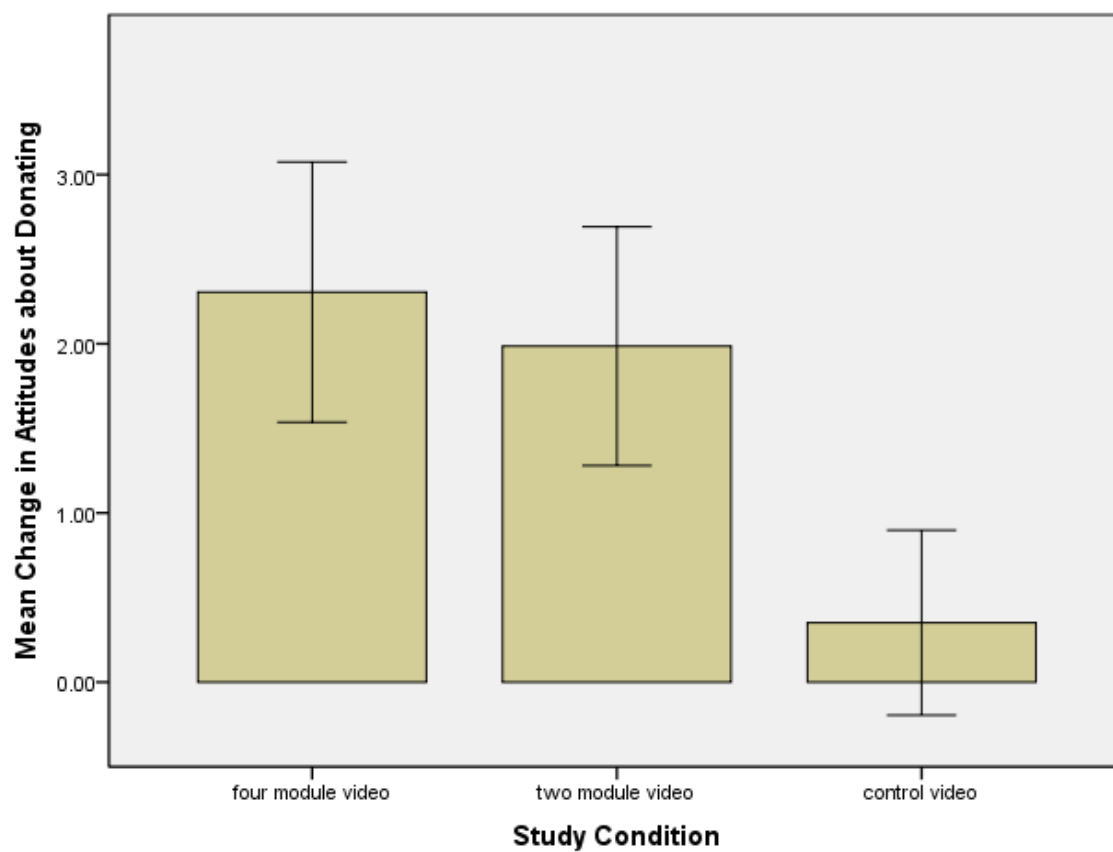
Figure 2. Mean (±95% CI error bars) for Change in Donation Attitude from Pre- to Post-Intervention by Study Condition
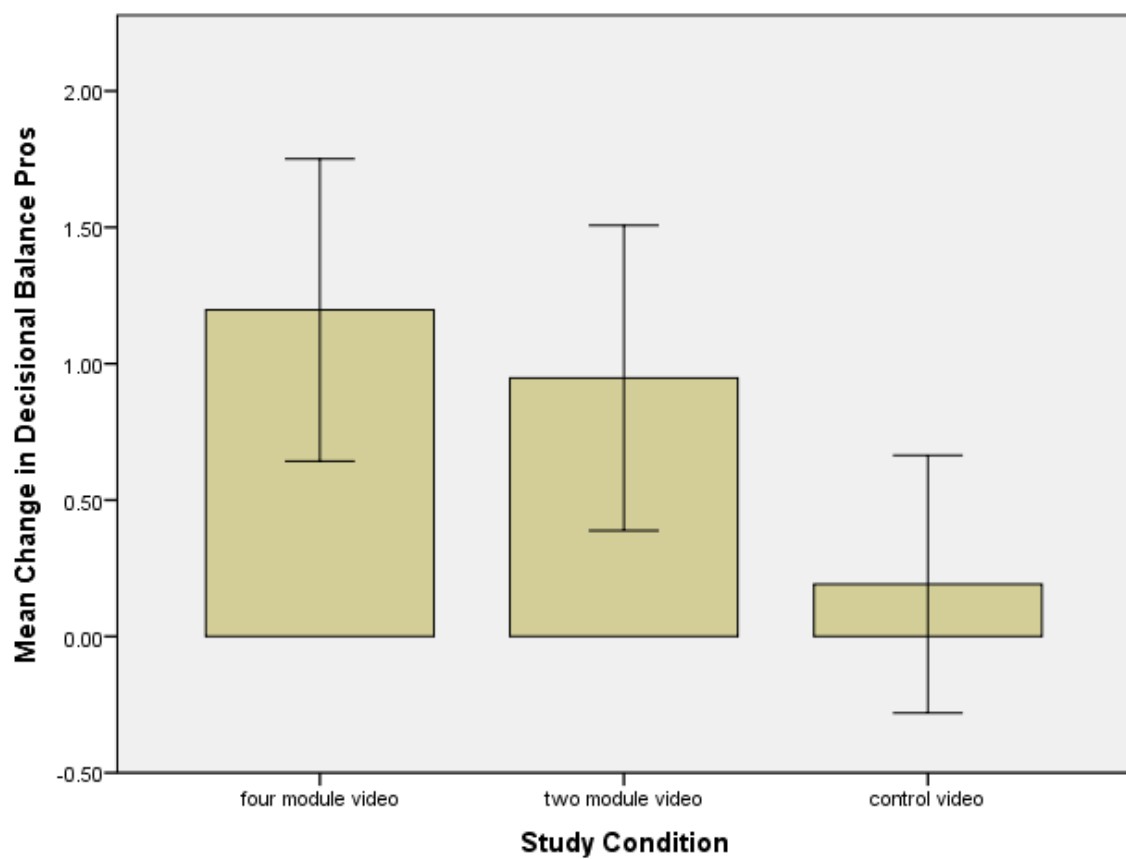
Figure 3. Mean (±95% CI error bars) for Change in Emphasis on the Pros of Blood Donation from Pre- to Post-Intervention by Study Condition.
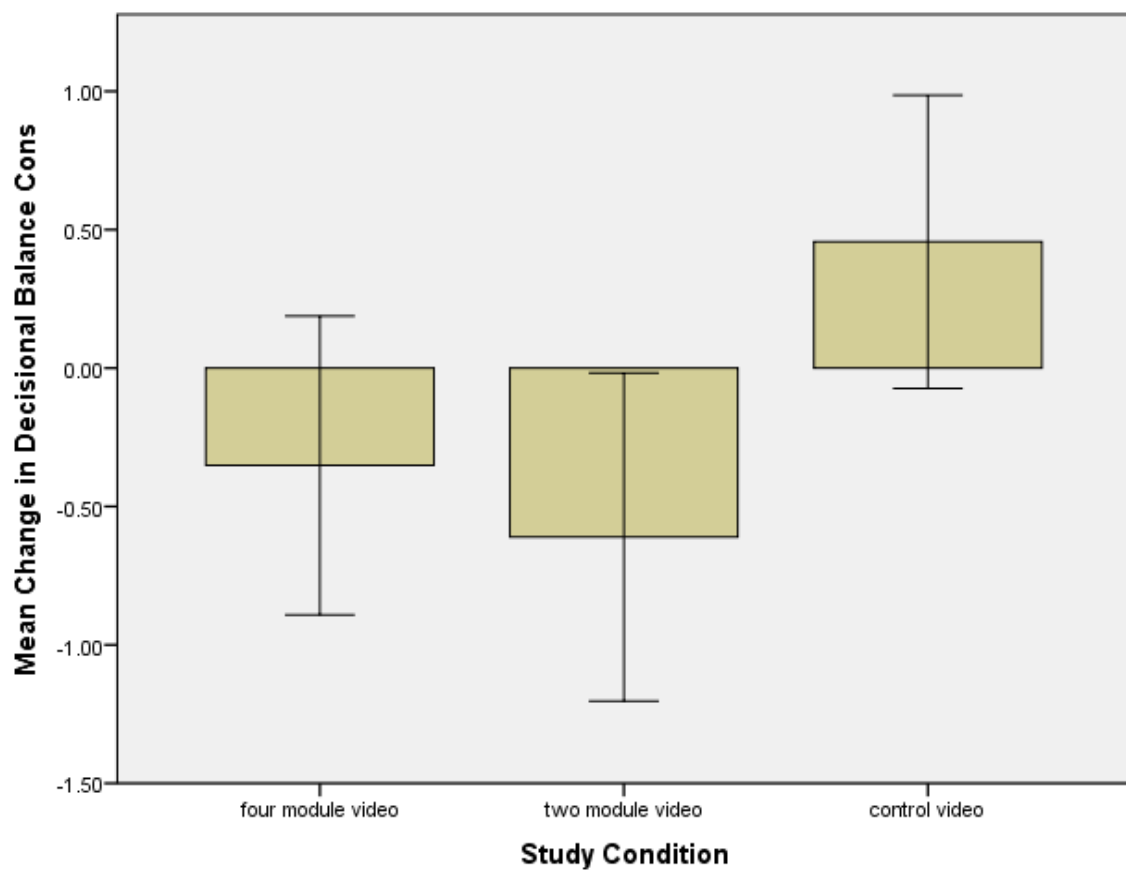
Figure 4. Mean (±95% CI error bars) for Change in Emphasis on the Cons of Blood Donation by Study Condition.
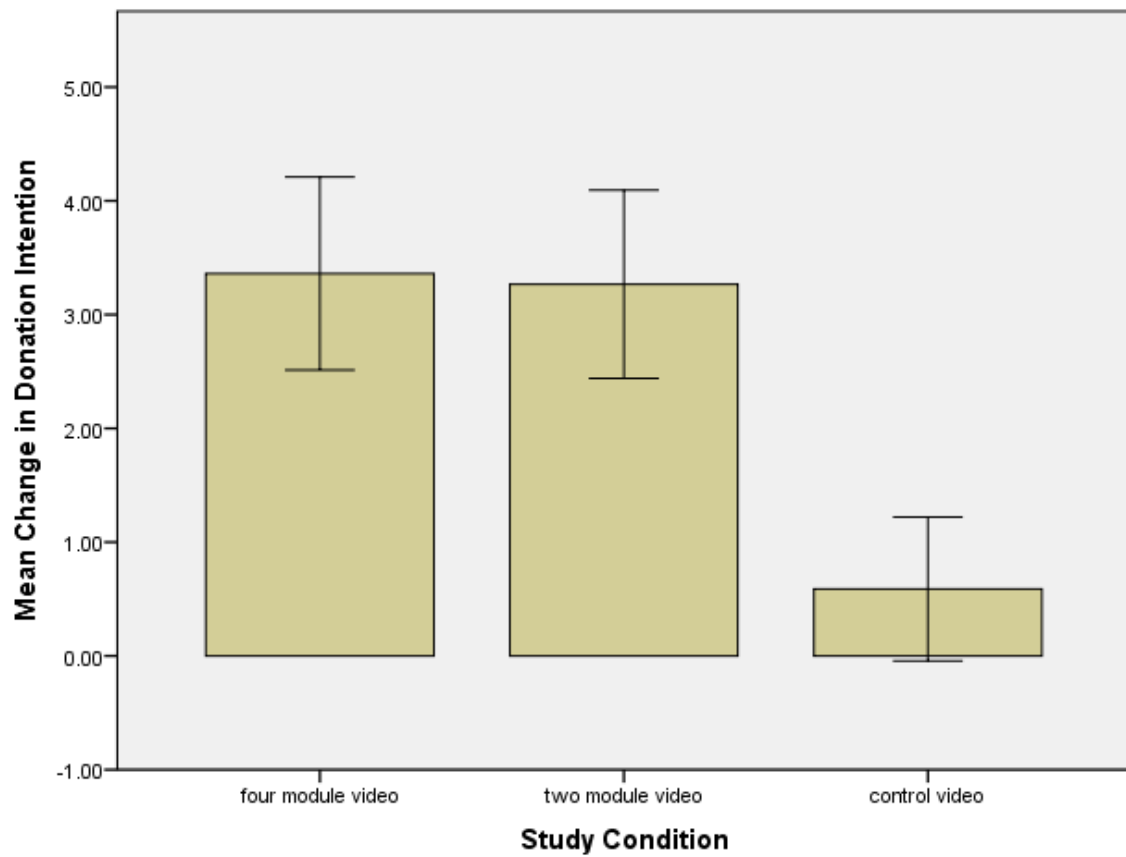
Figure 5. Mean (±95% CI error bars) for Change in Intention to Donate Blood from Pre- to Post-Intervention by Study Condition.
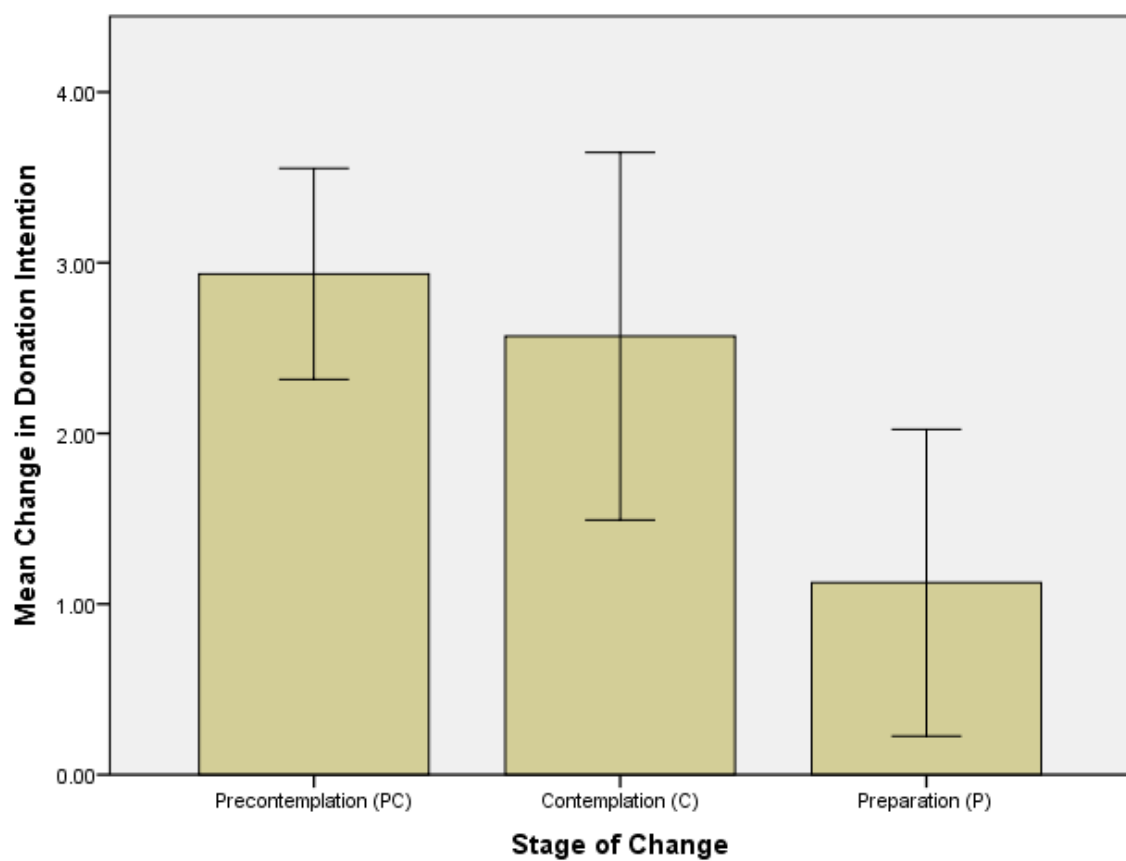
Figure 6. Mean (±95% CI error bars) for Change in Blood Donation Intention from Pre-
to Post-Intervention by Stage of Change.
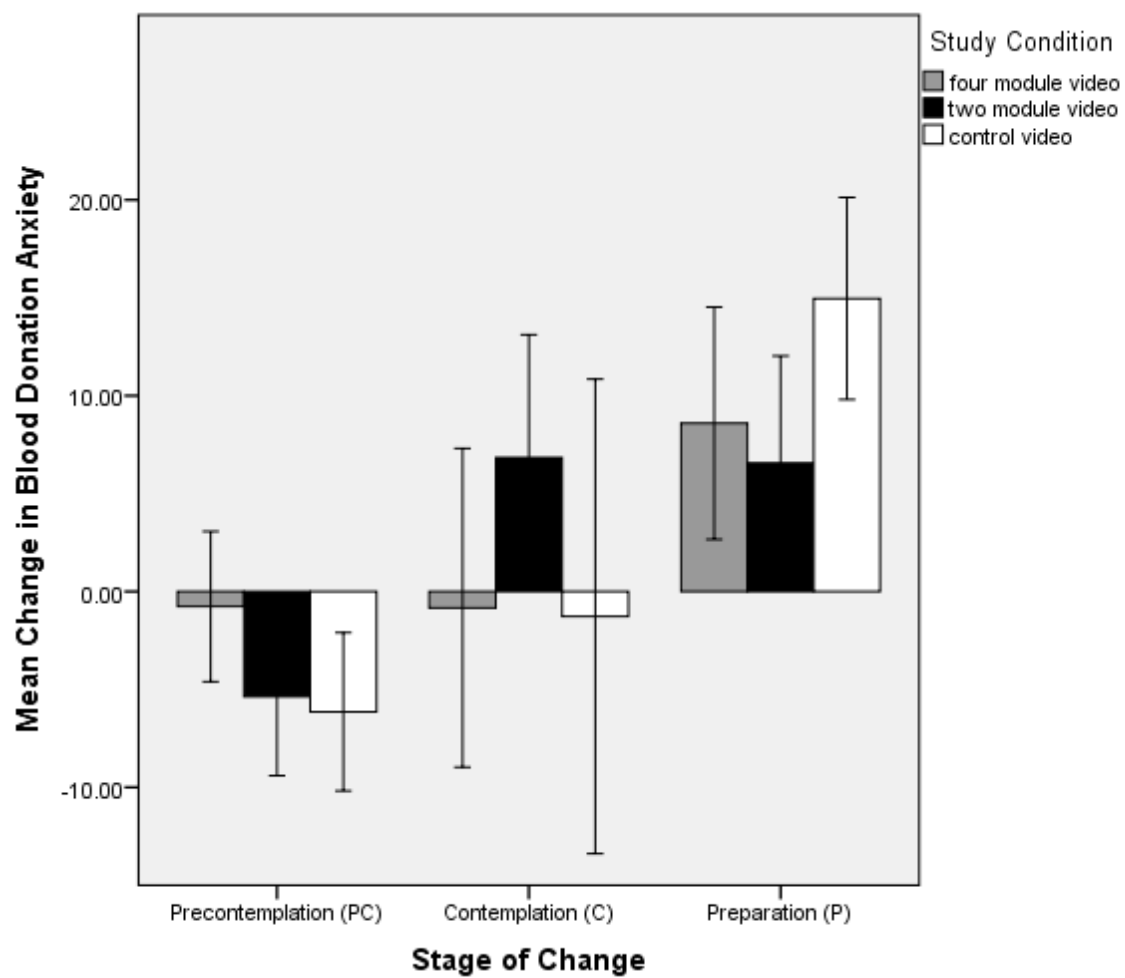
Figure 7. Mean (±95% CI error bars) for Change in Anxiety from Pre- to Post-Intervention by Stage of Change and Study Condition.

Appendix A: Supplemental Introductory Information Requested by Dissertation

Committee

Processes of Change

The processes of change are constructs that were originally not included in my review of TTM constructs; at the request of this dissertation committee, they were added here.

As mentioned in the Introduction, the stages of change construct represents a temporal dimension in the TTM model that helps researchers and clinicians understand when particular shifts in attitudes, intentions, and behavior can occur, but the processes of change are TTM constructs that helps understand how these shifts occur. Processes of change are overt and covert activities and experiences that individuals engage in when they attempt to modify problem behaviors or engage in new behaviors (Prochaska, DiClemente, & Norcross, 1992).

The processes of change were first identified theoretically in a comparative analysis of the major schools of psychotherapy. The processes were selected by examining recommended change techniques across different psychotherapy theories. Ten common processes of change were identified (Prochaska & DiClemente, 1982) and have been replicated in multiple other principal component analyses conducted on various response formats and diverse samples (Prochaska & DiClemente, 1983; Prochaska & Norcross, 1983; Prochaska, Velicer, DiClemente, & Fava, 1988). Table 5 provides a list of the ten processes of change and examples from the original smoking cessation literature along with examples of each process of change as defined for the blood

donation context by Ferguson and Chandler (2005). The processes are generally identified using self-report instruments, but in therapy settings they have also been reliably identified in transcriptions of psychotherapy sessions (Prochaska et al., 1992). Initially the processes of change, like other constructs in the TTM, were developed for use in smoking cessation treatment, but the model and its individual constructs have been applied to multiple health behaviors such as healthy eating, weight loss, and exercise (Hall, Robbins, Paiva, Knott, Harris, & Mattice, 2007; Marshall & Biddle, 2007; Prochaska, DiClemente, & Norcross, 1992; Rosen, 2000).

Prochaska and colleagues (1988, 1992) caution that the processes are not mutually exclusive; individuals often use several processes at a time, and they may use the same process as they progress through multiple stages of change. A meta-analysis of 47 cross-sectional studies conducted by Rosen (2000) found that the sequencing of processes is not consistent across health behaviors. In other words, depending on the target behavior, individuals may utilize different processes of change at certain stages of change. It is not yet clear how the sequencing may vary for different behaviors, but Rosen's (2000) meta-analysis suggests that individuals adopting new behaviors, like exercise, may slowly increase their use of multiple processes as they progress along the stages of change as opposed to persons seeking to stop problem behaviors who tend to use cognitive-based processes during the initial stages of change and behaviorally-oriented processes in the later stages of change.

Cognitive-affective and behavioral processes. In addition to the 10 individual processes of change identified by Prochaska and colleagues (1988), two higher order processes have emerged – cognitive-affective (originally called experiential) and

behavioral processes. The original individual processes cluster under these two higher

order factors. The five cognitive-affective processes are consciousness-raising, self-

reevaluation, dramatic relief, environmental reevaluation, and social liberation. The five

behavioral processes are self-liberation, counter- conditioning, stimulus control,

reinforcement management, and helping relationships. Prochaska and colleagues (1988)

admitted that there is no clear-cut distinction between these two factors and most of the

processes reflect both cognitive-affective and behavioral activities. Their clustering

developed through analysis of patterns that emerged in research and the discovery that

the use of certain processes seemed to co-occur as people progressed through stages of

change. The only study to date that examined processes of change in the blood donation

context indicates that the ten individual processes cluster under the cognitive-affective

and behavioral factors as predicted by Prochaska and colleagues (1988), with an internal

reliability of $\alpha = .84$ and $\alpha = .86$, respectively (Ferguson & Chandler, 2005).

In addition to research addressing cessation of unhelpful behaviors, TTM research

has also focused on behavior initiation, such as exercise adoption and diet change.

Rosen's (2000) meta-analysis indicates that for these behaviors, use of behavioral and

cognitive processes increase together as individuals progress through the stages of

change. Specifically, for exercise adoption use of cognitive processes has the largest

increase from Precontemplation to Contemplation stages with small consistent increases

thereafter and behavioral processes gradually increase throughout all the stages. Exercise

adoption is the target behavior most similar to blood donation in the literature to date

because it is one of the few target behaviors studied that is voluntary and that participants

are either engaging in for the first time or restarting after a break from the behavior, all

similar characteristics to blood donation. Thus, the assumption is that similar patterns will emerge with blood donation behavior.

Applying the processes of change to blood donation video. The four module blood donor recruitment video developed by France and colleagues (2011) includes topics that correspond with multiple processes of change. For example, the testimonial module 1) increases awareness about the need for blood (consciousness raising), 2) provides an example of how donating blood can affect the outside environment (environmental reevaluation), 3) uses the statement "don't regret not giving, help save a life" to directly address how one feels about oneself with respect to donating blood (self-reevaluation), and 4) provides an example of how one can feel rewarded/good about oneself for giving blood through the teenager's testimonial (reinforcement management). Because the video was made before it was noted that the TTM could be applicable to the blood donation decision process and blood donation recruitment interventions, there is not direct empirical evidence to indicate how many of the ten processes of change are represented in the four video modules. As illustrated in Table 6, examination of the four video modules and characteristics of each of the change processes provide little indication that social liberation, and helping relationships are represented in the modules. It was also assumed that the two module video did not include self-liberation and counter-conditioning in addition to social liberation and helping relationships.

The cognitive-affective and behavioral higher order processes of change can inform study interventions. The findings of Rosen's (2000) meta-analysis indicate that individuals moving toward initiating exercise adoption initially increase their use of cognitive processes dramatically before steadily increasing their use of behavioral

processes. Additionally, the original theoretical argument behind tailoring smoking cessation interventions to stage of change was to focus on what prospective quitters were willing to listen to and be aware of without overwhelming and ostracizing clients. The idea was that clients would focus on certain cognitive and behavioral processes in early stages, whereas other processes may only be relevant at later stages. For example, a person in Precontemplation may not be ready to hear about substituting alternatives for smoking behaviors (e.g., chewing gum, distraction) nor to adhere to those suggestions. S/he may still be learning about negative effects of smoking and may not even be aware that certain stimuli in the environment can trigger cravings (Prochaska et al., 1992). The same could be true for people not yet committed to being blood donors. Table 6 illustrates that the two module video is comprised of modules that include primarily cognitive processes while the four module video includes both cognitive and behavioral processes. A video focusing on cognitive processes may be more appropriate and palatable for individuals in the Precontemplation stage and a video focusing on both cognitive and behavioral processes may be most appropriate for persons in Contemplation and Preparation. Thus, the current study proposes that persons in Precontemplation would benefit most from an intervention consisting of the Testimonials and Concerns video modules, as they involve primarily cognitive-affective processes and persons in Contemplation and Preparation would benefit most from an intervention consisting of all four video modules because it incorporates both behavioral and cognitive-affective processes into the intervention.

There is also a pragmatic reason to compare a video intervention made up of only two modules versus all four modules. First, it may allow for the identification of the

most efficient approach to donor recruitment. If a video intervention comprised of only two modules is an equivalent motivator of potential donors then this would be the most time and cost-efficient approach for blood collection agencies to employ.

Several paired-samples t-tests were conducted to examine individual processes of change reported by participants in the current study. The tests revealed that assumptions made about the processes represented in each video condition were somewhat accurate. As Table 7 illustrates, after viewing the four module video participants reported a change in the same eight processes it was assumed this video represented. After viewing the two module condition participants reported a change in five processes of change, not six as originally assumed; environmental reevaluation and self-reevaluation were processes expected to change that did not and counter-conditioning and self-liberation were two processes not expected to change that did. Participants who viewed the control video only reported a change in self-reevaluation, indicating the control video served its purpose by minimally affecting the dependent variables.

Appendix A References

Hall, K. L., Robbins, M. L., Paiva, A., Knot, J. E., Harris, L., and Mattice, B. (2007). Donation intentions among African American college students: Decisional balance and self-efficacy measures. *Journal of Behavioral Medicine, 30*, 483-495.

Prochaska, J. O. and DiClemente, C. C. (1982). Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research, and Practice, 19*(3), 276-288.

Prochaska, J. O. and Norcross, J. C. (1983). Psychotherapists' perspectives on treating themselves and their clients for psychic distress. *Professional Psychology: Research and Practice, 14*, 642-655.

Prochaska, J. O., Velicer, W. F., DiClemente, C. C., and Fava, J. (1988). Measuring processes of change: Application to the cessation of smoking. *Journal of Consulting and Clinical Practice, 56*(4), 520-528.

Rosen, C. S. (2000). Is the sequencing of change processes by stage consistent across health problems? A meta-analysis. *Health Psychology, 19*(6), 593-604.

Appendix A Tables

Table 5

The Ten Processes of Change with Smoking Cessation and Blood Donation Examples

Process	Description	Smoking Example[a]	Blood Donation Example[b]
Self-liberation (B)	Choosing and commitment to act or belief in ability to change	I tell myself I am able to quit smoking if I want to.	I tell myself it's up to me to give blood.
Counterconditioning (B)	Substituting alternatives for problem behaviors (i.e., avoiding target behavior)	Instead of smoking I engage in some physical activity.	When giving blood, I try to think of something else.
Stimulus control (B)	Avoiding or countering stimuli that elicit problem behaviors	I remove things from my home that remind me of smoking.	I leave stickers/letters about blood donation in prominent places around my home.
Reinforcement management (B)	Rewarding one's self or being rewarded by others for making changes	I am rewarded by others if I don't smoke.	Giving blood is a rewarding experience.
Helping relationships (B)	Being open about problem/target behavior with someone who cares	I have someone whom I can count on when I'm having problems with smoking.	I have at least one friend that I can go to give blood with.
Consciousness raising (C)	Increasing information about self and problem/target behavior	I recall information people have given me on how to stop smoking.	I recall information people have given me on blood donation
Self-reevaluation (C)	Assessing how one feels and thinks about oneself with respect to problem/target behavior	My dependency on cigarettes makes me feel disappointment in myself.	I feel disappointed in myself when I don't give blood.
Dramatic relief (C)	Experiencing and expressing feelings about one's problem/target behavior	Warnings about health hazards of smoking move me emotionally.	The thought of helping someone to live moves me emotionally.

a Examples from Prochaska, Velicer, DiClemente, and Fava (1988)
b Examples from Ferguson and Chandler (2005)

Table 5 cont.

The Ten Processes of Change with Smoking Cessation and Blood Donation Examples

Process	Description	Smoking Example[a]	Blood Donation Example[b]
Environmental reevaluation (C)	Assessing how one's problem/target behavior affects the physical environment	I stop to think that smoking is polluting the environment.	I think the world would be a better place if everyone who could, gave blood.
Social liberation (C)	Increasing alternatives for non-problem behaviors available in society	I notice that public places have sections set aside for smoking.	I notice there are other places you can go to give blood.

a Examples from Prochaska, Velicer, DiClemente, and Fava (1988)
b Examples from Ferguson and Chandler (2005)

Table 6

The Processes of Change Assumed to be Involved in Study and Control Videos

Process	Two Module Video[a]	Four Module Video[a]	Control Video[b]
Self-liberation (B)		X	
Counter-conditioning (B)		X	X
Stimulus control (B)	X	X	X
Reinforcement management (B)	X	X	
Helping relationships (B)			
Consciousness raising (C)	X	X	X
Self-reevaluation (C)	X	X	
Dramatic relief (C)	X	X	
Environmental reevaluation (C)	X	X	
Social liberation (C)			

B = Behavioral processes
C = Cognitive-affective processes (formerly experiential processes)
[a] Two module video includes Testimonial and Concerns about Donation modules, four module video includes Testimonial, Concerns, Coping Strategies for Donation, and Donation Process modules.
[b] Stress reduction is target behavior in Control Video.

Table 7

Effect Sizes for the Mean Difference in Reported Processes of Change Pre- to Post-Intervention

Process	Two Module Video	Four Module Video	Control Video[a]
Self-liberation	0.26**	0.27**	0.13
Counter-conditioning	0.32**	0.03**	0.01
Stimulus control	0..35**	0.23**	0.18
Reinforcement management	0.06	0.21*	0.17
Helping relationships	-0.07	-0.01	0.12
Consciousness raising	0.29**	0.18*	0.03
Self-reevaluation	0.11	0.23**	0.20*
Dramatic relief	0.25**	0.25**	0.07
Environmental reevaluation	0.08	0.27**	0.04
Social liberation	0.16	0.03	0.04

* $p < 0.05$, ** $p < 0.01$

Appendix B: Methods – Changes to Proposed Methods Indicated by Dissertation

Committee and All Measures Used in the Present Study

With the introduction of the processes of change construct, the methodology of the current study was altered from four study conditions to the current three study conditions.

In addition, the Action/Maintenance stages were removed from the study design as there is a theoretical argument from both the TPB and TTM that persons in these groups are motivated differently (e.g., focus on different processes of change, influenced by different factors in their decision to donate) than persons in the first three stages (Gillespie & Hillyer, 2002; Prochaska et al., 1992; Rosen, 2000). Therefore, to make the study more parsimonious and allow for more power in the statistical analyses focus was shifted to individuals in the first three stages of change - Precontemplation, Contemplation, and Preparation.

The original proposal had a two week follow-up period and participants were compensated for their participation in the online follow-up survey with a second study participation credit. After discussion, it was agreed that a two week follow-up period was not sufficient to provide participants time to attempt to donate blood. Thus, the follow-up period was extended to thirty days. With the extension of the follow-up period, a different form of compensation had to be identified because some participants would complete the follow-up survey during finals. It was agreed that participants would be entered into a raffle for one of two $50 gift cards to Amazon.com.

The complete measures used in the current study are as follows:

Stage of Change

Please circle your response.

1) To the best of your knowledge, are you eligible to donate blood?   YES   NO

2) If not, when will you be eligible to donate? _____

3) How many times have you donated blood in the past 12 months?   0   1   2 or more

4) Do you intend to donate blood in the next six months?   YES   NO

5) Do you intend to donate blood in the next 30 days or whenever you are next eligible?

              YES   NO

State Anxiety Inventory –Blood Donation

DIRECTIONS: Please think about yourself donating blood. Read the statements below and circle the number that corresponds with how you feel right now <u>about donating blood</u>.	Not at all	Somewhat	Moderately	Very Much
1. I feel calm	1	2	3	4
2. I feel secure	1	2	3	4
3. I am tense	1	2	3	4
4. I am regretful	1	2	3	4
5. I feel at ease	1	2	3	4
6. I feel upset	1	2	3	4
7. I am presently worrying over possible misfortunes	1	2	3	4
8. I feel rested	1	2	3	4
9. I feel anxious	1	2	3	4
10. I feel comfortable	1	2	3	4
11. I feel self-confident	1	2	3	4
12. I feel nervous	1	2	3	4
13. I am jittery	1	2	3	4
14. I feel "high strung"	1	2	3	4
15. I am relaxed	1	2	3	4
16. I feel content	1	2	3	4
17. I am worried	1	2	3	4
18. I feel over-excited and "rattled"	1	2	3	4
19. I feel joyful	1	2	3	4
20. I feel pleasant	1	2	3	4

Scoring:

Reverse score items 1, 2, 5, 8, 10, 11, 15, 16, 19, 20 before summing total.

Blood Donation Attitudes Scale

1. The idea of donating blood in the next 8 weeks seems

1	2	3	4	5	6	7
Good						Bad

2. The idea of donating blood in the next 8 weeks seems

1	2	3	4	5	6	7
Pleasant						Unpleasant

3. The idea of donating blood in the next 8 weeks seems

1	2	3	4	5	6	7
Satisfying						Dissatisfying

4. The idea of donating blood in the next 8 weeks makes me

1	2	3	4	5	6	7
Happy						Sad

5. The idea of donating blood in the next 8 weeks seems

1	2	3	4	5	6	7
Repulsive						Attractive

Scoring

Reverse score items 1, 2, 3, and 4 before summing total.

Blood Donation Self-Efficacy Scale

Directions: 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. 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 the corresponding number. 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

Scoring: Reverse score items 2, 5, and 9 before summing total.

Subjective Norm Scale

Below are a number of statements related to how much others would like you to donate blood. Please read each statement carefully and indicate how likely or unlikely it is that your family or close friends would want you to donate blood and how likely you would be to do what they want.

1. Most people who are important to me think I should give blood.

1	2	3	4	5	6	7
Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely

2. Members of my family think I should give blood at the next blood drive.

1	2	3	4	5	6	7
Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely

3. My close friends think I should give blood at the next blood drive.

1	2	3	4	5	6	7
Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely

4. Generally speaking, I want to do what most members of my family think I should do.

1	2	3	4	5	6	7
Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely

5. Generally speaking, I want to do what my close friends think I should do.

1	2	3	4	5	6	7
Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely

Scoring: Sum all items for total score.

Blood Donation Intention Scale

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 will try to give blood in the next 8 weeks

    1   2   3   4   5   6   7

Probable   Improbable

2. If I did not donate blood in the next 8 weeks I would regret it

    1   2   3   4   5   6   7

Very unlikely   Very likely

3. If I did not donate blood in the next 8 weeks I would be disappointed

    1   2   3   4   5   6   7

Very unlikely   Very likely

4. I intend to give blood in the next 8 weeks

    1   2   3   4   5   6   7

Very unlikely   Very likely

5. I have decided to give blood in the next 8 weeks

    1   2   3   4   5   6   7

Very unlikely   Very likely

**Items 4 and 5 were separated from items 1, 2, and 3 by another measure in both the pre-intervention and post-intervention surveys.

Scoring: Reverse code items 1,2, and 3 before summing total.

Decisional Balance

Instructions: The following statements describe different opinions people may or may not have about blood donation. Please rate how important each statement is to you in deciding whether or not to donate blood. If you disagree with an item in this section of the survey that probably means it is not important in your decision. Please use the following 5-point scale:

1 = NOT AT ALL IMPORTANT
2 = SOMEWHAT IMPORTANT
3 = MODERATELY IMPORTANT
4 = VERY IMPORTANT
5 = EXTREMELY IMPORTANT

_____ 1. I may be helping somebody in my community.

_____ 2. It is an easy way to help someone else.

_____ 3. I may save someone's life.

_____ 4. I am afraid of needles.

_____ 5. I will be helping to prevent blood shortages.

_____ 6. The sight of blood makes me feel sick.

_____ 7. I will set a positive example for others.

_____ 8. Donating blood is painful.

_____ 9. Donating blood is the right thing to do.

_____ 10. I may find out that I have a disease.

_____ 11. The blood bank might reject my blood.

_____ 12. I might be told I am not eligible to donate blood.

Pros Subscale: Items 1, 2, 3, 5, 7, and 9
Physical Cons Subscale: Items 4, 6, and 8
Eligibility Cons Subscale: Items 10, 11, and 12

Processes of Change

Instructions: Please indicate on a scale of 1-5 the frequency with which the following statements apply to you. If the statement does not apply to you, circle the "0" (e.g. if you have never given blood, then item 3 below would not apply).

1. I remember seeing posters and articles in magazines or on T.V., advertising the need for more donors.

0	1	2	3	4	5
N/A	never				repeatedly

2. I can expect to be rewarded by others if I give blood.

0	1	2	3	4	5
N/A	never				repeatedly

3. When giving blood I try to think of something else.

0	1	2	3	4	5
N/A	never				repeatedly

4. Posters and articles in magazines about the need for blood move me emotionally.

0	1	2	3	4	5
N/A	never				repeatedly

5. I leave stickers / letters about blood donation in prominent places around my home.

0	1	2	3	4	5
N/A	never				repeatedly

6. I see signs for blood donation in public places.

0	1	2	3	4	5
N/A	never				repeatedly

7. I could be open with at least one special person about my experience with blood donation.

0	1	2	3	4	5
N/A	never				repeatedly

8. I know I'd feel better about myself if I was a blood donor.

0	1	2	3	4	5
N/A	never				repeatedly

9. I tell myself it's up to me to go and give blood.

0	1	2	3	4	5
N/A	never				repeatedly

10. I get some material reward from giving blood (e.g. stickers).

0	1	2	3	4	5
N/A	never				repeatedly

11. I think about information from posters / articles on how to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

12. When I'm giving blood, I look the other way.

0	1	2	3	4	5
N/A	never				repeatedly

13. I think the world would be a better place if everyone, who could, gave blood.

0	1	2	3	4	5
N/A	never				repeatedly

14. The thought of helping someone to live moves me emotionally

0	1	2	3	4	5
N/A	never				repeatedly

15. I notice other places you can go to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

16. I tell myself that I can get over my fears of blood donation.

0	1	2	3	4	5
N/A	never				repeatedly

17. I have at least one good friend that I could go to give blood with.

0	1	2	3	4	5
N/A	never				repeatedly

18. I feel disappointed in myself that I don't give blood.

0	1	2	3	4	5
N/A	never				repeatedly

19. I recall information people have given me on blood donation.

0	1	2	3	4	5
N/A	never				repeatedly

20. The staff make me feel good about giving blood by showing their appreciation.

0	1	2	3	4	5
N/A	never				repeatedly

21. I keep things around my home / place of work that remind me of the need to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

22. Helping others is a good quality I'd like to think I have..

0	1	2	3	4	5
N/A	never				repeatedly

23. I make myself feel good about giving blood, before going to donate.

0	1	2	3	4	5
N/A	never				repeatedly

24. Dramatic portrayals about the consequences of a lack of blood donors upset me.

0	1	2	3	4	5
N/A	never				repeatedly

25. When giving blood, I make use of the time and peace to think and relax.

0	1	2	3	4	5
N/A	never				repeatedly

26. I recall information people have personally told me about blood donation.

0	1	2	3	4	5
N/A	never				repeatedly

27. There are always people at the blood collection centre that I can talk to about my fears and anxieties.

0	1	2	3	4	5
N/A	never				repeatedly

28. There is always a time and a place I can go to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

29. When giving blood, I like having someone to talk to to take my mind off the process.

0	1	2	3	4	5
N/A	never				repeatedly

30. I make commitments to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

31. When I give blood, I find it a personally rewarding experience.

0	1	2	3	4	5
N/A	never				repeatedly

32. If I didn't give blood, I'd think I was being selfish.

0	1	2	3	4	5
N/A	never				repeatedly

33. I tell lots of people about my experience with blood donation / about my plans to give blood.

0	1	2	3	4	5
N/A	never				repeatedly

34. I react emotionally to seeing pictures of people in hospital.

0	1	2	3	4	5
N/A	never				repeatedly

Scoring for Processes of Change measure
Primary Factors

1. Consciousness Raising = 1, 11, 19, 26 (4 items)
2. Dramatic Relief = 4, 14, 24, 34 (4 items)
3. Counter Conditioning = 3, 12, 25, 27, 29 (5 items)
4. Self Re-evaluation = 8, 18, 22 (3 items)
5. Helping Relationships = 7, 17, 33 (3 items)
6. Social Liberation = 6, 15, 28 (3 items)
7. Reinforcement Management = 2. 10, 20, 31 (4 items)
8. Stimulus Control = 5, 21 (2 items)
9. Self Liberation = 9, 16, 23, 30, 32 (5 items)
10. Environmental Re-evaluation = 13 (1 item)

Marlowe-Crowne Social Desirability Scale

DIRECTIONS: Listed below are thirteen statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally.

T   F   1. It is sometimes hard for me to go on with my work if I am not encouraged.

T   F   2. I sometimes feel resentful when I don't get my way.

T   F   3. On a few occasions, I have given up doing something because I thought too little of my ability.

T   F   4. There have been times when I felt like rebelling against people in authority even though I knew they were right.

T   F   5. No matter who I'm talking to, I'm always a good listener.

T   F   6. There have been occasions when I took advantage of someone.

T   F   7. I'm always willing to admit it when I make a mistake.

T   F   8. I sometimes try to get even rather than forgive and forget.

T   F   9. I am always courteous, even to people who are disagreeable.

T   F   10. I have never been irked when people expressed ideas very different from my own.

T   F   11. There have been times when I was quite jealous of the good fortune of others.

T   F   12. I am sometimes irritated by people who ask favors of me.

T   F   13. I have never deliberately said something that hurt someone's feelings.

Scoring:
Code all items as 1 = false, 0 = true.
Reverse code items 5, 7, 9, 10, and 13 before summing total.

Demographics and Blood-Drive Sign Up

Session Date: _____   Session Time: _____   Participant #: _____

Please provide an answer for all questions/statements below.

Email Address: _____

Sex: male / female

Age (years): _____

Race: Please choose a category (or categories) that best describes your racial

background:

____ American Indian/ Alaskan Native   ____ Black or African American
____ Asian   ____ White
____ Native Hawaiian/Other Pacific Islander   ____ Other (_____)

Ethnicity: Please choose a category that best describes your ethnicity:

____ Hispanic or Latino   ____ Not Hispanic or Latino

College Rank:

____ Freshman   ____ Sophomore   ____ Junior   ____ Senior

How many times have you donated blood? _____

How many times have you donated plasma? _____

Are you willing to sign up to give blood at a blood drive?   YES   NO

If yes, please select a timeslot below and we will contact you via email to confirm the date, time, and location or to provide further details. If neither of these dates work for you, please indicate that you would like us to email you with additional blood drive dates and locations available for sign-up.

	Blood Drive Date Blood Drive Location	Blood Drive Date Blood Drive Location
9:00		
10:00		
11:00		
12:00		
1:00		
2:00		
3:00		
4:00		
5:00		
6:00		
7:00		

Follow-up Email Sent to All Participants

Email Subject: 30 Day Follow-Up for "Assessment of Educational Web Video" Study

Dear Study Participant,

First of all, thank you for your participation in this study. You were informed during Part 1 of the "Hey! Wanna watch a video?: Assessment of Educational Web Video" study that you would receive a follow-up email one month later requesting information regarding your involvement in a recent blood drive (if any). This is the aforementioned email. Our aim in gathering this information is to obtain accurate data regarding college students' participation in volunteer blood drives in the Athens area. Knowing which students did not donate blood is just as important as knowing who did attempt to give blood.

Please answer the survey questions honestly. Once you have completed the questionnaires, you have the option to enter a raffle for one of two $50 Amazon.com gift cards. Your raffle entry will not be linked to your answers. It will take approximately 15 minutes for you to complete the questionnaire.

Use this link to access the survey:
https://ohiopsych.us2.qualtrics.com/SE/?SID=SV_1BWf92WfWAAUz9G

If you have any questions, please contact me by replying to this email.

Best,
Jamie Huckins-Barker, M.S.
Principal Investigator
IRB# 11X164

Follow-up Text Message approved to send to participants after half of data collection was completed

"Message from OU Psychology Department:

In the last 30 days did you attend a blood drive with the intention to donate blood?

Please respond YES or NO.

Also, please complete follow-up survey emailed to you."

Appendix C: Supplemental Statistical Analyses
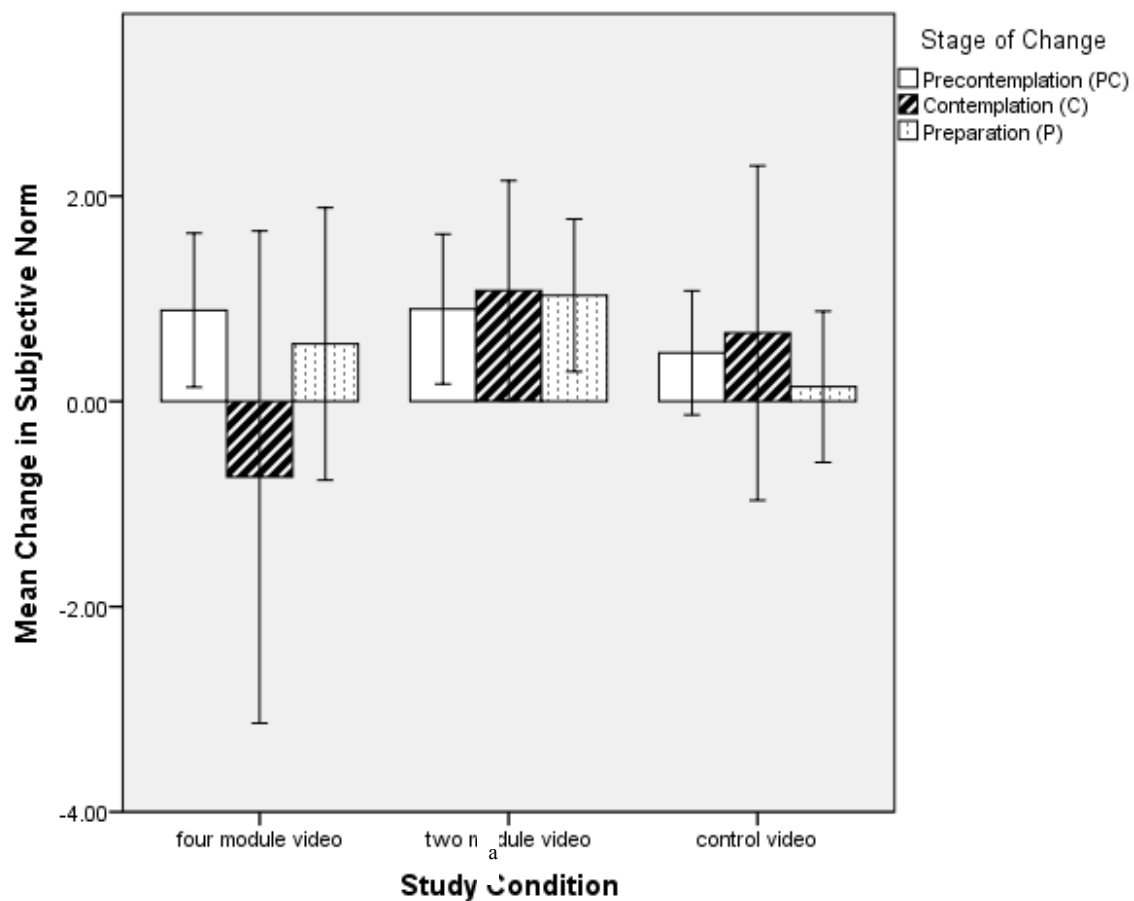
Supplemental Figures for Non-Significant Results

Figure 8. Mean (±95% CI error bars) for Change in Subjective Norm from Pre- to Post-Intervention by Study Condition and Stage of Change.
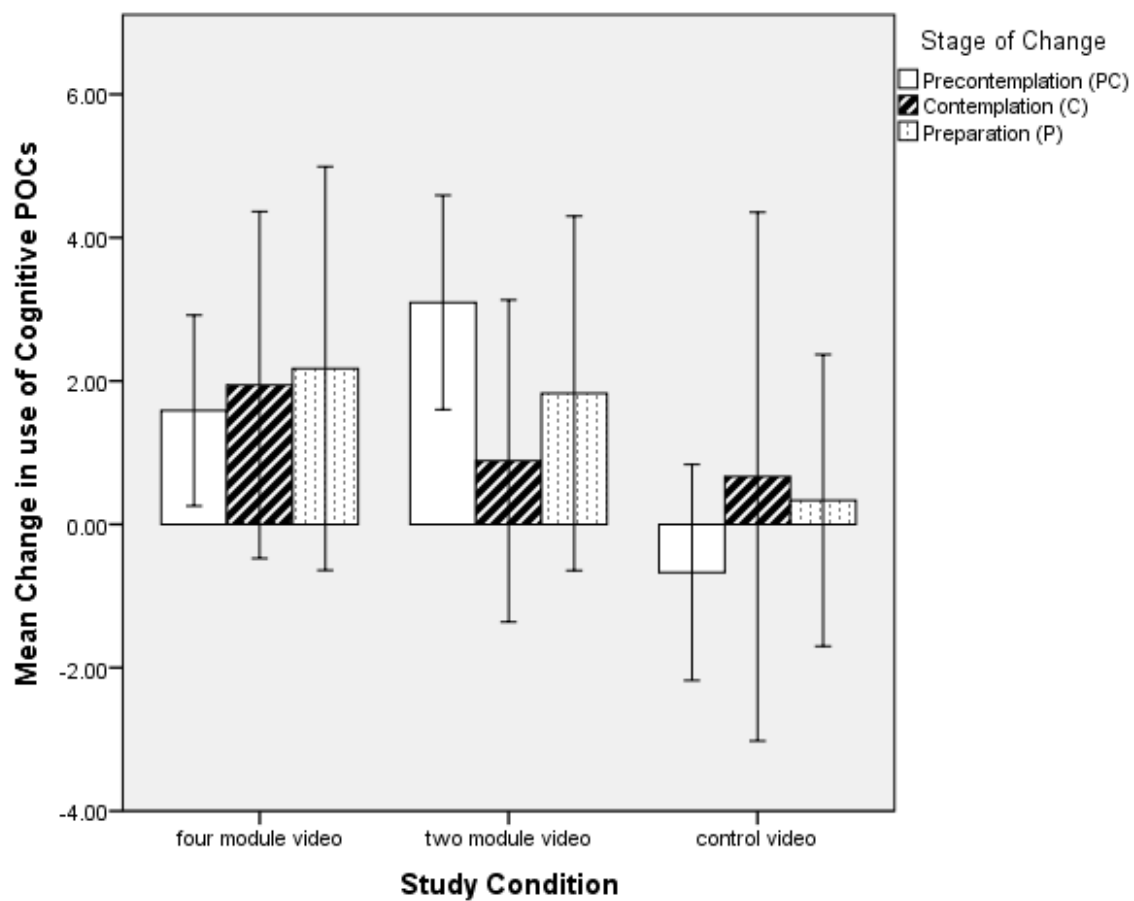
Figure 9. Mean (±95% CI error bars) for Change in Use of Cognitive Processes of Change by Study Condition and Stage of Change.
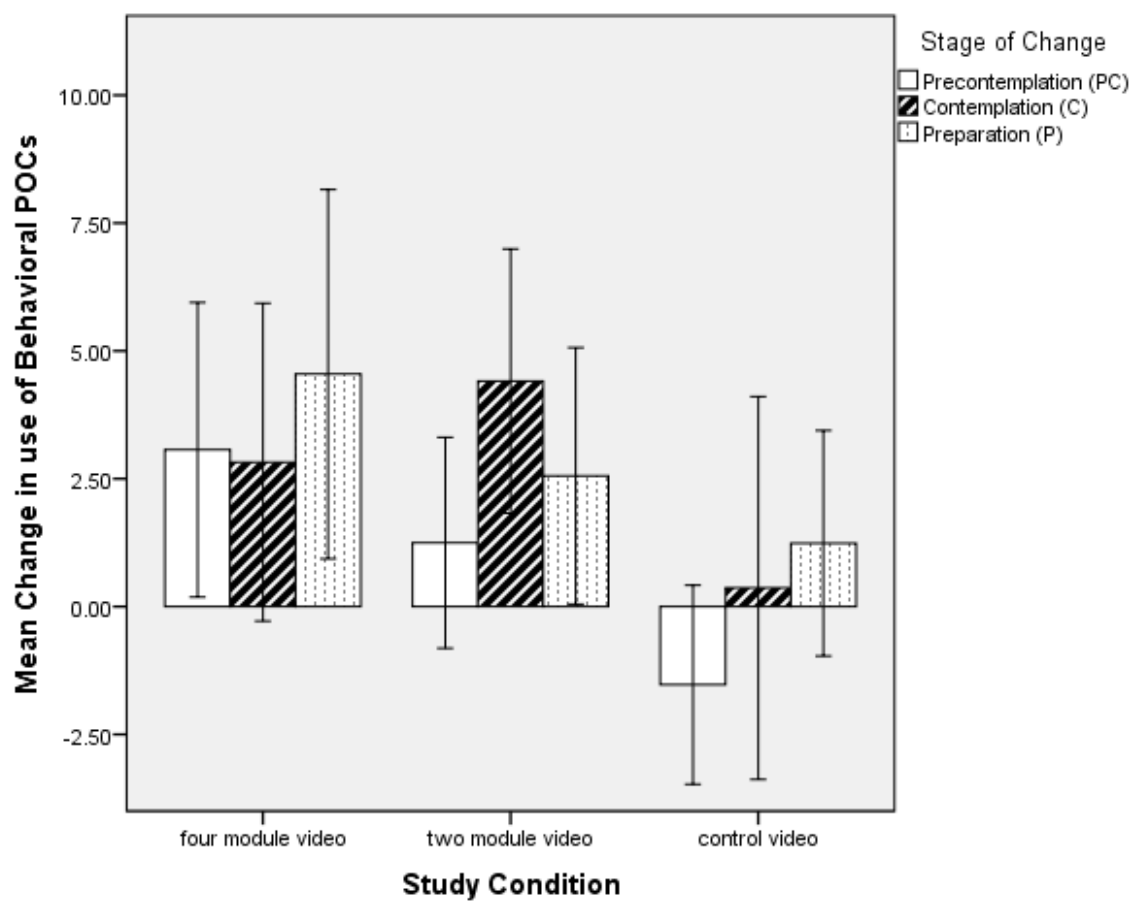
Figure 10. Mean (±95% CI error bars) for Change in use of the Behavioral Processes of Change by Study Condition and Stage of Change.

Supplemental Correlational Analyses Stratified by Stage of Change

Correlational analyses of dependent measures at baseline are provided in Table 8. Additional correlations of the dependent measures stratified by stage of change, as illustrated in Tables 9-11, reveal different correlations for some measures at each stage of change. For example, attitudes about blood donation, donation-related anxiety, and subjective norm were correlated with intention for participants in Contemplation and Preparation, but among participants in Precontemplation intention was correlated with attitude, subjective norm, self-efficacy, and cognitive processes of change. Still, some measures remain correlated regardless of participants' stage of change; anxiety and attitude are significantly correlated among participants in all three stages of change. This information may be useful in understanding characteristics of individuals at each level of readiness to donate blood. It may also be helpful in tailoring stage-matched interventions. For example, one would expect that an intervention focused on increasing Precontemplators' confidence in their ability to donate blood (i.e., self-efficacy) may also affect several other variables, such as blood donation attitudes, donation-related anxiety, focus on the pros and cons of donation, and donation intentions. Interventions utilized in the current study were successful in increasing donation confidence, attitudes about donating, awareness of the pros of blood donation, and decreasing focus on the cons of donation, as well as increasing donation intention. It remains to be seen if future research can replicate and/or improve on these results and if these changes will translate into future donation behavior among study participants.

Table 8

Correlations Between Each Dependent Measure at Baseline

	Attitude	Dec. Balance-Pro	Dec. Balance-Con	Intention	Anxiety	Subjective Norm	POC-Cog	POC-Beh
Self-Efficacy	0.47**	0.31**	-0.29**	0.27**	-0.41**	0.23**	0.28**	0.16**
Attitude	--	0.47**	-0.34**	0.67**	0.46**	0.34**	0.39**	0.11*
Dec. Balance-Pro	0.47**	--	0.04	0.33**	0.24**	0.28**	0.54**	0.29**
Dec. Balance-Con	0.34**	0.04	--	-0.21**	0.42**	0.01	0.06	0.14**
Intention	0.67**	0.33**	-0.21**	--	-0.30**	0.39**	0.38**	0.03
Anxiety	0.46**	-0.24**	0.42**	-0.30**	--	-0.10	-0.10	0.04
Sub. Norm	0.34**	0.28**	0.01	0.39**	-0.10	--	0.40**	0.15**
POC-Cog	0.39**	0.54**	0.06	0.38**	-0.10	0.40**	--	0.52**
POC-Beh	0.11*	0.29**	0.14**	0.03	0.04	0.15**	0.52**	--

* $p < 0.05$, ** $p < 0.01$

Table 9

Correlations Between Each Dependent Measure at Baseline for Participants in Precontemplation

	Attitude	Dec. Balance-Pro	Dec. Balance-Con	Intention	Anxiety	Subjective Norm	POC-Cog	POC-Beh
Self-Efficacy	0.42**	0.20**	-0.23**	0.14*	-0.39**	0.13*	0.22**	0.17*
Attitude	--	0.32**	-0.20**	0.53**	-0.34**	0.28**	0.32**	0.13
Dec. Balance-Pro	0.32**	--	0.21**	0.12	-0.12	0.19**	0.53**	0.30**
Dec. Balance-Con	-0.20**	0.21**	--	0.01	0.39**	0.17**	0.22**	0.16*
Intention	0.53**	0.12	0.01	--	-0.09	0.42**	0.32**	0.05
Anxiety	-0.34**	-0.12	0.39**	-0.09	--	0.06	0.02	0.07
Sub. Norm	0.28**	0.19**	0.17**	0.42**	0.06	--	0.38**	0.18**
POC-Cog	0.32**	0.53**	0.22**	0.32**	0.02	0.38**	--	0.50**
POC-Beh	0.13	0.30**	0.16*	0.05	0.07	0.18**	0.50**	--

* $p < 0.05$, ** $p < 0.01$

Table 10

Correlations Between Each Dependent Measure at Baseline for Participants in Contemplation

	Attitude	Dec. Balance-Pro	Dec. Balance-Con	Intention	Anxiety	Subjective Norm	POC-Cog	POC-Beh
Self-Efficacy	0.31*	0.27*	-0.13	0.19	-0.26	0.29*	0.14	0.06
Attitude	--	0.55**	-0.27*	0.65**	-0.48**	0.18	0.08	0.07
Dec. Balance-Pro	0.55**	--	-0.08	0.37**	-0.26	0.42**	0.34**	0.22
Dec. Balance-Con	-0.27*	-0.08	--	-0.12	0.28*	-0.12	0.19	0.15
Intention	0.65**	0.37**	-0.12	--	-0.33**	0.31*	0.18	-0.01
Anxiety	-0.48**	-0.26	0.28*	-0.33**	--	-0.18	0.19	-0.01
Sub. Norm	0.18	0.42**	-0.12	0.31*	-0.18	--	0.37**	0.05
POC-Cog	0.08	0.34**	0.19	0.18	0.19	0.37**	--	0.59**
POC-Beh	0.07	0.22	0.15	-0.01	-0.01	0.05	0.59**	--

* $p < 0.05$, ** $p < 0.01$

Table 11

Correlations Between Each Dependent Measure at Baseline for Participants in Preparation

	Attitude	Dec. Balance-Pro	Dec. Balance-Con	Intention	Anxiety	Subjective Norm	POC-Cog	POC-Beh
Self-Efficacy	0.18	0.26*	-0.20	-0.05	-0.21	0.26*	0.12	0.17
Attitude	--	0.41**	-0.26*	0.47**	-0.39**	0.34**	0.23*	0.09
Dec. Balance-Pro	0.41**	--	0.10	0.14	-0.21	0.23*	0.41**	0.28*
Dec. Balance-Con	-0.26*	0.10	--	-0.13	0.29*	-0.08	-0.03	0.19
Intention	0.47**	0.14	-0.13	--	-0.23*	0.22*	0.17	-0.02
Anxiety	-0.39**	-0.21	0.29*	-0.23*	--	-0.33**	-0.19	-0.04
Sub. Norm	0.34**	0.23*	-0.08	0.22*	-0.33**	--	0.28*	0.12
POC-Cog	0.23*	0.41**	-0.03	0.17	-0.19	0.28*	--	0.62**
POC-Beh	0.09	0.28*	0.19	-0.02	-0.04	0.12	0.62**	--

* $p < 0.05$, ** $p < 0.01$