<u>Walden University</u>

College of Social and Behavioral Sciences

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Rabecka Martin

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Walden University
2014

Abstract

Effects of Implementation Intention Planning

on Increasing Blood Donation in Adolescent Teens

by

Rabecka A. Martin

MA, University of Pittsburgh, 2007

BS, University of Pittsburgh, 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

Walden University

February 2014

Abstract

The blood banking industry has traditionally relied largely on altruistic donations from adolescent teens in order to supply demand for blood products. The blood supply and demand balance is expected to lead to blood shortages due to an increasing demand and a stagnation of supply. The purpose of this study was to determine if a free-writing exercise, grounded in implementation intention planning (IPT) theory, is an effective activity leading to blood donation, in adolescents with high naturally occurring intentions to donate. A secondary analysis was performed on data collected from a study conducted by a local blood bank, which involved randomizing participating schools into one of two active conditions or a control condition. The dependent variable (DV), blood donation, was measured by a local blood bank by matching pre-drive participant names to schools' blood-drive donation registration. Blood donation history and the IPT conditions (IPT writing exercise or check mark date & time indicator), were the independent variables (IV) for the analysis and, were measured by independent reviewer completion status rating of IPT worksheets. Six schools and 768 individuals participated in the study. The data were analyzed via a chi square analysis that examined 2 of the IVs or control effects on the DV at one time. The free-writing exercise was found to be effective in leading to donation, in participants with moderately high intentions to donate blood and was found to be more effective than the check mark date & time indicator in the same subgrouping. Previous blood donation history was significantly related to future blood donation. This positive effect on blood donation could lead to IPT-focused interventions for blood donation history positive adolescents with moderately high intentions to donate blood, supporting their goal striving toward altruistic behaviors

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UMI Number: 3613463

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Dissertation Publishing

UMI 3613463

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Dedication

I would like to dedicate this dissertation in the name of Brian K Martin, my

faithful and unwavering partner and soul mate. Brian has inspired me and supported me

through all of life's obstacle's including this marathon dissertation project. Without

Brian, I would not be the person I am today nor would I have ever dreamed of attempting

this project. Thank you for seeing me as your equal, challenging me to be better, and for

holding down the family (diapers , dishes, & the whole lot) as I was missing all the years

it has taken to make this life-long dream a reality. This belongs to you as much as it does

to me.

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Chapter 1: Introduction to the Study

The Study Focus

Blood donation in the United States is a business that has survived on the unselfish and altruistic donations of blood from individuals in local communities. Each day in the United States it is estimated that over 41,000 donations are required to meet the demand for blood due to illnesses, elective medical procedures and accidents (ARS, 2014). Blood cannot be generated or manufactured and it is estimated that every two seconds, someone in the United States requires a transfusion of blood or blood products (ARS, 2014). It is estimated that the blood supply and demand balance is likely to lead to blood shortages due to an increasing demand and a stagnation of supply (ARS, 2014) Social and behavioral scientists have studied the challenge of blood donations for decades (Ferguson, France, Abraham, Ditto, & Sheeran, 2007). These efforts have gone a long way toward understanding the differences between donors and nondonors as well as identifying variables that predict who will rate themselves as having high intentions to donate at a future date (Ferguson et al., 2007). Despite their efforts, little advancement has been made in behavioral or psychosocial-based programs that have the potential for increasing donation behavior in any segment of the population, including individuals who rate themselves as having high intentions towards donation (McMahon & Bryne, 2008).

The Department of Health and Human Services (DHHS), the Centers for Disease Control and Prevention (CDC), and the Centers for Medicare and Medicaid Services (CMS) have called for more research in the area of both blood banking basic science as well as behavioral sciences as a means for warding off the impending, potentially life

threatening, intersection of increasing demand and decreasing donations (Sullivan & Wallace, 2005). In the United States, because of increasing restrictions on who is eligible to donate blood, a very small proportion of the general population is actually medically eligible to donate blood (American Red Cross, 2012).

Currently, the percentage of United States citizens who are medically eligible to donate blood hovers around 8%, a large portion of who are high-school age adolescents (Sullivan & Wallace, 2005). In the Pittsburgh region, the area of this study, nearly 30% of all blood units are donated at the annual start-of-school blood drives to the local blood bank, also known as the (ITxM) or Institute for Transfusion Medicine (ITxM, 2012). In addition, throughout the rest of the year, this high school demographic adds an additional 28% of the total units collected via other area drives as well as onsite, blood bank office drop-in donations (ITxM, 2012). Thus, studying what motivates this specific demographic for blood donation at school drives is a critical area of research. The current chapter serves as a brief orientation to the study concept, theory, design and potential impact of the results.

Brief Review of the Literature

In the 3 decades in which social and behavioral scientists have been working on blood donation research, several conceptual models have been used as the lens for understanding the nature of blood donation and those who do and do not choose to give blood (Ferguson et al., 2007). Stage models and altruistic behavioral models have given way to the predominating model for understanding blood donation intentions as seen by its dominance in the literature: the theory of planned behavior (TPB). The TPB has

become the most popular lens through which to study blood donation intentions because of its notable blood donation predictive success, which is estimated to be around 30% (Sheeran, 2002). The theory of planned behavior is a social-cognitive model of behavioral intentions that has been modified to examine attitudes and beliefs towards blood donation (Ajzen, 1991; Giles, 2004). Azjen (1991) stressed the importance of beliefs, attitudes and subjective norms as well as perceived behavioral control when predicting behavior .

In the early 2000's Giles and colleagues made the first attempt to apply the theory of planned behavior towards blood donation in a prospective and quantitative research design that stressed the importance of the self -efficacy component of the TPB in blood donating intentions (Giles, 2004). More contemporary research in this area has focused on the utility of a modified version of the theory of planned behavior in predicting blood donating intentions (Lemmens, 2009). Though the literature applying the TPB in altruistic behaviors, specifically with regards to blood donation is robust, it is lacking in prospective quantitative applications that look at the models' predictive value in actual blood donating behaviors. However, Azjen (1999), in an original work applying the TPB in learning behaviors, found that the TPB had a predictive component in actual learning behaviors.

More recently, however, McMahon and Bryne (2008) applied the theory of implementation intentions planning (IPT) towards blood donation research in arguably the first attempt at a social-cognitive approach to increase blood donation. These researchers cited the strong empirical support for implementations intentions theory in

facilitating goal-directed and goal attainment behavior in other areas of behavioral-based research (i.e., exercise, smoking cessation, learning, and nutrition) as the grounds for the theory's likely success when applied to blood donation research (McMahon & Bryne, 2008).

IPT is a motivational and goal attainment theory developed in the early 1990s by psychologist Peter Gollwitzer (Gollwitzer, 1993). Implementation intention plans have been shown to increase goal attainment through a process of linking situational cues to goal directed behavior (Gollwitzer, 1993). Implementation intention plans are crafted by the individual for the purpose of enhancing the translation of goal intentions, instructions that people give themselves to achieve a desired outcome, into goal attainment behavior in the service of goal striving (Gollwitzer, 1993). Implementation intention plans typically take the form of *if/then* statements that links the critical situational cues to goal attaining behavior (Gollwitzer, 2003; p. 484). An example of this from a student's perspective might be: *If it is the last day of the blood drive and after my lunch period, then, I will walk with Katie to the gymnasium where the blood drive is being held*. Implementation intentions are self- crafted plans that include two critical components: the behavior that will occur in service to the goal and the situational context (details) in which that behavior will occur (Gollwitzer, 2003).

Though the attempt by McMahon and Byrne (2008) to increase blood donation rates via their IPT study condition did not show an effect, these researchers noted that future such studies should be focused on behavioral-based research in an effort to increase blood donation, which is the ultimate desired outcome of blood banking

research. Furthermore, McMahon and Byrne (2008) point out several major limitations

to their study design which likely resulted in the lack of effect of their IPT condition.

Finally, the present research study design and IPT study conditions differ significantly

and uniquely from that of the McMahon and Byrne study, thus allowing this study to fill

a significant gap in the blood banking literature with regard to the effects of IPT

interventions on blood donation rates. The following differences are the most significant

and impactful differences between the current study and the McMahon and Byrne study:

1. The IPT Study conditions (independent variables) in this study differ from

   McMahon and Byrne in that they were constructed to meet the three most

   important conditions of effective implementation intention plans as outlined

   by Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, (2007); they are self-

   crafted, detail oriented and written in the "if/then format. In the McMahon

   and Byrne study, the IPT study condition was a *fill in the blank* for the date

   and time of when blood donation will occur and thus did not meet two of the

   three critical conditions of effective implementation intention plans

   (Gollwitzer et al., 2007). Note that I designed one of the IPT conditions in

   the current study to mimic exactly the McMahon and Byrne study condition as

   a means of comparing its' effect, if any, to the IPT study condition that is self-

   crafted, detailed and in the if/then format.

2. The current study was quantitative, experimental, between subjects, controlled

   study design utilizing an in person questionnaire. I included only participants

   with self-stated, validated, high, naturally- occurring intentions to donate

blood in the IPT conditions (i.e. were asked to create an implementation intentions plan for blood donation). The McMahon and Byrne study design was a cross-sectional, descriptive, follow-up study design utilizing both a mailed and in person questionnaire. The IPT condition in this study was included or administered in every other mailer (McMahon & Byrne, 2008). As the study was descriptive in nature, there was no control condition. Note that no prequalification of naturally occurring intentions was required for IPT condition assignment. Therefore, some participants in the McMahon & Byrne study with low or no naturally occurring conditions were asked to complete the IPT condition for blood donation regardless of their lack of naturally occurring desire to donate blood (see McMahon & Byrne, 2008).

The power analysis of the McMahon and Byrne study was performed based upon the more robust and well understood TPB, study question and hypothesis. McMahon and Byrne (2008) stated, in the discussion section of their publication, that the resulting sample size for the IPT portion of the study turned out to be inadequate to produce enough implementation intention plan data points to perform a statistical analysis. In fact, only two participants who completed the IPT condition actually returned the blood donation questionnaire indicating that they had presented themselves for blood donation (McMahon & Byrne, 2008). In the current study, I performed a power and sample size analysis based upon the estimated effect size of implementation intention plans in the literature and has generated more than sufficient sample size to perform a statistical

analysis of the IPT effect calculated as a factor of the IPT based research questions and hypothesis (2X2 Chi Square).

McMahon and Byrne (2008) were accurate in their theoretical basis and rational for the application of the IPT to blood donation, but their study design, IPT condition design and participant turnout did not allow for an effect (if present) to be detected. The current study was unique in that I had designed it specifically to detect an IPT effect in the selected, highly motivated population with the power of a controlled experimental design. See Table 1 for a more complete description of the differences between this study and the McMahon and Byrne 2008 study.

Table 3

Differences between McMahon and Byrne (2008) and the Current Study

	McMahon & Byrne	Current Study
Population	College students & Faculty	High school Students age 16-18
Sample size	172 based upon TPB hypothesis sample size analysis	500 based upon IPT hypothesis sample size analysis
Sampling method	Convenience	Convenience / random assignment
IPT condition	Fill in the blank with a chosen date (out of three provided) and time	Self-crafted, detailed & if/then format
IPT condition validity	No review of IPT condition worksheets	Triple review for accurate completion
Design	Cross-sectional, descriptive, follow-up utilizing mail & in person questionnaire and IPT condition included in "every other mailer." No control condition (no pre-qualification of naturally occurring intentions for IPT condition assignment)	Quantitative, experimental, between subjects, controlled design utilizing in person questionnaire. Only participants with validated high naturally occurring intentions included in IPT conditions
Theoretical basis	Both IPT and TPB	IPT only
Dependent variable measure	Questionnaire asking about attendance at the mobile clinic	Actual clinic attendance recorded by mobile clinic
Data analysis performed / planned	No statistical analysis was performed due to inadequate amount of data returned for this variable	2 X 3 Chi square analysis to examine a main effect of independent variables on blood donation or an interaction effect between IV's
Conclusion	No effect of IPT condition on blood donation rate	TBD

Social science experts in the field of blood banking literature have called for more implementation intentions planning-based behavioral research (Ferguson, France, Abraham, Ditto, & Sheeran, 2007). Thus the rationale and conceptual framework of the proposed study and analysis are fully supported by the implementation-planning literature. Additionally, social scientist experts in the blood banking research community have specifically called for this type of experimental study and design via key publications and peer reviewed literature. Finally, the current study was guided, in part, in design via one study attempt at applying an implementation intentions-like based condition toward blood donation (Ferguson et al., 2007; Gollwitzer, 1999; McMahon and Byrne, 2008).

Research Questions and Hypotheses

RQ1: Can an evidence-based free writing implementation intention planning condition be an effective self-regulatory activity leading to goal attainment, i.e., blood donation?

H_a1: The participants at schools in the study condition which completed the IPT worksheet (Condition A – IPT self-crafted statement) will have a significantly higher rate of blood donation attempts at the follow-up clinic day than those participants at schools in the study condition which had the same level of self-reported baseline intentions but do not complete IPT worksheet (Condition C – Control condition).

$H_0 1$: The participants at schools in the study condition which completed the IPT worksheet (Condition A – IPT self-crafted statement) will have the same rate of blood donation attempts at the follow-up clinic day as those participants at schools in the study

condition who had the same level of self-reported baseline intentions but do not complete IPT worksheet (Condition C – Control condition).

RQ2: Can an evidence-based free writing, detailed and "if/then" formatted implementation intention planning condition be a more effective self-regulatory activity leading to goal attainment, i.e., blood donation than a check mark date and time indicator?

H_a2: The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have a significantly higher rate of blood donation attempts at the follow-up clinic day than those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

H_02: The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have the same rate of blood donation attempts at the follow-up clinic day as those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

RQ3: Does positive or negative previous blood donation history status of the study participants have an effect on blood donation?

H_a3: Participants with a positive previous blood donation status will have significantly higher rates of blood donation than participants with a negative previous blood donation status.

H$_0$3: Participants with a positive previous blood donation status will have the same rate of blood donation as participants with a negative previous blood donation status.

Problem Statement

In the last 2 decades, the AABB has reported a narrowing trend in the blood unit supply and demand margin (Sullivan & Wallace, 2005). Though the number of altruistic blood donation units collected per year has been slightly increasing since an all-time low in 1997, the growth in blood use has been faster than the growth in donations (Sullivan & Wallace, 2005). Periodically, the Assistant Secretary for Health along with the Department of Health and Human Services (DHHS) operating divisions (Centers for Disease Control and Prevention [CDC], Centers for Medicare and Medicaid Services [CMS], Food and Drug Administration [FDA]) conduct a contracted survey and report of national blood collection and use data and trends (NBCUS, 2009). The last such survey and report, performed in 2009, stated that over 44,000 units of blood were used on a daily basis in the United States, mostly for the purpose of elective and emergent surgical procedures (NBCUS, 2009). The report also noted that the vast majority of the blood supply generated to meet that daily demand in the United States was secured through altruistic blood donation (NBCUS, 2009). Though the NBCUS report noted a current surplus in blood supplies, it warned of likely robust and imminent increases in demand in the near future as well as stagnant trends in altruistic donation (NBCUS, 2009).

The sharp and impending forecasted increase in the need for blood units in the United States is expected to occur as a function of the explosion in growth of the elderly

population as a result of the baby boomer generation entering the 70+ age range and the vast increases in medical technology that have made more complicated and extensive types of surgeries for the general population, which includes the elderly, more possible and available (Sullivan & Wallace, 2005). These advances in medical and surgical technology have the far reaching ability to increase both the quality of life and life expectancy of our citizens, yet not without the cost of drastic increases in the need for blood as well as health care dollars (NBCUS, 2009).

In order to bolster the future blood supply to meet the forecasted demand, it is imperative that blood banking professionals not only understand what motivates individuals to intend to donate blood but also what factors are at play during goal striving toward this end behavior (i.e., goal thwarting or derailment factors, decay of natural intentions, logistical and time related factors, etc.) so that appropriate blood drive campaigns and programs can be developed to support altruistic blood donation-related behaviors.

Social science experts in the field of blood banking have called for more implementation intentions planning-based behavioral research as a way of supporting the future demands (Ferguson et al., 2007). Besides McMahon and Byrne's 2008 attempt to support blood donation intentions using an IPT based approach, no other behavioral psychology research exists that proposes a behavioral-based research design that could potentially impact the problem (McMahon & Byrne, 2008). In light of the unique differences between this proposal and the McMahon and Byrne (2008) study, the current

research proposal fills a significant gap in the literature that may help to support future blood supply demands.

Nature of the Study

This research project was a secondary analysis of data collected from a quantitative, prospective, experimental research where I employed an implementation-intentions planning questionnaire and study condition intended to manipulate participant intention planning, which was significantly and uniquely modified from McMahon and Bryne (2008) and as suggested by Ferguson et al. (2007). The study additionally involved a Likert-type self-report intentions-to-donate scale that was used to obtain participants' naturally occurring levels of baseline motivation to donate blood. I used this information to assign threshold levels that identified individuals who would receive study conditions (those who had naturally occurring high motivations to donate blood) and those who would not participate further in the study protocol (i.e., those showing little to no naturally occurring motivation to donate blood).

Participants' schools underwent random assignment to either one of two active conditions or to a control condition. The dependent variable, blood donation or blood donation attempt (offering oneself for donation but being turned away for medical ineligibility was considered positive for blood donation for the purposes of this study), was collected by blood drive professionals on the day of school blood drives and was matched to participant predrive study questionnaires via participant name. The prospective, quantitative, randomized, experimental design was chosen for reasons of strengthening the internal validity of the study and the participant population was chosen

for future generalizability to the population of interest to the blood bank (external
validity).

Purpose of the Study

The main purpose of this analysis was to understand how the ITxM study
implementation-intentions planning condition, designed based on extensive
implementation intentions planning literature, and affected the blood donating behavior
of study participants who indicated high naturally occurring intentions to donate blood. I
designed this study in cooperation with the ITxM blood bank as an independent research
consultant, with the aspiration that IPT-based independent variables may be used in the
future to increase the blood donation units collected during the annual high school blood
drives in the Pittsburgh region and potentially across the country.

Conceptual Framework

The approach taken by ITxM was to design a research condition to facilitate
blood donation based on an implementation intentions planning conceptual framework.
In this section, I outline and support this framework with the literature. I also further
review this in Chapter 2 of this document (Chatzisarantis, Hagger, & Wang, 2010;
Hagger & Chatzisarantis, 2009; Schweiger Gallo & Gollwitzer, 2007).

Implementation intentions planning theory is a self-regulatory planning theory
that supports individual goal attainment through the development of situational plans that
lead to goal directed behavior (Gollwitzer, 2003). IPT theory has been said to make goal
directed behavior appear automated in response to the situational cue over time (see

Gollwitizer, 2003). IPT plans normally take the form of *if/then* statements that link the desired, goal directed behavior with the self- chosen situational cue (Gollwitzer, 2003).

The mental link between the behavior and the situational context allows for a psychological process that leads to an atomization of the behavior in response to the selected situational cue; the selected response behavior is characterized by immediacy, efficiency, and redundancy (Bargh, 1994; Gollwitzer, 2003; Orbell & Sheeran, 2000; Sheeran, Webb, & Gollwitzer, 2005). Additionally, it has been shown that the process of mentally linking a situational cue with a specific behavior heightens the specified cue accessibility in the individual (Gollwitzer, 2003). The heightened accessibility of the situational cue has been shown across many types of situational cues and responses (Aarts, Dijksterhuis, & Midden, 1999; Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2007).

For this study, I chose this conceptual framework because of its effective behavior-facilitating power seen in many areas of behavior research, from smoking cessation to learning behavior (Chatzisarantis et al., 2010). Additionally, the effect size of IPT on behavior has been reported via one large meta-analysis as being medium to large (Gollwitzer & Sheeran, 2006, p. 8). Finally, this conceptual framework has already been applied, though in a very different and descriptive study design, to examine the behavior in question by other researchers who cited the efficacy of this conceptual theory in other areas of behavioral research (Brickell, Chatzisarantis, & Pretty, 2006; McMahon & Bryne, 2008). In summary, this conceptual framework has been applied to examine a

wide range of behaviors, with diverse participating populations including the behavior

and population of interest here.

Operational Definitions of Terms

*Blood donation***:** Blood donation is operationally defined as participants who offer

themselves to blood banking officials for donation on the day of the blood drive (i.e.,

attendance at blood donation mobile clinic). These participants were counted as

"positive" or "donated" toward the dependent variable "blood donation." Individual who

offered their donation but were denied the opportunity by blood banking employees after

prescreening because of medical status were included in or counted as "donated/ denied"

for the study data analysis.

Implementation intention planning theory: Implementation Intention Planning

Theory (IPT) is a motivational and goal attainment theory developed and introduced by

Gollwitzer (1993). *Implementation intention plans* are plans that link situational cues

with goal-directed behaviors that support advancement towards goal attainment

(Gollwitzer, 1993). Implementation intention plans are best when personally crafted by

the individual as a set of instructions that allow for likely situational cues to automatically

link probable behaviors in service of the goal (Gollwitzer, 1993). Implementation

intention plans typically take the form of an "if/then" statement (Gollwitzer, 2003; p.

484). An example of this from a student's perspective might be: "If it is Monday and the

lunch dismissal bell rings, then I will stop at Jim's science class to pick him up and we

will go together to the blood drive location in the gymnasium together." Implementation

intention statements include two critical components: the behavior that will occur in

service to the goal and the situational context (details) in which that behavior will occur (Gollwitzer, 2003).

Implementation intentions plans (IPT): Two unique IPT construct plans were used as separate condition of the independent variable. These work sheets (see Appendix A-B) instructed participants to construct either a free writing implementation intention plan surrounding the failure to start critical derailment factor for blood donation or instructed participants to check mark a date and time from choices given when they would be most likely to donate blood.

Self-Regulation: Self-regulation is defined as the personal type of social cognitive, self -regulation as has been adequately described by Alfred Bandura in his "social cognitive theory of self-regulation" (Bandura, 1991). Bandura (1991) describes that human behavior is primarily motivated and regulated through an ongoing self-regulatory process that involves monitoring one's own behavior, its' precursors and the effects of said behavior. All goal direct behaviors are a result of this ongoing process that continually operates as long as the goal maintains importance to the indivdual (Bandura, 1991).

Goal Attainment: Goal attainment is defined as offering one's self for blood donation at the school mobile blood drive unit during one of the pre-defined days of the annual school blood drive. Offering one for blood donation outside of the school blood drive location, for example at a local blood bank location, was not considered as goal attainment for the purposes of this study. Note that goal attainment only occurs with the elicitation of goal directed behavior.

Goal directed behavior (goal striving): Goal attainment makes necessary a series of goal directed behaviors in the service of that goal. Goal directed behaviors are any behavior that brings an individual closer to his/her goal; in the case of this study, blood donation. For goal directed behaviors to be successful they must be initiated, and they must be sustained until the goal is reached (goal striving) (Golwitzer, 2007). Additionally, goal directed behaviors can be "derailed" in the course of striving by a multitude of factors working against the goal motivational forces (Golwitzer, 2007).

Theory of planned behavior (TPB): The theory of planned behavior is a social-cognitive model of behavioral intentions, originally designed to look at learning behaviors, that has been modified to examine attitudes, and beliefs towards blood donation (Ajzen, 1991; Giles, 2004). Azjen's theory stresses the importance of beliefs, attitudes, subjective norms as well as perceived behavioral control when predicting behavior (Azjen, 1991). Giles and colleagues (2004) made the first attempt to apply the theory of planned behavior towards blood donation in a prospective and quantitative research design that stressed the importance of the self- efficacy component of the TPB towards blood donating intentions.

Secondary data analysis: A secondary data analysis is the use of data generated by someone or some organization other than the author (Creswell, 2008). This study includes a secondary analysis of data generated by the ITxM (The Institute of Transfusion Medicine) and Central Blood Bank of Pittsburgh, PA.

Altruism (altruistic blood donation): Altruism is the practice of concern for the welfare of other individuals without regard for one's own welfare in the situation (Batson

et al., 2011). Altruism or altruistic acts need to be distinguished from those that are born out of a sense of "loyalty" or "duty" (Batson et al., 2011). The current study used the following behavioral- based definition of altruistic blood donation: *Altruistic blood donation* is donation that is seen as a selfless act or gift, as the individual donors have nothing personally to gain from their donation outside of potentially positive emotional experiences likely to occur due to the act of giving (Ferrar & Leippe, 1992; Sullivan & Wallace, 2005). Altruistic blood donation differs significantly from the other main types of blood donation, specifically, patient-specific replenishment donation, which is a donation for a specific individual; autologous donation, which is a procedure in which blood units are donated by an individual for the purpose of using those exact units in the future during a planned surgery; and paid donation (Ferguson et al., 2007). These types of donations are seen as "reward based" donation, as they are motivated by tangible rewards to the donors (Sullivan & Wallace, 2005, p. 15).

Assumptions and Limitations

There were several assumptions inherent in the ITxM blood bank study design. One assumption was that the participating schools, those who agreed to participate in the study, were not significantly different in their student body characteristics. An additional assumption that I made about the participating schools was that the material and or emotional incentives to donate offered via school practices are not significantly different between control and active study condition school groups. For example, some schools have historically offered free deserts at lunch to those who donate or small trinkets of appreciation (i.e. pins, hats, school pride stickers etc.). In addition, being known as a

donor in some schools may prompt more verbal positive / emotional rewards from teachers, coaches' and staff than in other schools with less awareness and team spirit surrounding the annual blood bank program.

With regard to the baseline measure of naturally occurring intentions, the assumptions of the researchers regarding the ITxM blood bank study were that participation in the study and or presence of blood bank staff would not significantly and artificially/transiently inflate participant natural intentions ratings nor would the time gap between baseline intentions measurement and first opportunity to donate undergo a significant, natural level of decay. Additionally, the ITxM researchers assumed that the single donation intentions Likert-type survey item accurately captured true baseline intention levels.

The ITxM study was also limited by its focus on a narrow segment of the population, high school juniors and seniors, and thus may not be applicable to the population at large. Additionally, the study population was selected by the ITxM researchers from one region of the United States and thus may not apply to other areas of the United States and or globally.

Finally, the ITxM study was designed by the ITxM researchers and me to focus on actual blood donation at the schools' mobile blood drive, which represented a limited opportunity to give blood. This dependent variable was chosen by the ITxM researchers and me as it naturally flows from the research problem (i.e., it is the behavioral based dependent variable that can affect a positive impact toward the stated research problem). It is important to note that some individuals may have chosen to give blood on their own,

outside of the context of the mobile blood drive related to their school. Therefore, a potential limitation of the study scope was that I could only measure blood donation for a specific snapshot in time and at a specific location. Thus, participants may have offered themselves for donation outside of the study's ability to capture those behaviors.

Another limitation of the study for analysis was that the participants' naturally occurring intentions for donation were taken at only one point in time and eligibility to move forward in the study was determined at that point alone via blood bank professionals. This represented a single snapshot of a person's strength of intentions that would occur, via protocol design, one to two weeks prior to his or her first opportunity to act on stated intentions. Research on intentions for behavior, in general, suggests that intention levels tend to naturally vary over time (Gallo & Gollwitzer, 2007). Thus, a weakness of the ITxM blood bank study protocol design would be that the natural variations that affect intentions over time, and may ultimately affect the dependent variable, would not be captured. Though this would be considered a true limitation of the study, it should additionally be noted that research in the area of intentions has also shown that variation levels amongst those reporting higher levels of intentions tend to be lower than those initially self-reporting lower naturally occurring intention levels (Gallo & Gollwitzer, 2007).

An additional limitation is that the study conditions that I designed were based on the most commonly cited area of derailment in goal striving for blood donation: failure to start (Ferguson et al., 2007). However, it is likely that study participants were influenced by many other derailment factors such as peer influence, poor time management, or fear

(Ferguson et al., 2007). Thus, the assumption that I made was that the study conditions were applicable to all potential cognitive-emotional processes affecting participant derailment in all study participants. It is much more likely that multiple and highly complicated sociocognitive, and individually unique processes were at play in each individual that varied over time (Ferguson et al., 2007). The oversimplification and universal application of social cognitive derailment processes may be an inherent weakness of this study design.

Finally, the results of the ITxM blood bank study were applicably bound by the study population being a homogenous group whose attitudes and characteristics were likely dissimilar to that of the general population. Though this group of generally healthy individuals was a target population for blood banking officials, the results may not be applicable to the population at large and study results may not be generalizable for the entire population.

Significance of Study

Ferguson et al. (2007) specifically called for the development of implementation intention-based study conditions focused on the failure to start specific critical derailment factor. Since then a single, descriptive based study that did not produce enough data to analyze an effect of the IPT based condition was made by McMahon and Byrne, to apply implementation intentions planning to facilitate blood donation. The majority of the socio-cognitive blood banking literature involves studies designed to examine the predictive ability of modified versions of the TPB on blood donation intention (Ferguson et al., 2007). Though this theory has been credited for its predictive ability in blood

donation intentions, the very few studies that have examined the theory's predictive ability in blood donation "behavior" have shown only a very modest effect (Sheeran, 2002). Therefore, studies designed to focus on blood donation behavior are needed, specifically with regard to those that apply implementation intention conditions designed to increase blood donation (Ferguson et al., 2007). The ITxM blood bank study and subsequent data analysis were designed by the ITxM researchers and me specifically to fill this gap in the literature, as an implementation intentions based independent variable with a single dependent variable (blood donation behavior) is proposed. This information could be used to significantly bolster the US blood supply in a time of increasing need, thus brining significant health benefits to many.

Professional Significance and Application

Through the current research, I will fill a significant and obvious gap in the psychosocial and behavioral-based literature in blood banking. The findings of this study could potentially inform blood banking professionals as to more effective blood banking campaigns and program tools directed at adolescent teens. Additionally, the study results may be more generally used to better understand how implementation intentions planning might be applied to increase goal-directed behavior in other areas of behavioral-based research outside of blood banking. Potentially, researchers who are interested in other areas of altruistic acts may use this study's findings to inform research studies designed for their specific altruistic behaviors of interest.

Positive Social Change Implications

The positive social change implications of this study are multifactorial in that the information gained through this study may lead to a bolstered knowledge base of how to move individuals from intentions to actions in the most general sense. This information can be powerful for designing effective behavioral programs across a myriad of desired health, altruistic, and learning-related behaviors. The potential for positive impact to society may be more far reaching than the obvious benefit of the study informing blood banking professionals on how to design effective blood drive campaigns and program tools. In a society of complacency where many barriers exist to thwart positive intentions (time, money, support), empowering individuals with the knowledge to support behavioral goals may result in positive social change. In addition, the knowledge gained from this study can be used to bolster U.S. blood supplies, in a time of increasing demand, thus resulting in the potential to save the lives of or increase the health of many in our society.

In summary, the current study analysis of the blood bank's data examining the effects of an IPT free writing activity on blood donation in high school juniors and seniors stems from a social problem of critical significance. Through this study, I will fill a significant gap in the blood banking literature, a gap that blood banking professionals themselves have called attention to, and result in both positive social change and advancement of the profession of social psychology. In Chapter 2, I further examine both the methodological and theoretical literature supporting the proposed study concept and design. Furthermore, the study research question and hypotheses will be defined and a

literature based description of each variable will be provided. Chapter 3 will discuss the design of the study analysis while chapter 4 will review the results of the study. Finally, in Chapter 5 I will provide a discussion of the results and point out future directions for research and point out the social impact of this study.

Chapter 2: Literature Review

The margin between blood units transfused and blood units used in the United States has been narrowing, primarily due to a large and increasing blood demand (Sullivan & Wallace, 2005). Altruistic blood donation is by far the most common type of donation, accounting for up to 91% of all units donated on an annual basis in the United States (Sullivan & Wallace, 2005). It is important to note that altruistic blood donation differs significantly from the other main types of blood donation, specifically, patient-specific replenishment donation, which is a donation for a specific individual; autologous donation, which is a procedure in which blood units are donated by an individual for the purpose of using those exact units in the future during a planned surgery; and paid donation (Ferguson et al., 2007). These types of donations are seen as *reward based* donation, as they are motivated by tangible rewards to the donors (Sullivan & Wallace, 2005, p. 15). *Altruistic donation* is donation that is seen as a selfless act or gift, as the individual donors have nothing personally to gain from their donation outside of potentially positive emotional experiences likely to occur due to the act of giving (Ferrar & Leippe, 1992; Sullivan & Wallace, 2005).

The narrowing in supply and demand margins of blood units combined with the projected steep increase in blood demand that is forecasted by the Department of Health and Human Services (DHHS) operating divisions: Centers for Disease Control and Prevention (CDC), Centers for Medicare and Medicaid Services (CMS), Food and Drug Administration (FDA), and the National Institutes of Health (NIH) point to a likely shortage that could affect the ability to perform life-changing elective surgeries that

improve the quality of life and life expectancy of many U.S. citizens (Sullivan & Wallace, 2005).

Understanding antecedent attitudes and controlling factors of blood donation is only one part of the puzzle that allows blood banking professionals to plan and implement appropriate and effective advertising campaigns and blood donation programs to assist in meeting the projected blood demands. Additionally it is imperative to understand goal-striving behavior, the gap between goal intentions and goal attainment (Gollwitzer, 1990). In fact, recent literature suggested that studies where researchers have estimated the percentage variance in behavior explained by intentions alone is estimated only 28% (Sheeran, 2002). Thus, in order to design and implement effective blood banking advertising campaigns and programs, one must first examine the cognitive self-regulatory components of goal striving that can successfully translate goal intentions into goal-attainment behaviors.

The ITxM study researchers and I examined the effects of an implementation intention planning (IPT)-based manipulation / condition on blood donation behavior at an on-campus blood drive among high school juniors and seniors who had indicated moderate-to-high levels of naturally occurring intentions to donate blood. The goal that I had in writing this chapter was to further examine both the methodological and theoretical literature supporting the ITxM study concept and design as well as the secondary data analysis. Additionally, I will define the ITxM study research question and hypotheses and a literature based description of each variable.

Relevant Literature Comparing and Contrasting Different Points of View

I performed the literature review for this research via a search of the Medline, PubMed, Health and Medical complete, PsycInfo, Psyc Articles databases as well as the multidisciplinary databases Academic search premier and Expanded Academic ASAP. The main search words that I used to generate results included*: social cognitive theory, motivation theory, prototyping/willingness model; theory of planned behavior, implementation planning theory, blood donation, altruistic behavior, goal striving,* and *goal attainment*. The results generated over 250 relevant articles which I reviewed with a total of 45 annotated and included in the following review.

Review of the Blood Bank Literature

Social, behavioral, and cognitive sciences have contributed to the understanding of blood donation recruitment for nearly three decades (Ferguson et al., 2007). The social science research approach has been to concentrate on theoretical models that attempt to predict donor intentions (Ferguson et al., 2007). Those theoretical models have included stage models and models of altruistic motivation, as well as the prevailing model of the Theory of Planned Behavior (TPB). Multiple researchers have conducted surveys where they have supported the idea that blood donors are motivated by altruistic motives (Glynn, Klienma, & Schreiber, 2002; Trimmel, Lattacher, & Janda, 2005). Additionally, several researchers who used prospective study designs have looked at blood donation messages targeted at altruism and altruistic motivations to facilitate blood donations in specified populations (Paulhus, Shaffer, & Downing, 1977; Ferrar & Leippe, 1992; Reich et al., 2006). Though these researchers showed that individuals who were

exposed to prosocial or altruistic messages were more likely to intend to donate blood, these studies have been criticized for mistaking altruism for what would be better described as *social duty* in their experimental messages (Ferguson et al., 2007, p. 2002). Furthermore, subsequent research using the TPB has included the idea of social duty or moral norms and has found the concept of moral norms to be highly predictive of blood donation intentions but not necessarily blood donation (Lemmens et al., 2005; Giles & Cairns, 1995).

While researchers of stage models have helped to identify differences among cognitive and behavioral processes between donors and nondonors in service of issues related to donor retention, no behavioral programs based on this work have been developed or tested (Piliavin & Callero, 1991; Ferguson & Bibby, 2002; Prochaska, DiClemente& Norcross, 1992). To their credit, researchers who work in the area of stage models of motivation to donate blood has contributed to the understanding of the donor pool as a non-homogenous entity in regard to cognitive processes (Ferguson et al., 2007). However, this work has largely fallen out of favor in part due to the emergence of other the boretical models with more accurate predictive abilities, and thus more robust potential for the development of behavioral conditions, such as the TPB (Ferguson et al., 2007).

Review of Blood Bank Literature using TPB

Because of its blood donation intention predictive success, the TPB, as originated by Icek Azjen in the early 1990's, and modified versions of said theory have dominated the blood banking literature for the past decade (Azjen,, 1991; McMahon & Bryne,

2008). Though researchers in the area of other complicated health-related behaviors such as exercise, addiction cessation, smoking cessation, and health/diet management estimated the predictive success of the TPB at around 20-30%, the success of this theory in predicting blood donation intentions has been considerably better. This is likely due to the fact that the TPB has been applied to behavioral intentions of blood donation, as opposed to the actual behavior (Ferguson et al., 2007). In 1995, Giles, McClenahan, Cairns, and Mallet made one of the first attempts to apply Ajzen's TPB to blood donation intentions (Giles et al., 2004). In this pivotal study, Giles et al. (1995) concluded that the basic construct variables of the TPB, including potential donor attitudes, subjective norms, and perceived behavior control, were responsible for 61% of the variance in potential donor intentions to donate blood with perceived behavioral control (Giles & Cairns, 1995). Building on this success, and taking a cue from Ajzen that the basic construct could be modified by adding additional variables in order to increase the predictive value of the tool, Armitage and Conner (2001) increased the blood donation intention predictive value to 70 % of the variance by adding in moral norms and self-identity to the model.

Finally, a more recent iteration of the TPB has been added and researchers have added and focused on the concept of self-efficacy has tipped the predictive value of the model to 73% of blood donation intentions being accounted for by model constructs (Giles et al., 2004). Though highly successful in the prediction of intentions, critics of the TPB's utility cite the fact that little research has been conducted on the model's ability to predict actual blood donation behavior (Ferguson et al., 2007). While Giles and

Carins (1995) supported the model's predictability of actual behavior, citing the TPB accounting for 56% of the variance in blood donation, little follow-up has been performed in service of the validation of this phenomenon (Ferguson, 1996; McMahon & Bryne, 2008).

Review of the Blood Bank Literature using IPT

In dealing with the challenges of lack of behavior-focused research and that the TPB has not led to behavioral-based programs, McMahon and Bryne (2008), citing evidence from a myriad of health behavior research studies that successfully partnered the TPB with implementation planning theory IPT, made an attempt to bridge the intention behavior gap in their study combining TPB and IPT with a goal of predicting and improving attendance at a local mobile blood donation clinic. Using a cross-sectional, follow-up survey design targeting local university students in Ireland, McMahon and Byrne (2008) found that their modified TPB questionnaire, which included anticipated regret and self-identity, accounted for 51% of the variance in intentions for future donations. Of the 600 potential participants, half of whom were, on an every other in the queue random basis, invited to create implementation intention plans, 172 were included in the final analysis. The authors reported no difference in donations between those who created implementation plans and those who did not create one.

McMahon and Byrne (2008) drew out several limitations in the implementation portion of this study. First was the fact that of the 172 participants, only 3 showed up to the mobile blood unit with intentions to donate. Thus, the sample size was too small to

allow for any effect of the IPT condition to be detected via statistical analysis. Additionally, a formidable limitation not noted by the authors of this study was the design of the IPT planning condition itself, which appears from the methods section to have been a simple check mark the "date and time of your planned donation" based on provided clinic hours (McMahon & Byrne, 2008, p. 329). Furthermore, the IPT condition in this study was assigned via an "every other mailer" approach, where the IPT questionnaire was included with every other questionnaire that was mailed out to perspective participants (McMahon and Byrne, 2008). In this approach, the authors did not allow for the important consideration of the participants' level of naturally occurring intentions to donate blood (Golwitzer, 2007). Thus, some participants with little to no naturally occurring level of intentions to donate blood were asked to complete an intentions plan for blood donation and were included in the data analysis. This fact may have also interfered with the researchers' attempts at realizing an effect of their IPT manipulation.

Despite the limitations and outcome of McMahon and Byrne's (2008) attempt to increase blood donation behavior via implementation intention planning, the study remains a pivotal piece of the blood banking literature as it represents a change in direction, one which has been called for by several premier blood banking social scientists for years, toward a focus on social science research designs that promote actual donor participation and retention (Ferguson et al., 2007; Lemmens et al., 2005). Furthermore, the consistent success of implementation intention planning in the promotion and maintenance of other complicated health-related behaviors supports the

use of behavioral techniques built on this theory in particular (Ferguson et al., 2007; McMahon & Byrne, 2008). Finally, Gollwitzer, the father of implementation intentions, has contended that specifically self-reported goal intentions that are supported by appropriately created implementation intention plans are more likely to be enacted, especially in the case of postponed intentions, as is the case in most blood donation studies where the TPB and intentions are surveyed weeks prior to the arrival of a mobile blood unit where the opportunity for the behavior becomes available (Ferguson et al., 2007; Gollwitzer, 1993; Orbell, Hodgkins, & Sheeran, 1997)

Review of Implementation Intentions Planning Theory

Implementation intentions are if-then plans that link situational cues or good opportunities to act with responses that are in service of attaining goals or desired outcomes Implementation intentions are formed for the purpose of *goal striving* or the translation of goal intentions into goal directed action or behaviors (Gollwitzer, 1993). Gollwitzer (1993) postulated that forming if-then plans enabled people to deal effectively with self-regulatory problems (i.e. failure to start, fear or logistical challenges to goal attainment; that might otherwise undermine goal striving). Experimental evidence indicates that if-then plan formation promotes effective management of various problems in goal striving and increases rates of goal attainment in many different areas of behavioral research when they are in the form of self- crafted statements that include two critical components: the behavior that will occur in service to the goal and the situational context (details) in which that behavior will occur (Gollwitzer, 2003).

The mental link between the behavior and the situational context allows for a psychological process that leads to an atomization of the behavior in response to the selected situational cue; the selected response behavior is characterized by immediacy, efficiency, and redundancy (Bargh, 1994; Gollwitzer, 2003; Orbell & Sheeran, 2000; Sheeran, Webb, & Gollwitzer, 2005). Additionally, it has been shown by many researchers that the process of mentally linking a situational cue with a specific behavior heightens the specified cue accessibility in the individual (Gollwitzer, 2003). The heightened accessibility of the situational cue has been shown across many types of situational cues and responses (Aarts, Dijksterhuis, & Midden, 1999; Parks-Stamm, Gollwitzer, & Oettingen, 2007; Webb & Sheeran, 2007).

Gollwitzer (2003) noted several points at which even strong intentions to act can be thwarted. For example, Sheeran, Aubrey, and Kellett (2007) found that even though study participants had strong intentions to attend an initial psychotherapy session, "fear of negative effect," in this case fear of embarrassment and shame, was a key factor that negatively affected actual attendance (p. 26). Derailment variables that have been identified as specifically important to blood donation include: "failure to get started" (overcoming reluctance) and "expectations of a negative effect," likely due to a fear of the blood donation process (Gollwitzer, 2003, p. 26; Ferguson et al., 2007, p. 2003). Studies looking at these two specific areas of goal attainment derailment have supported the hypothesis that implementation intentions can be effective strategies to mitigate their negative impact on goal attainment (Gollwitzer, 2003). For example, Gollwitzer and Sheeran (2006) found that implementation intention planning had a medium to large

effect (Cohen's *d* = .61) on the failure to get started issues related to goal attainment. Additionally, Sheeran et al. (2007) found that implementation intention planning was an effective strategy for mitigating initial reluctance leading to failure to get started in men who had high intentions to perform testicular self-exams.

Finally, a recent meta-analysis of 94 studies in which the researchers were looking at the effects of implementation intentions planning across many types of behaviors and areas of goal domain attainment derailment found the effect of implementation intention planning to be medium to large with a reported Cohen's *d* = .65 (Gollwitzer & Sheeran, 2006). More than ample evidence exists to support the application of implementation intention planning conditions to the specific areas of goal derailment in the blood donation goal attainment process. In fact, Ferguson et al. (2007), specifically called for the development of implementation intention-based research on donor recruitment that focuses specifically on failure to start and expected negative outcomes derailment factors.

Conceptual Framework and Rationale for the Study

The rationale and conceptual framework of the proposed study analysis are fully supported by the implementation planning literature called for by social scientist experts in the blood banking research community and informed via one similar study attempt, McMahon and Byrne, 2008, that attempted to apply an implementation intentions based research condition toward blood donation with null findings (Ferguson et al., 2007; Gollwitzer, 2006; McMahon & Bryne, 2008).

The concept of increased goal directed behavior as a function of implementations intentions planning surrounding said behavior has been seen in the literature for a multitude of behaviors with a medium-to-large effect size (Gollwitzer & Sheeran, 2006). One attempt at applying the IPT concept to blood donation was ill designed and thus failed to show any effect of the IPT condition (McMahon & Byrne, 2008). This study has been designed to apply the behavior-facilitating concept of implementation intentions planning on the problem of blood donation using a strong design and application of the concept.

Literature-Based Description of Research Variables

Independent Variables

Manipulation of intention plans. A review of the literature on implementation intentions planning provided strong evidence and support for several critical elements that appear to be key to forming effective implementation intention plans (Schweiger Gallo & Gollwitzer, 2007). Those critical elements, which were notably absent from the implementation planning design of the McMahon and Byrne (2008) study, include: self-selecting a goal director behavioral response and situational cue, details and precision in selecting "if" and "then" portions of the plan, and the actual format of the written implementation plan statement (Gollwitzer et al., 2007).

Self-selecting a goal-director behavioral response and situational cue. Self-selection of a goal-directed behavioral response and an environmental cue is of critical importance because it facilitates the participants' active cognitive process in deciding how to best make progress toward their personal goal (Gollwitzer et al., 2007). This

cognitive process has been shown to be critical in promoting the initiation of goal striving as well as leading the participant on a personal discovery of obstacles or unwanted influences that may derail the behavioral goal (Gollwitzer et al., 2007). As such, self-selecting also functions as a goal-stabilizing and goal-shielding exercise (Gollwitzer et al., 2007). For example, the *then* portion of a plan can be self-selected to be a shielding mechanism based on the participant's personal knowledge of his or her personal cognitive and emotional state and actions regarding resiliency. Consider the difference between the following two IPT statements: "If it is 2:00 p.m. on Monday afternoon, then I will go to the blood drive location in the lunch room," versus "If it is after my lunch period on Monday afternoon and I have not yet donated because of my anxiety about needles, then I will ask my friend Katie to walk with me to the lunch room and stay with me through my donation process." Here it can be seen how the second statement has both activated and facilitated the participants active cognitive processes of goal striving and goal shielding (Gollwitzer et al., 2007).

Details and precision in selecting *if* and *then* portions of the plan. A review of the effective implementation planning literature produced ample support for the importance of the precision and details of the self-selected implementation plan (Gollwitzer et al., 2007). Similar to the importance of self-selection, the details of the "if/then" portion of the implementation plan requires a level that is facilitative of the cognitive process that graphically links the situational cue and the goal-directed behavior (Gollwitzer et al., 2007). Consider the differences between two example plans: "If it is Monday, then I will exercise," versus "If it is Monday during my lunch hour, then I will

drink my protein shake while walking the trail around my office building making three laps in that 1 hour." Clearly, the ambiguity in the first statement leaves the individual in a situation where further contemplation will need to occur, sometime on Monday in order to identify when, where, and how to exercise (Gollwitzer et al., 2007). In the second, detailed statement, no further cognitive processes need to occur in service of how, when, and where the desired behavior will occur. The details of the plan support a clear situational cue and exact behavioral response that can activate the atomicity phenomena of the goal striving behavior as described by Bargh and others and illuminated in above paragraphs (Bargh, 1994; Schweiger Gallo & Gollwitzer, 2007).

Strength of participant naturally occurring goal intentions. In addition to the previously discussed evidence-based guidance in the design of the current study's implementation plan conditions, one other important component of effective implementation plans was illuminated by the literature review. This is the relationship between the strength of the participants' intentions, goal striving, and will to succeed guided the threshold points at which study participants were instructed to engage in the implementation planning or be told that their participation in the study was complete. Sheeran,Webb, & Gollwitzer, (2005) found that participants in a study were highly unlikely to engage in effective, self-crafted implementation planning processes when they had little-to-no intention of performing the behavior in question, despite being instructed to do so. In this study, the quality and detail orientation of the implementation plans that were self-crafted by participants with low levels of intention were inadequate to be considered for data analysis. Therefore, the researchers at the ITxM blood bank have

chosen to exclude participants who self-report intentions of 4 or below, which indicates

no naturally occurring, personal motivation to donate blood, from participating in the

implementation intentions study condition portion of their study. Furthermore, this

decision is in line with the overriding goal of this study, which is to study the

effectiveness of implementation intentions planning on translating self-reported positive

intentions to donate blood into active blood donation behavior.

Previous blood donation history. The literature surrounding previous blood

donation status is strong with regards to prediction of future behavior (Ferguson & Bibby,

2002). Researchers in study after study have shown that one of the strongest independent

indicators for future behavior, whether it is success in school or blood donation behavior,

is previous behavior (Ferguson, 1996). This general rule maintains constant with blood

donation with only a small, and predictable, exception (Ferguson, 1996). In individuals

who have only had one previous exposure to blood donation and that exposure was

negative, the converse rule would apply; i.e. past behavior would predict opposite future

behavior (Ferguson & Bibby, 2002). In fact, Ferguson and Bibby (2002) found that a

"negative" experience did not necessarily need apply to the individual directly. These

researchers found that first time donors who witnessed another donor fainting (an

uncommon occurrence, but most common of the possible negative physiological

reactions to blood donation), was less likely to donate blood in the future.

Dependent Variable

The following behavioral based definition of altruistic blood donation will be

utilized in the study. *Altruistic blood donation* is donation that is a selfless act or gift.

The donors for this study will be considered giving blood for altruistic reasons if the individual had nothing personally to gain from their donation outside of potentially positive emotional experiences likely to occur due to the act of giving (Ferrar & Leippe, 1992; Sullivan & Wallace, 2005). For the purposes of this study, patient-specific replenishment donation, which is a donation for a specific individual; autologous donation, which is a procedure in which blood units are donated by an individual for the purpose of using those exact units in the future during a planned surgery; and paid donation were not counted as positive for altruistic donation (Ferguson et al., 2007).

Literature Related to Different Methodologies to Investigate Outcomes

Surrogate markers of donation have been the predominant mechanism for the investigation of blood donation in the few published studies that attempted to look beyond past intentions (Ferguson et al., 2007). For example, Lemmens et al. (2009) used a post donation survey of participants asking all individuals to self-report if they donated during the blood drive. The weakness of this approach is that it allows for individuals who participated in the IPT condition portion of the study to be lost to follow up. This can dramatically reduce the power of the study design and thwart any attempt to show a positive effect of the study's independent variable.

Two seperate researchers looked at attendance at blood drive clinics, Giles et al. (2004) and McMahon and Byrne (2008). The McMahon and Byrne (2008) measured attendance via a questionnaire asking about attendance and resulted in critically low data points on attendance at the clinic ($N = 3$). Statistical analysis could not be performed to look at potential independent variable effect as a result of the low amount of data

generated. Giles et al. (2004) were able to show a significant relationship between TPB intentions and actual donations at the clinic.

The called-for direction in blood banking research is one in which a strong behavioral-based approach is married with the implementation intentions concept in an effort to facilitate blood donation in those with positive intentions to do so (Ferguson et al., 2007). To date, much of the blood donation research has focused on intentions to donate, with few studies attempting to translate what is known about intentions into behavior (Ferguson et al., 2007). The one study that did attempt to apply the IPT conceptual framework to blood donation failed due to flaws in the conceptual design and application of the IPT framework (McMahon & Byrne, 2008). Thus, the current study and subsequent secondary data analysis was designed by the ITxM researchers' and I to fit into a natural progression of the literature in blood donation research and to fill a gap in the literature that may add to both the general IPT and goal-striving research and well as the blood banking knowledge base.

In summary, the theories and methods of the current study and ITxM experiment are empirically grounded and supported. Chapter 3 will attempt to further examine and delineate the research study design and approach with a detailed description of timelines, setting and samples, instrumentation and materials as well as data collection and analysis. Chapter 3 will conclude with a description of measures taken for the protection of the rights of study participants and the cooperative agreements / relationship between the ITxM blood bank and this researcher.

Chapter 3: Research Method

The main purpose of the ITxM Blood bank study and subsequent secondary data analysis was to understand whether implementation intentions planning can affect the blood donating behavior of study participants who indicate high naturally occurring intentions to donate blood. In this chapter, I will further examine and delineate the design and approach of the study and proposed data analysis with a detailed description of timelines, setting and samples, instrumentation and materials as well as data collection and analysis. In Chapter 3, I will conclude with a description of measures taken for the protection of the rights of study participants and the cooperative agreements / relationship between the ITxM blood bank and this researcher.

Research Design and Approach

The ITxM blood bank study researchers and I designed this study as a quantitative research study which utilized a convenience sample and random assignment of study conditions in a prospective fashion to participating schools. This empirical approach involved a Likert-type self-report intentions-to-donate scale that was collected at the onset of the study from each participant, in order to obtain participant's naturally occurring, baseline levels of motivation to donate blood. This information was then used to assign threshold levels that identified individuals who would receive study conditions and those who would not participate further in the study protocol; those with a score of 4 or above, indicating a somewhat to strong naturally occurring baseline intentions to donate blood, would go on to the active condition phase of the study and those with 3 or less, indicating very little to no naturally occurring intentions to donate blood, would be

eliminated from the study. Participants' schools were randomly assigned to one of two active conditions (exposure to the IPT manipulation / condition) or one control condition. All participants in a given school received the same study condition. Blood donation attempts (dependent variable) data, were collected by blood drive professionals on the day of the school blood drive and was matched to participant pre-drive study questionnaires via participant name by blood bank professionals.

Blood donation attempts included both those individuals who donated blood and those who presented themselves for donation, but were turned away by blood drive professionals due to medical ineligibilities. Raw deidentified data was presented by the ITxM to me for secondary data analysis using a 2 X 3 Chi Square analysis. The study design and chosen sample that I had taken from the population of interest (i.e., high school adolescents) dictated that the study enrollment occurred during the fall blood drive season: September through October of 2012. See Figure 1 for ITxM Study design and dissertation prospectus timeline and flowchart.
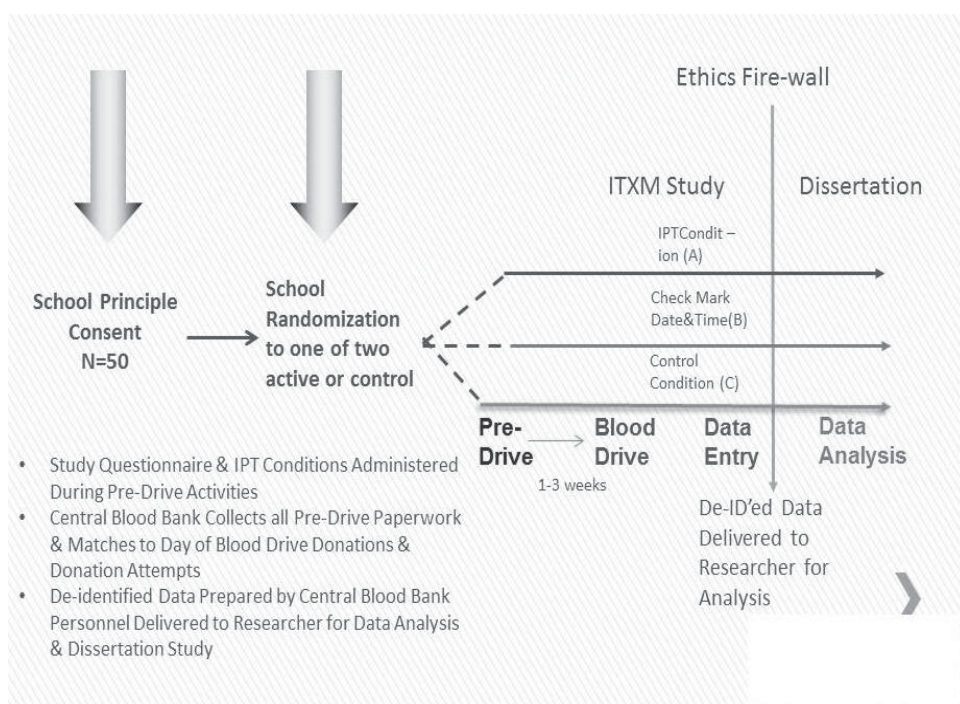
Figure 1. Timeline and Flowchart of ITxM Study and Dissertation Design.

Justification for Study Design and Approach

The approach taken for this study and the subsequent analysis was to design an

Implementation Intentions Planning (IPT)-based study condition to facilitate blood

donation based on the implementation intentions planning conceptual framework

that has been outlined and supported extensively in the literature and thoroughly

reviewed in chapter two of this proposal (Chatzisarantis et al., 2010; Hagger &

Chatzisarantis, 2009; Schweiger Gallo & Gollwitzer, 2007). I chose this conceptual

framework because of its effective behavior facilitating power, as seen in many different

areas of behavioral research from smoking cessation to learning behavior (Chatzisarantis et al., 2010).

This conceptual framework has already been applied to study the behavior in question by other researchers who cited the efficacy of this conceptual theory in other areas of behavioral research (Brickell, Chatzisarantis, & Pretty, 2006; McMahon & Bryne, 2008). The noted limitations of the one existing IPT and blood donation study by McMahon and Byrne (2008) has allowed for several areas for significant and unique design changes that should allow for an effect of IPT on blood donation, if present, to be detected successfully. That is, the McMahon and Byrne (2008) study has guided this study and proposal on several levels, including IPT independent variable condition design and assignment to those with a high preexisting level of naturally occurring motivation to donate blood, power analysis, and participant selection / sampling method.

I chose a quantitative research design for this study for many reasons. It is fairly well agreed upon by blood banking researchers that this area of blood donation research is sophisticated and robust and well described in the literature (Ferguson, 2007). Thus, a qualitative and descriptive approach to the research questions proposed would not likely add significantly to the information that already exists. In addition, McMahon and Bryne (2008), using an IPT theory, set the conceptual foundation and can be seen as a foundational entry study into this specific subset of blood donation research. More importantly, however, is that the dependent variable of this study, attempted blood donation, is categorical and binary in nature. A participant can be said to have either attempted (offered themselves for blood donation) to donate blood or not. This type of

dependent variable and easily manipulated independent variable (Intention planning) in a convenience sample are all study characteristics that are well suited for a quantitative design where the power of statistical analysis can be applied towards a more definitive outcome (i.e., one with high internal and external validity; Creswell, 2009).

In summary, a behavioral-based study in an area of research that has been well described where the dependent variable is binary in nature is best served by a strong quantitative study design (Creswell, 2009). Furthermore, the ITxM blood bank study was designed by the ITxM researchers and me to derive logically from the problem statement, which essentially describes a need for an increase in altruistic blood donations in the U.S. that will be required to supply increasing forecasted demands. The study design and analysis will support a positive social outcome by providing the literature with needed information with regard to the effective goal facilitative power of an IPT based independent variable on blood donation. Such information can then be applied to bolster the nation's blood supply at a time of drastic increasing need, thus ensuring the needs of all are met.

Setting and Sample

The ITxM researchers designed the blood bank study to look at high school mobile blood drives, and drew from a convenience sample of adolescent teenagers' ages 16-19 years. The ITxM researchers and I chose the setting and population because of the both independent data and the literature citing several global and local trends in the growing importance of this age group in blood donation supply (ITxM, 2012; NBCUS, 2009). For example, in the Pittsburgh region, the area in which the current study was

implemented, nearly 30% of all blood units are donated at the annual start-of-school

blood drives from adolescents ages 16-18 (ITxM, 2012). In addition, throughout the rest

of the year, the same high school demographic adds an additional 28% of the total units

that are typically collected via other area drives as well as onsite blood bank office drop-

in donations (ITxM, 2012).

Sampling Method and Sampling Frame

Potential high schools for inclusion were chosen by blood bank professionals

from a list of 120 eligible schools in the Pittsburgh area. Principals and or headmasters

were approached by blood bank personnel with the study concept in late summer 2012

and asked to participate in the study in addition to their normal participation in the blood

drive program. Once schools agreed to study participation and consented, the study

conditions were randomly assigned via blood bank personnel to each school via a

computer-generated random sampling number assignment program, Microsoft's

Randomization Allocation 7.0.

Sample Size and Power Analysis

The power analysis that I performed for this study was an a priori analysis

conducted based upon a 2 X 2 Chi Square design with the degrees of freedom set as 2, a

95% confidence interval and a conservative estimation of the effect size as .30 (a medium

effect size). The effect size for implementation intentions planning has been stated in the

literature in only one multivariate analysis to be a "medium-to-large effect size"

(Gollwitzer & Sheeran, 2006, p. 8). Utilizing the G-Power 3.1.5 statistical package and

the above entry points, the power analysis yielded a total of 172 participants, with 29

participants in each of the 6 study conditions (Zuur & Leno, 2012). Because of the

convenience sampling performed for this study, it was likely that the data set would

include far more than the required N to reach statistical significance as each enrolled

school had eligible student body of over 500 students per school. Thus, it was also likely

that the data from only three schools would have been required for the data analysis for

this study.

Eligibility Criterion for the Study Participants

To be eligible for inclusion in this study, schools had to meet the following

eligibility criteria: The school had participated in the Pittsburgh regional start-of-school

mobile blood drives at least 1 year prior to the 2012-2013 drive; the school headmaster or

principal had to consent to all conditions of the blood drive and study; the school's total

student body had to be equal to or greater than 500 students; and the school had to have

more than 1 but no more than 3 consecutive days of active blood drive collection days on

premises. Within each school, eligible participants were limited by the ITxM personnel

to the age range of 16-19 years.

Characteristics of Selected Sample

The participants of this study were adolescents between 16-19 years of age. The

local Pittsburgh area is below the national average for cultural and social diversity, as

well as household income (The U.S. Census Report, 2010). Therefore the sample

participants were expected to be fairly homogeneous in cultural background. In addition,

the sample participants, those in the age range of 16-19 years, in general have been

shown through previous blood bank data to be largely composed of individuals who meet

blood bank medical eligibility criteria for blood donation (i.e., over 96% of the participant pool is medically eligible at any one given time; ITxM, 2012). Finally, the potential participant pool and sample have had a historically fairly large proportion of students who met inclusion criteria and who donated blood (ITxM, 2012). For example, ITxM estimated that during the 2011-2012 school blood drives, more than 20% of the eligible donors within the specific age range of this study actually donated blood (ITxM, 2012).

Assignment of Study Conditions

The study's convenience sample of 50 consented high schools underwent random assignment to the three study conditions: free-writing IPT condition, check mark date and time indicator condition or the control condition. The pools of possible participating schools were identified from a list of 120 schools within the ITxM Pittsburgh region mobile blood drive catchment area. Of the 120 schools, 15 schools consented for involvement in the study.

Materials

Independent Variables

The independent variable conditions (manipulation of intentions) and the control condition were accomplished through a single page *teach sheet* that described the requirements for completion of the study condition on the second page of the research packet and briefly described the IPT theory referred to as creating if/then statements and how it can support goals. The teach sheet also contained directions which gave an example of an "*if/then*" statement created for the goal donating blood. The teach sheet

also highlighted the importance of the if/then format of the intention planning statement

and the detail orientation contained in the sample statement. The teach sheet's

instructions concluded by directing participants to proceed to the next page to create their

own if/then statement for blood donation if they have reached a minimum of 4 or above

on the single question asking about their natural levels of motivation to donate blood at

the upcoming school blood drive. This second page for all the IPT conditions included a

final two-sentence instruction set for completing the if/then statement and provided an

area to free-write the statement. The area provided for the statement was color coded

with red for the *if* portion of the statement and blue for the "then" portion of the

statement. The amount of guidance provided in this area is important for supporting

participants in the proper if/then format of their own statements. Finally, this final sheet

instructions concludes, after the area for free-writing, with a final instruction to turn in all

sheets of the packet and a brief statement of gratitude.

The handwritten IPT statements were reviewed individually and separately by a trained

master's level research assistant and I who checked the statements for satisfactory

completion levels. *Satisfactory completion* was defined as follows:

1. The hand writing is legible.

2. Both the "if" and "then" portions of the free writing exercise are completed.

3. The statement is applicable (related to blood donation), logical, and makes
   intuitive sense.

4. There is more detail (at least one additional detail point per *if* and *then* section
   of the statement) included in the statement then just date and time/location.

Statements that did not achieve agreement by both reviewers as having satisfactory completion were removed from data analysis by myself or ITxM research personnel and reported as such in the results portion of the dissertation document. There was no scoring for IPT statements in this study only *completed, satisfactory* or *completed, unsatisfactory*, which was noted in the SPSS database, by ITxM research personnel, as a score of 1 for completed, satisfactory and 0 for completed, unsatisfactory. All IPT free-written statement hard copies were first scanned and saved on a hard drive and then copied and stored in multiple locations in metal filing containers. All IPT statements were made available upon request in both electronic and hard copy format.

Manipulation of planned intentions (3 manipulations/ conditions). Three IPT worksheets were employed by ITxM researchers as the independent variable manipulations. These were called Conditions A, B and C.

Condition A: The first independent variable work sheet contained instructions that guided participants in constructing a free writing, detailed and if/then formatted implementation intention plan surrounding the failure to start derailment factor for blood donation (See Appendix A).

Condition B: I designed this independent variable specifically to mimic the IPT condition used by McMahon and Byrne (2008), who that found that this type of check mark date and time implementation Intentions plan did not affect blood donation rates in those with strong intentions. This study condition included a one-item instruction that read: "Blood donation employees will be present at your school to accept donations on August 6 from 7:30 a.m. - 5 p.m. and on August 7 from 1 p.m. - 7 p.m. Please complete

the following statement: I intend to donate blood on ____ (please indicate the day) at ___

(please indicate the time)" (See Appendix B).

Condition C: (Control) The control condition study packet did not include the

IPT teach sheets or IPT free-writing statement sheet. This research packet included only

the Likert-type self-report naturally occurring intentions statement and descriptive data

page. In addition, a second page with the same statement of gratitude and instructions to

turn in the entire packet when completed was found as the last items on the active

comparator study packets. The control study packet is located in Appendix E. The

control condition includes only the same demographic questionnaire present in conditions

A and B with a statement of thanks for their participation in the study (See Appendix C).

Previous blood donation status (positive /negative). This variable has been

shown through the blood bank literature to be a significant and independent predictor of

future blood donation (Ferguson, 1996). Therefore, a single item on the demographic

portion of the questionnaire will ask all participants (including the control condition):

Have you previously donated blood? *Yes No.*

Dependent Variable

Blood donation and/or offering oneself for donation at the school blood drive was

measured by blood bank professionals at each school blood drive day and the data was

subsequently entered into a secure database (SPSS). Participants who offered themselves

for blood donation but were turned away because they were medically ineligible to

donate were considered as positive for blood donation for the purposes of this study.

Participants who donated and/ or offered themselves for donation were matched by name from prescreening research questionnaire to the official blood drive database.

The dependent variable, the blood donation attempts both positive and negative, was collected on each day of the mobile blood drive by ITxM mobile blood drive collection professionals. The ITxM professionals entered basic demographic data for all individuals who presented themselves for blood donation into the ITxM electronic database. A final report for each individual school was prepared electronically by ITxM management and included the names of all students ages 16-19 who presented themselves for blood donation. The ITxM research department delivered the final data report to me as an anonymous and cross-referenced list matching individuals to study packets with study participant numbers only.

Likert-type self-report intentions scale. The Likert-type, self-report naturally occurring intentions scale was located on the bottom of the demographic questionnaire and includes a one item question as follows:

I intend to give blood at the upcoming school blood drive.

I_____I

   0   1   2   3   4   5   6   7

Strongly disagree   *Strongly agree*

The exact wording of this individual question was taken directly from the Theory of Planned Behavior (TPB) research questionnaire found in the appendix of the article by Ferguson et al. (2009). The validity and reliability of this type of Likert-type instrument

are both well documented and thus, no additional processes were used to assess this well-founded concept (Carifio & Perla, 2007).

On the page following the one item Likert-type self-report intention, a three-sentence instructional set directed those individuals who met the threshold level of 4 or more to continue on and for those who were below 4 to hand in their packets. These instructions are referred to as the *threshold instruction sheet*, which can be found in Appendix A-C of this study.

The threshold level that I used to determine whether the participants would continue in the study protocol on to the active condition stage was set at 4 and above. (See Appendix A for a copy of survey.) The 4 and above intention threshold was chosen for continuation in the study as these scores indicated that the participants had positive intentions towards blood donation. Individuals with less than positive intentions to donate blood (scores of 3, 2 , 1, and 0) were not asked continue on in the study as asking individuals with negative intentions to donate to craft statements about donation is not the focus or intent of this study. Scores from both the descriptive data worksheets and the Likert-type self-report intentions were manually entered into the SPSS database by ITxM research personnel and hard copies of the worksheets were first scanned and saved on a hard drive and then copied and stored in multiple locations in metal filing containers. All of this work was performed by ITxM blood bank professionals. All raw data collected from these two portions of the study packets were made available upon request in either or both electronic and paper copy version.

Data Collection and Analysis

Descriptive analysis for the collected raw descriptive data for this study includes a descriptive analysis table giving the sample size, participant characteristics such as the average age, the percentage of subjects of each gender, and the percentage of subjects who have previously donated and with what historical frequency. I performed an analysis of central tendencies and dispersion of all descriptive data points. Finally, I constructed histograms to plot the previously donated and never donated groups as a function of current donation as well as for high school grade level and gender as a function of donation to check for differences between groups.

The data that I collected for the purpose of inferential statistical analysis include satisfactory completion of IPT conditions A, B and the control condition. The dependent variable, blood donation attempt, Yes or No; and the naturally occurring variable (the Likert-type self-report) blood donations scale was used during inferential statistical analysis and was reported with results ranging between a score of 0-7. I stratified this variable into the following groups: 0-3: no further study conditions, and scores of 4 and above were in the group who received an intention study manipulation. All inferential data were collected and entered into the IBM SPSS 20.0 statistical software data package by ITxM professionals.

Inferential statistical analysis.

The goal of the inferential analysis derives from the following study questions and hypotheses:

RQ1: Can an evidence-based free writing implementation intention planning condition be an effective self-regulatory activity leading to goal attainment, i.e., blood donation?

$H_a1:$ The participants at schools in the study condition which completed the IPT worksheet (Condition A – IPT self-crafted statement) will have a significantly higher rate of blood donation attempts at the follow-up clinic day than those participants at schools in the study condition which had the same level of self-reported baseline intentions but do not complete IPT worksheet (Condition C – Control condition).

$H_0 1:$ The participants at schools in the study condition which completed the IPT worksheet (Condition A – IPT self-crafted statement) will have the same rate of blood donation attempts at the follow-up clinic day as those participants at schools in the study condition who had the same level of self-reported baseline intentions but do not complete IPT worksheet (Condition C – Control condition).

RQ2: Can an evidence-based free writing, detailed and "if/then" formatted implementation intention planning condition be a more effective self-regulatory activity leading to goal attainment, i.e., blood donation than a check mark date and time indicator?

$H_a2:$ The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have a significantly higher rate of blood donation attempts at the follow-up clinic day than those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

$H_0 2$: The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have the same rate of blood donation attempts at the follow-up clinic day as those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

$RQ3$: Does positive or negative previous blood donation history status of the study participants have an effect on blood donation?

$H_a 3$: Participants with a positive previous blood donation status will have significantly higher rates of blood donation than participants with a negative previous blood donation status.

$H_0 3$: Participants with a positive previous blood donation status will have the same rate of blood donation as participants with a negative previous blood donation status.

A 2 X 2 chi-square goodness of fit test was proposed, which allowed a determination of whether or not observed blood donation frequency differed between the previous blood donation history positive and previous blood donation history negative groups. All inferential statistical procedures were performed by the IBM SPSS 20.0 statistical software data package.

Description of Data Collection Processes

The data for this ITxM study and subsequent secondary analysis were collected at each individual school during two discrete phases referred to as the *preblood-drive phase* and the *blood-drive phase*. The preblood-drive phase occurred 2-3 weeks prior to the

first day of the arrival of the mobile blood drive clinic. The blood-drive phase began

upon the arrival of the mobile blood drive clinic (Day 1) and represents the participants'

first opportunity to attempt to donate blood.

During the preblood-drive phase, the blood drive professionals conducted a 20-

minute teaching session with the entire student body describing the importance of blood

donation and providing information on when, where, and how to donate blood as well as

what to expect with the donation process and how best to prepare for donation. At the

end of this session, blood bank professionals provided teachers of the junior and senior

classes with study packets for completion. Participants returned completed packets to the

individual teachers who submitted them to the school principal to be collected or on the

day of collection by blood bank personnel. Data packets were then reviewed by trained

blood bank staff and raw data were entered into the IBM SPSS 20.0 data system by ITxM

professionals. Data worksheets were then copied with the copied versions de-identified

for the purposes of delivery to the researcher. Original copies were kept on location at

the ITxM blood bank where they will remain for the course of required 6 year time

period.

The data collected on the blood drive day included only the dependent variable

(blood donation attempt). These data were collected during the blood-drive phase by

mobile blood drive collection professionals who were required to enter basic

demographic data into the ITxM electronic database for all individuals who presented

themselves for blood donation. ITxM management prepared final report for each

individual school electronically and delivered to me as de-identified and cross-matched raw data for analysis.

Potential Threats to External and Internal Validity

The ITxM study was also limited by its focus on a narrow segment of the population, high school juniors and seniors, and thus may not be applicable to the population at large. Additionally, I selected the study population from one region of the United States and thus may not apply to other areas of the United States and or globally.

Finally, ITxM researchers and I designed the study to focus on actual blood donation at the schools' mobile blood drive, which represented a limited opportunity to give blood. It is important to note that some individuals may choose to give blood on their own, outside of the context of the mobile blood drive related to their school. Therefore, a potential limitation of the study scope was that it only measured blood donation (a dependent variable) for a specific snapshot in time and at a specific location. Thus, participants may offer themselves for donation outside of the study's ability to capture those behaviors.

A possible threat to internal validity to the study is the fact that the individuals who receive the manipulations will be reading an example of an IPT statement that is related to blood donation. It is possible that the any effect on blood donation may be related to the general focus of the manipulation on blood donation and not to the actual writing exercise itself. I did consider that the example for this study be changed to a non-blood donation example, but blood banking officials thought the examples were less clear

and ambiguous in nature. Therefore, this possible limitation on internal validity is being
noted here.

Measures Taken for Protection of Participants' Rights

This study was conducted by the ITxM blood bank through its regulatory and
ethics committee as a waiver of individual informed consent with headmaster/principal
consent serving as the only means of informed consent (See Principal consent form in
Appendix F). In the Pittsburgh region, where this study took place, there has been a long
history of a close, cooperative relationship between the local public and private schools
and the ITxM blood bank. Traditionally, ITxM has principal and headmaster consent to
participation in blood drives, which includes both the pre-drive teaching day as well as
multiple blood drive collection days. In the agreement for participation, the principals'
agreed, via signature, that the blood drive was to be considered part of the yearly
curriculum for all students.

The consent form additionally contained verbiage that asked the
principals/headmasters to consent to any de-identified data collected from the blood bank
program being used for research purposes. In return for allowing the blood bank blood
drive program to become a part of school curriculum, ITxM provides an annual
scholarship competition that provides a small amount of scholarship monies to the top
blood-unit producing schools to be awarded to the individuals of the schools' choosing
with the condition that actual individual blood donation not be a prerequisite of the
scholarship eligibility and requirements.

This IPT study is only a small portion of a larger research program that the ITxM blood bank launched with its high schools in 2012 as a means of understanding how to further motivate high school donations. As a follow up to participation in the 2012-2013 blood bank research programs, I offered the participating schools a chance to have a follow-up educational session in which the results of the study and further education on implementation planning will occur. In service to this goal, I developed a 15 minute educational slide deck has been developed in cooperation with this researcher and the ITxM blood bank for study exit purposes.

The relationship between the ITxM blood bank and I is one of both independent and unpaid research consultant as well as recipient of de-identified IPT data set from the 2012-2013 blood drive year only. I received all raw data, under the strict guidance of data cooperation and use agreement (see Appendix F) for the secondary analysis of the data as proposed in this chapter. Furthermore, the ITxM blood bank and I agreed upon and signed the additional following legally binding research cooperation documents: Data use agreement; Letter of cooperation and a Confidentiality Agreement.

In summary, this chapter has reviewed both the design and approach for the ITxM study and has given justification for the chosen approach as well as for the proposed statistical analysis. The power analysis as well as sample population characteristics have been reviewed and explanations of materials used during the study have been delineated. Finally, data collection procedures and measures taken for the ethical protection of participants were reviewed.

The following study and subsequent results adds to the blood banking knowledge base with regard to the utility of implementation intentions planning towards blood donation. Such knowledge can be used to bolster our nation's blood supply in a time of increasing demand thus resulting in positive social change through ensuring that the gift of life (a safe and adequate blood supply) continues to be there for those in need.

Chapter 4: Results

Purpose of the Study

The main purpose of this analysis was to understand how the ITxM study

implementation-intentions planning condition, designed based on extensive

implementation intentions planning literature, may affect the blood donating behavior of

study participants who indicated high naturally occurring intentions to donate blood. The

ITxM blood bank researchers and I designed this study with the aspiration that IPT-based

independent variables may be used in the future to increase the blood donation units

collected during the annual high school blood drives in the Pittsburgh region and

potentially across the country.

Research Questions

RQ1: Can an evidence-based free writing implementation intention planning

condition be an effective self-regulatory activity leading to goal attainment, i.e., blood

donation?

H_a1: The participants at schools in the study condition which completed the IPT

worksheet (Condition A – IPT self-crafted statement) will have a significantly higher rate

of blood donation attempts at the follow-up clinic day than those participants at schools

in the study condition which had the same level of self-reported baseline intentions but do

not complete IPT worksheet (Condition C – Control condition).

H_01: The participants at schools in the study condition which completed the IPT

worksheet (Condition A – IPT self-crafted statement) will have the same rate of blood

donation attempts at the follow-up clinic day as those participants at schools in the study

condition who had the same level of self-reported baseline intentions but do not complete IPT worksheet (Condition C – Control condition).

RQ2: Can an evidence-based free writing, detailed and "if/then" formatted implementation intention planning condition be a more effective self-regulatory activity leading to goal attainment, i.e., blood donation than a check mark date and time indicator?

$H_a2:$ The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have a significantly higher rate of blood donation attempts at the follow-up clinic day than those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

$H_02:$ The participants at schools in the study condition which completed the IPT worksheet condition (Condition A) will have the same rate of blood donation attempts at the follow-up clinic day as those participants at schools in the study condition which had the same level of self- reported baseline intentions who complete the checkmark date and time indicator (Condition B – check mark date and time indicator).

RQ3: Does positive or negative previous blood donation history status of the study participants have an effect on blood donation?

$H_a3:$ Participants with a positive previous blood donation status will have significantly higher rates of blood donation than participants with a negative previous blood donation status.

H$_0$3: Participants with a positive previous blood donation status will have the same rate of blood donation as participants with a negative previous blood donation status.

Chapter 4 is organized to examine the data collection and analysis process as proposed and any discrepancies from the actual collection / analysis process. In this chapter I review the sample characteristics and demographics and I continue with an examination of external validity. Furthermore I will delineate the descriptive statistics I used in the analysis of the study data and then discuss the statistical analysis in service of each hypothesis provided above along with each corresponding probability value. Confidence intervals and effect sizes will also be reported as appropriate.

Data Collection

All of the data for the blood bank study were collected by blood bank personnel during the winter and spring blood drives of the 2012-2013 school year. The six consented schools used in the following analysis were approached during the Fall of 2012 either prior to the beginning of the school year or at the start of the year. However, the process for consenting at many of the schools (five of six) required that I present the study concepts to the school board and allow the board to vote on the proposed study. The above described process significantly lengthened the consent process making the first possible available blood drives for study in the winter and spring. Of the 50 schools that I approached for inclusion in the study, nine schools consented for inclusion. Of the nine schools that consented, two of the largest schools, Titusville and North Marion High, consented for two separate blood drives constituting two separate homogeneous student

body populations. Of the remaining seven schools, three schools withdrew consent from the study as well as participation in the blood drive project following the events of the Sandy Hook school shooting on December 14th. This was in an effort to remove all unnecessary outside individuals from school grounds as the school districts in the local area began to review and "tighten down" security measures in response to the tragedy. The final number of participating school events included six. The response rate was nine out of 50 schools or 18% and the subsequent actual school participation rate was 12% of the approached schools.

The data that the ITxM study collected at the participating schools occurred as proposed and as outlined in Chapter three of this dissertation, in two discrete phases (i.e., the preblood drive phase and the blood drive phase). For the six participating school events, this constituted 12 data collection time points which all occurred without a single protocol violation or discrepancy from the data collection plan.

Descriptive Statistics

A total of 768 participants completed the blood bank study in the six participating schools, as follows: 165 participants from Burgettstown, 145 from North Marion A, 175 from North Marion B, 114 from Titusville A, 134 from Titusville B and 35 from Trinity High school. Three hundred and ninety seven (51.7%) of the total sample were female and 370 (48.2%) were male. All participants were 16 years of age or older with 280 (36.5%) self- identifying as *senior class*, 312 (40.6%) identifying as *junior class*, 164 (21.4%) identifying as *sophomore class*, and 12 or (1.6%) identifying as *freshman class*.

The sample in this study was fairly representative of the greater population, as the participating schools represent a fairly homogenous subset of the population including schools from rural, suburban and city areas, as well as a range of socio-economic classes. A fairly equal number of males and females participated, and the participation at each school was roughly similar except for the Trinity High school population which had a lower level of participation due to inadequate advertising of the study event. Though ethnic data were not among data collected from the participants, demographic data quoted for the participating school from the federal education budget project website suggest that the sample was largely white with an average of 96.5% white student body from the six participating schools (SPC, 2010). Therefore, the ethnicity of the participants in this study was highly skewed towards the white population; yet, this is not unlike the greater Pittsburgh area demographic data in general, which has a largely white population; 89.9% white as per 2010 U.S. Census data (SPC, 2010).

Of the 768 participants, 541 (70%) self-identified as having never previously donated and 227 (29%) had previously donated blood, with 106 participants or 13.8% donating once previously, 46 or 6.0% donating twice previously and 75 participants or 9.8% having donated more than two times prior to the blood bank study. The self-reported intentions to donate scale rating results of a 2X8 chi-square analysis of the 768 participants' self-reported intentions to donate (IV) as a function of their donation status (DV), as seen in Table 3 below:

Table 3

Self -Reported Intentions to Donate Blood of Study Participants as a Function of

Previous Donation

		Self reported intentions to donate								
		0	1.00	2.00	3.00	4.00	5.00	6.00	7.00	Total
Number	0	214	54	59	87	36	27	28	36	541
of	1.00	19	2	4	9	12	8	17	35	106
previous										
donation	2.00	4	0	3	7	1	4	13	14	46
s										
	3.00	5	4	1	3	4	3	4	51	75
	Total	242	60	67	106	53	42	62	136	768

Of the 768 participants, 119 (15.5%) of the population donated blood. Fifty-six of the 119 donating participants were seniors (20%), 49 were juniors (15%), 13 (9.2%) were sophomores, and 1 was a freshman (.8%). Seventy-five or 63% of 119 donating participants were female and 44 (36%) were male. The rate of blood donation per participating school was 15.3%. The 2X6 chi square analysis revealed that there was no statistically significantly difference between schools: $X^2 = 3.04$, $p > .05$. The results of a 2X8 chi square analysis revealed that blood donation status (DV) was positively correlated to the participants' self–rated intentions to donate score, ranging from 0 to 7 (naturally occurring variable): $X^2 = 267.17$, $p < .001$ (See Table 4).

Table 4

Donation Status as a Function of Likert Type Rating

# times previously donated	0	1	2	3	4	5	6	7	Total
No	241	60	66	105	46	32	36	63	649
Yes	1	0	1	1	7	10	26	74	120
Totals	242	60	67	106	53	42	62	137	769
Percentage	.04	.00	.01	.009	1.3	2.3	41	53	15

Results

Question 1

Can an evidence-based free writing implementation intention planning condition be an effective self-regulatory activity leading to goal attainment (i.e., blood donation)? The results from the 2X2 chi-square comparing Conditions A (the IPT free writing exercise) to Condition C (the control condition) on blood donation (DV) are as follows: In Conditions A & C combined in the 4, 5, 6, and 7 self- scored intentions to donate groups, there were 69 donating individuals out of 171 total participants. The donation rate was 40.3% in this grouping. Of the 69 donating individuals, 34 originated from Condition A which had an expected count of 34.7 and 35 originated from Condition C which had an expected count of 34.3: $X^2=.04$, $p > 0.05$.

Table 5

A Crosstabulation of Likert Scales 4 -7 Conditions A&C: Donation Status

| | | | Condition | | |
			A	C	Total
Presented for donation	No	Count	52	50	102
		Expected count	51.3	50.7	102.0
	Yes	Count	34	35	69
		Expected count	34.7	34.3	69.0
Total		Count	86	85	171
		Expected count	86.0	85.0	171.0

The differences between the observed and expected blood donation frequencies in groups A and C were not statistically significantly different. In examining the proposed subgroupings, the 4-5 self- scored intentions to donate grouping showed a 27% blood donation rate with, 15 of 54 individuals donating blood. The 2X2 chi-square analysis of this sub-grouping, examining observed versus measured frequencies in blood donation (DV) between the aforementioned conditions (IV), revealed that the donation observed frequency for Condition A (the IPT Group) was 13 with the expected count 8.3: $X^2 =$ 8.14, $p < 0.001$. This represented a statistically significant difference with a higher observed blood donation frequency than expected frequencies of blood donation. The observed over expected frequencies for Condition C, the control condition, was 2/6.7.

Table 6

A Crosstabulation of Likert Scales 4- 5 Conditions A&C: Donation Status

			Condition		
			A	C	Total
Presented for donation	No	Count	17	22	39
		Expected count	21.7	17.3	39.0
	Yes	Count	13	2	15
		Expected count	8.3	6.7	15.0
Total		Count	30	24	54
		Expected count	30.0	24.0	54.0

Note: B Crosstabulation

This represents a statistically significant difference towards more blood donation in the expected frequencies versus the observed blood donation frequencies in Condition C: 8.3: $X^2 = 8.14$, $p < 0.05$. In examining the second proposed subgrouping there was a 46.5% blood donation rate, with 54 of 116 individuals donating blood. Utilizing a 2x2 chi-square examining the observed versus expected frequencies in blood donation (DV) between the control group & Condition A (IV) in the 6-7 self- scored intentions to donate grouping revealed the donation observed frequency for Condition A (the IPT Group) was 21 with the expected donation count being 25.6: $X^2 = 2.94$, $p > 0.05$. This difference was not statistically significant. The observed over expected frequencies for the control condition was 33/28.4. Again, these numeric differences in observed v. expected frequencies do not represent a statistically significant difference $X^2 = 2.94$, $p > 0.05$.

Table 7

A Crosstabulation of Likert Scales 6 - 7 Conditions A&C: Donation Status

	Condition

			A	C	Total
Presented for donation	No	Count	34	28	62
		Expected count	29.4	32.6	62.0
	Yes	Count	21	33	54
		Expected count	25.6	28.4	54.0
Total		Count	55	61	116
		Expected count	55.0	61.0	116.0

Note: A Crosstabulation

Question 2

Can an evidence-based free writing, detailed and "if/then" formatted implementation intention planning condition be a more effective self-regulatory activity leading to goal attainment, i.e., blood donation, than a check mark date and time indicator? The results from the 2X2 chi-square analysis comparing observed versus expected frequencies in blood donation rate (DV) between the independent variables Conditions A (the IPT condition) and Condition B (the date & time indicator) are as follows: In Conditions A & B, in the 4, 5, 6 and 7 self-rated to donate groups, there were 81 donating individuals out of 205 total participants. The donation rate was 39.5% in this grouping. Of the 81 donating individuals, 34 originated from Condition A and 47 originated from Condition B. There were no statistically significant differences between observed and expected frequencies of blood donation for conditions A (34 / 33.2) or B (47 / 47.8): $X^2 = .055$, $p > 0.05$.

Table 8

A Crosstabulation of Likert Scales 4 -7 Conditions A&B: Donation Status

	Condition		Total
	A	B	

Presented	No	Count	50	74	124
for		Expected Count	50.8	73.2	124.0
Donation	Yes	Count	34	47	81
		Expected Count	33.2	47.8	81.0
Total		Count	84	121	205
		Expected Count	84.0	121.0	205.0

Note: **A Crosstabulation**

The difference in blood donation rate between groups A and B was not considered statistically significant ($p > 0.05$). In examining the proposed subgroupings the 4-5 self-scored intentions to donate grouping showed a 21.4% blood donation rate with 15 of 70 individuals donating blood. A 2X2 chi square analysis examining the difference in observed verses expected frequencies in blood donation (DV) between Condition A & B (IV) in the 4-5 sub groupings revealed the donation observed frequency for Condition A (the IPT Group) was 13 with the expected count being 6.4: $X^2 = 14.96$, $p < .001$. This represented a statistically significant difference with a higher observed blood donation frequency than expected frequencies of blood donation. The donation observed frequency for Condition B (the check mark date & time Group) was 2 with the expected count being 8.6 : $X^2 = 14.96$, $p < .001$. This represented a statistically significant difference with a higher expected blood donation frequency than observed frequency of blood donation.

Table 9

A Crosstabulation of Likert Scales 4 & 5 Conditions A&B: Donation Status

			Condition		Total
			A	B	
Presented for donation	No	Count	17	38	55
		Expected count	23.6	31.4	55.0
	Yes	Count	13	2	15
		Expected count	6.4	8.6	15.0
Total		Count	30	40	70
		Expected count	30.0	40.0	70.0

Note: A Crosstabulation

In examining the second proposed subgrouping, the 6-7 self- scored intentions to donate grouping showed a 49.2% blood donation rate with, 66 of 134 individuals donating blood. The 2X2 chi square analysis examining the difference in observed versus expected frequencies in blood donation (DV) between Conditions A&B (IV) in the 6 and 7 sub grouping revealed that the donation observed frequency for Condition A (the IPT Group) was 21 with the expected donation count being 26.1: $X^2=3.25$, $p > 0.05$. This difference was not statistically significant. The observed frequency for Conditions B (check mark date & time) was 45 with the expected frequency being 39.9: $X^2=3.25$, $p > 0.05$. Again, this numeric difference in observed v. expected frequency did not represent a statistically significant finding.

Table 10

A Crosstabulation of Likert Scales 6 & 7 Conditions A&B: Donation Status

	Condition	Total

			A	B	
Presented for donation	No	Count	32	36	68
		Expected count	26.9	41.1	68.0
	Yes	Count	21	45	66
		Expected count	26.1	39.9	66.0
Total		Count	53	81	134
		Expected count	53.0	81.0	134.0

Note: A Crosstabulation

Question 3

Does the positive or negative previous blood donation history status of the study participant predict current blood donation behavior? Of the 768 participants, 228 (29.6%) had a positive previous blood donation status and 540 (70.3%) had never previously donated. A 2X2 chi-square analysis examining the differences in observed versus expected blood donation frequencies (DV) between the previous blood donation negative and previous blood donation positive groups (IV) showed that previous blood donation positive status was a statistically significantly related to offering oneself for blood donation during this study. The expected blood donation frequency for the previously donated group was 35.3 individuals with the actual count being 85 individuals: $X^2 = 117.5$, $p < .001$. For the blood donation history negative group, the expected blood donation frequency count was 83.7 individuals expected to donate with the actual count being 34 individuals donating blood: $X^2 = 117.5$, $p < .001$. The difference between the blood donation of the two groups, blood donation history positive v. blood donation history negative, was statistically significant as well: $X^2 = 117.5$, $p < .001$.

Table 11

Blood Donation as a Function of Blood Donation History Status

			Previous Donation		Total
			N(negative)	P(positive)	
Presented for donation	No	Count	506	143	649
		Expected count	456.3	192.7	649.0
	Yes	Count	34	85	119
		Expected count	83.7	35.3	119.0
Total		Count	540	228	768
		Expected count	540.0	228.0	768.0

In summary, there were no statistically significant differences between the IPT free writing exercise group and the control groups or the IPT free writing or the check mark date and time indicator groups as a whole. However, there were statistically significant differences in observed versus expected frequencies of blood donation for the 4-5 Likert scale self-rated intentions to donate sub groupings in both the IPT free writing versus the control conditions as well as the IPT free writing versus the check mark date and time IPT indicator. The statistically significant effects were present regardless of the participants' previous blood donation history status; positive or negative. In the 6-7 Likert scale self-rated intentions to donate sub groupings there were no statistically significant differences. Finally, there was a difference in observed versus expected frequencies in blood donation behavior for individuals who had a previously donated blood in comparison to participants who had never previously donated.

In the following chapter I will further examine the above described results and discuss the findings in the context of the literature. Furthermore, in Chapter 5 I will once again review the limitations of this study and make recommendations for future research

and direction. Finally, I will illuminate implication for social change as a result of the

impact from this study and possible applicable recommendations for blood banking

professionals.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to determine if an evidence-based free-writing exercise, grounded in implementation intention planning (IPT) theory, is an effective self-regulatory activity leading to goal attainment, specifically blood donation, in participants with high naturally occurring intentions to donate blood. This research project involved a secondary analysis of data collected from a quantitative, prospective, experimental research study which I designed to employ an implementation-intentions planning questionnaire and study condition intended to manipulate participant intention planning, which I significantly and uniquely modified from McMahon and Byrne (2008) and as suggested by Ferguson et al. (2007).

This study additionally involved a Likert-type self-report intentions-to-donate scale that the ITxM researchersdesigned and used to obtain participants' naturally occurring levels of baseline motivation to donate blood. The ITxM researchers then used this information to assign threshold levels that identified individuals who would receive study conditions (those who had naturally occurring high motivations to donate blood) and those who would not participate further in the study protocol (i.e., those showing little to no naturally occurring motivation to donate blood). Participants' schools were randomly assigned to either one of two active conditions or to a control condition. Blood drive personnel collected the dependent variable, blood donation or blood donation attempt (offering oneself for donation but being turned away for medical ineligibility was considered positive for blood donation for the purposes of this study), on the day of school blood drives and then matched the DV data to participant predrive study

questionnaires via participant name. The ITxM researchers chose the prospective, quantitative, randomized, experimental design for reasons of strengthening the internal validity of the study and the participant population was chosen for future generalizability to the population of interest to the blood bank (external validity). This study was conducted as a joint venture between the ITxM blood bank and I in order to discover a possible mechanism to facilitate blood donation in the adolescent teen population.

The results of this study supports the idea that the evidence-based free-writing exercise, grounded in implementation intention planning (IPT) theory, was an effective self-regulatory activity leading to goal attainment, specifically blood donation, only in participants with moderately high intentions to donate blood (i.e., those with a 4-5/7 Likert rating of naturally occurring intentions to donate blood). The results of this study failed to show an effect of the same IPT free writing exercise on the participant group as a whole. Additionally, the results of this study suggest that for individuals with moderately high intentions (those with a 4-5/7 Likert rating of naturally occurring intentions to donate blood) an IPT based free writing exercise was statistically significantly more effective in leading to goal attainment, i.e. blood donation, than a check mark date and time indicator. The results from this study failed to confirm the two aforementioned statistically significant effects found in the 4-5 Likert subgrouping in either the participant group as a whole or the 6-7 Likert subgrouping of participants. Finally, the results from this study also showed that participants with a previous blood donation history status positive for blood donation were statistically significantly more

likely to donate blood than those with a previous blood donation status that was negative for blood donation.

Interpretation of the Findings

The results of this study are mixed. While there were no statistically significant differences for the main study hypothesis in the large participant group as a whole; and this fact does not support implementation intentions planning as an effective self-regulatory exercise in goal striving for blood donation, this was somewhat expected and was the main reason for proposing examining the participant sub-groupings of the 4-5 and 6-7 Likert scales separately. So the question stands as to why would there be a statistically significant and robust effect of the IPT exercise for the 4-5 Likert sub-grouping but no effect for the 6-7 and thus the participant group as a whole? Perhaps this is due to the fact that there is more room for supporting goal striving in those individuals with moderately high naturally occurring intentions to donate as opposed to a group of individuals (Likert 6-7) who are already fairly well set in their conviction, experienced (90% of the individuals who scored themselves a 6 or a 7 had a positive donation history as opposed to 10% of those who score themselves in the 4-5 range) and likely to donate anyway (the donation rate for the 6-7 Likert group overall was 50% versus only 18% for the 4-5 Likert group)?

However, the converse question can and should also be asked which is: if the IPT condition is effective at supporting goal striving then why was it less effective at shielding the goal striving of those who rated themselves as the most motivated to donate blood in comparison to their more moderately motivated peers (those with a Likert score

of 4-5)? It could be hypothesized that the IPT conditions were more effective at the *failure to start* goal thwarting issue than the *goal shielding* goal thwarting mechanism and thus exerted its effect on blood donating naive individuals (who would most appropriately represent a failure to start the process of becoming a blood donor) as opposed to shielding the goal striving of experienced individuals? In this case, the actual intended end goal and thus cognitive processes supporting the goal of the potential donor may be seen as very qualitatively different between becoming a donor and donating again. This qualitative difference in the goal striving of donors' vs. non-donors is discussed in the blood donation literature and has been shown to play a part in the cognitive processes that impact donation rates (Nance, 2009). This, however, is a theory that would require further study to understand fully the cognitive forces at play in the goal striving of potential blood donating individuals.

Another possible explanation for this finding is found in the self-regulation literature, in which researchers suggest two plausible controlling factors that would cause the more experienced 6-7 intentions group to approach their goal striving from a more docile perspective (Lind, 2004; Elliot & Dweck, 2013). In a study where researchers examined challenging vs. easy goals, Lind and colleagues found that individuals approaching novel goals; i.e., those goals that they perceived as more challenging (yet not unattainable) promoted stronger goal striving and goal attainment than those individuals approaching the same goals but who felt the same goal to be less challenging or not novel (Lind, 2004). Additionally, Elliot and Dweck (2013) found that individuals striving to reach *performance* goals, goals to develop a new skill, in comparison to *mastery* goals, a

goal to develop a current skill to a higher level, were more aggressive in their goal striving and goal attainment behavior (Elliot & Dweck, 2013). Applied to the current analysis of the blood bank goal striving study, these findings may help to frame the perhaps unexpected results of the most experienced and most highly intentioned groups failing to respond to the IPT conditions.

I would like to conclude with a word on the failure of the IPT condition to show an effect on the 6-7 intention subgrouping and how this may be related to environmental factors. The literature is robust with evidence about goal striving as it relates to automaticity and environmental disruption (Vancouver & Scherbaum, 2000). Primarily the literature supports the fact that conflicting goals and environmental cues during goal striving reduce the automaticity and of the goal and thus goal attainment (Vancouver & Scherbaum, 2000). With regards to the population from the blood bank study one important factor stands out about the 6-7 subgrouping. These individuals were predominantly high school seniors. Though the amount of extra-curricular activities and goal oriented activities in comparison to their junior and thus 4-5 subgrouping peers can only be hypothesized at this point to be greater, this could be yet another hypothesis to explain the discrepancy found in the results of this study; one that would require further research.

In the current study, at least for the Likert 4-5 sub grouping of participants, I confirmed the broad body of literature that supports implementation intentions planning as an effective tool towards goal attainment across many types of behavioral goals (Gollwitzer & Sheeran, 2006). Additionally, this was the first study to successfully

extend implementation intentions planning via a free writing IPT exercise to blood donation behavior, in the 4-5 Likert subgroup, and to show that a check mark date and time IPT exercise was not statistically significantly effective in supporting blood donation in the same sub-group or in any other participant grouping. This is a significant finding as it suggests, as per Gollwitzer's (2006) theory, that the personal cognitive process of self-selecting the details of the situational cue and the goal directed behavioral response allows for a higher level of goal striving and shielding of the goal, leading to a higher goal attainment rate, in comparison to self-selecting a date and time which requires less details and thus cognitive demand (Gollwitizer, 2006). It may be fruitful to focus future studies on individuals with lower intentions to donate blood or on those with blood donation specific fears to see if IPT based theories can help support those individuals towards donation.

McMahon and Byrne (2008) did not find a statistical significance in blood donation, with participants who utilizing a check mark date and time indicator, which was likely identical to the one utilized in this study, when they attempted to compare them to matched controls who did not experience an IPT check mark date and time indicator (McMahon & Byrne, 2008). However, as noted previously, their study design was significantly different form the design of this study. For example, selecting out the individuals with high naturally occurring intentions to donate blood for inclusion in the IPT condition is one study design difference that likely led to statistical significance in blood donation this study. It should be noted, in fact that the blood donation rate of those in the Likert rating of 0-3 (those who self-selected out of the IPT condition in this study

design) was less than .06% or three out of 475 individuals. Therefore, including those individuals in the IPT condition would have had the effect of significantly watering down any effect of the IPT condition making it difficult to reach statistical significance. However, the results of this study would support the fact that the IPT condition used in this study would not have had the expected effect in facilitating blood donation that the researchers were perhaps expecting.

Assumptions and Limitations

There were several assumptions inherent in the ITxM Blood bank study design. One of the assumptions about the participating schools was that the material and or emotional incentives to donate offered via school practices are not significantly different between control and active study condition school groups. During data collection it was noted by blood bank personnel that the largest Condition B school (Titusville High School), did make a day of blood drive decision to offer "free period" time for all donating students. I made the decision to not exclude the data from the study because of the fact that it was unanimously agreed upon by blood bank officials that this type of "day of" incentive are: (a) not very effective in nature, and (b) likely occurring in most schools without blood bank officials becoming aware of the situation. Therefore, though there was a chance that this school-based incentive artificially increased donation in a large portion of the Condition B (IPT check mark date and time indicator) participants in this study, I reasoned that these nominal incentives were likely universal. Furthermore, the statistical analysis for Condition B was decisive and thus not in question.

Another assumption that I made was the impact of the blood bank presenters' presence on the participants in the study. The original impact was thought to be minimal as the effect was proposed to be the same across conditions and thus would not individually select out or impact one group of participants more than another. However, in this case it was interesting to note that feedback from the blood bank officials implementing the study survey unanimously suggested that individuals in study Condition A were possibly artificially impacted by researcher presence toward blood donation because of the amount of time that was spent to explain the free writing IPT condition and or answer questions surrounding how to write the IPT statement. In fact the blood bank officials who gave feedback on this suggested that they spent, on average, 10 minutes longer with the study A Condition participants than with any other condition due to the need to explain the IPT writing exercise in depth and or answer individual questions about the writing exercise. Obviously, the positive care and impact of individual time spent with participants in this condition could have artificially impacted the blood donation rate of Condition A. However, once again, the statistically analysis showed a robust effect for condition A in the Likert 4-5 subgrouping. Therefore, taking off the impact of researcher presence in this case would likely not have reduced the effect below statistical significance. In addition, the fact that Condition A was not statistically significant across all levels of the study conditions also increases the confidence that the "researcher effect" in this case was not significant.

Another limitation of the study was that the participants' naturally occurring intentions for donation was taken at only one point in time and eligibility to move

forward in the study was determined at that point alone by ITxM personnel. This represented a single snapshot of a person's strength of intentions that would occur, via protocol design, one to two weeks prior to his or her first opportunity to act on stated intentions. Research on intentions for behavior, in general, suggests that intention levels tend to naturally vary over time (Gallo & Gollwitzer, 2007). Thus, a weakness of the ITxM blood bank study protocol design would be that the natural variations that affect intentions over time, and may ultimately affect the dependent variable, would not be captured. Though this would be considered a true limitation of the study, it should additionally be noted that research in the area of intentions has also shown that variation levels amongst those reporting higher levels of intentions tend to be lower than those initially self-reporting lower naturally occurring intention levels (Gallo & Gollwitzer, 2007). It would be interesting to see, however, if individuals with the highest levels of donation intentions and experience in donation have wider variations in intentions over time than those naive to donating and who have moderately high levels of intention as the aforementioned study did not segment out the intentions to look at participant sub groups based upon intention levels nor did it look at the donation history of the individual. This would be another area of study that could further researchers' understanding of goal striving in blood donation.

Recommendations

Moving forward then, it appears as if the effect of implementation intentions on blood donation of high school adolescents in specific is perhaps more complex than originally hypothesized with both level of blood donation intentions and blood donation

history likely exerting complex influences on donating behavior. Future research in this area should look at IPT free writing conditions that speak directly to the specific "goal thwarting" mechanism likely at play for individuals at each blood donation history level. In addition, more research into the level of intention variation overtime in high intending individuals across both the 4-5 and 6-7 Likert sub groupings would perhaps produce helpful information to understand why the IPT free writing exercise was not effective of the group of individuals with the highest reported intentions to donate. Furthermore, the results from this study will need to be replicated in other groupings of individuals, outside of high-school adolescents, to understand if the IPT effect seen in the Likert 4-5 subgrouping is generalizable across the population.

Implications

As a result of this study, locally speaking, over 700 adolescents were exposed to information and training on implementation intentions planning which they can use as a tool for goal striving on many areas of their lives. This provided a real and tangible positive social change for the individual participants of the study at a time in their lives where goal striving will be acutely critical to their success.

On a more broad scale, this study has had positive social implications in that it has allowed the local blood bank to adopt blood donation support practices that they feel will further support blood donation based upon the results of this study. Specifically, the Likert scoring system and an IPT free writing support program will be utilized for those young adults with moderately high intentions (Likert scale 4-5). This will potentially support blood donation here in the Pittsburgh area which has been in area that has had to

purchase in blood from surrounding areas for the last 6 months because of an inability to support the blood demand for the local area. Furthermore, research in the area of the limits of control by intentions with maturation shows a linear correlation between age and control of intention (Webb & Sheeran, 2006). Thus, possible implications would include further supporting the blood supply via the implementation of an IPT free writing support program in adults with moderately high intentions to donate. This could be performed at local area corporate blood drives which occur annually and are the area's second largest source of blood units collected through altruistic means.

It is my sincerest hope that the recommendations from this study, as absorbed by the local blood bank in their blood donation support campaign practices, may be more widely spread and thus perhaps support blood donation on a larger scale in those individuals with moderately high intentions to donate blood. This could potentially have a positive impact on blood supplies across the world and may have implications for goal striving in other behavioral based research as well.

Conclusion

In conclusion, this study found that an IPT based free writing exercise had a statistically significant effect on the blood donating behavior of high school adolescents reporting moderately high intentions to donate blood. The results of this study also support the hypothesis that a simple check mark date and time indicator IPT exercise was not effective in facilitating the same type of blood donation effect seen in the free writing exercise. This is a critical point as it validates the importance of the cognitive process, as Gollwitzer proposed, as the mechanism for strongly attaching the environmental queue

with the desired goal supporting behavior and suggests that blood drive campaigns should eliminate the commonly used check mark date and time indicators in favor of a free writing exercise. In addition, the study found that previous blood donation history is a strong predictor of future blood donation in high school adolescents' 16-19 years of age. This strongly validates information currently in the literature and suggests that perhaps blood bank campaigns should develop different types of blood drive campaigns for blood donation naive versus blood donation experienced individuals. This positive effect of the IPT condition in this study on blood donation could lead to IPT-focused interventions for blood donation history positive high school students with moderately high intentions to donate blood, supporting their drive toward altruistic behavior.

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Appendix A: IPT Condition (Condition A)

Name:_____   Date:___/___/___

Date of Birth __/__/19__

High school name _____

Please circle your answers to the following:

Gender: Male   Female

You are a: Freshman   Sophomore   Junior   Senior

Have you previously donated blood? Yes   No

If yes, how many times?   Once   Twice   Three or more times

Your school's mobile blood drive will occur on Aug. X and X from Ytime-Ztime.

Blood drive professionals will be available during the above stated times in the

(school gymnasium, etc.).

On a scale of 0-7 where 0 is strongly disagree and 7 is strongly agree, please indicate

(by circling a single number choice) how much you agree with the following

statement:

I intend to give blood at the upcoming school blood drive.

I_____I

0   1   2   3   4   5   6   7

Strongly Disagree   Strongly Agree

If you have indicated on the question above a score of 4 or more, please read and complete the next section of this packet before handing in your entire packet to you teacher. If you indicated a score of 3, 2, 1, or 0 on both questions on the previous page, please do not complete the second section of this packet, your participation is complete! Thank you for your time and please remember to turn in this entire packet your teacher.

IPT Failure to start

You have indicated on the previous pages of this packet that your intentions to donate blood at the upcoming school blood drive are somewhat to very positive. Please read the following instructions and examples and then create your own "if/then" statement and write it in the space provided. **Please hand in this entire packet to your teacher only after you have completed your own "if/then" statement.**

An "if/then" statement is one in which you think about, decide, and then write down in detail exactly when and how you will perform a desired behavior, in this case donate blood.

Here is an example of a simple "if/then" statement for proceeding with an exercise plan:

If it is a school day with no after school activities and I have finished with my homework, then I will immediately put my books away, take my water bottle out of the refrigerator, get my dog Max on his leash, and we will walk to the park and around the lake 3 times together.

First, notice the details contained in the statement. The statement needs to be detailed because thinking through the details of your plan allows for you to visualize EXACTLY when and how you will proceed.

Second, notice also the "if/then" format highlighted in the above example. Here is a possible example for a blood donation "if/then" statement:

If it is the first day of the blood drive and I arrive at school on time, then I will ask my homeroom teacher to be excused to go to the mobile blood drive location, I will

stop by Sarah's room to pick her up, and we will walk to the mobile blood drive location together to donate blood.

Please proceed to the next page where you will create your own "if/then" statement

Thinking through the details of the day that you will potentially give blood, please create an equally detailed "if/then" statement for how you may proceed to give blood on that day should you decide to do so.

If_____

_____

_____

_____

then I

will_____

_

_____

____

Please turn in this page containing your "if/then" statement to your teacher along with the rest of your packet. Thank you for your intentions to support your school's blood drive and for considering giving the gift of life. ☺

Name: _____   Date: ___/___/___

Appendix B: Check Mark Date and Time Indicator (Condition B)

Name:_____   Date:___/___/___

Date of Birth __/__/19__

High school name _____

Please circle your answers to the following:

Gender: Male   Female

You are a: Freshman   Sophomore   Junior   Senior

Have you previously donated blood? Yes   No

If yes, how many times?   Once   Twice   Three or more times

Your school's mobile blood drive will occur on Aug X and X from Ytime-Ztime.

Blood drive professionals will be available during the above stated times in the

(school gymnasium, etc.).

On a scale of 0-7 where 0 is strongly disagree and 7 is strongly agree, please indicate

(by circling a single number choice) how much you agree with the following

statement:

I intend to give blood at the upcoming school blood drive.

I_____I

  0   1   2   3   4   5   6   7

Strongly Disagree   Strongly Agree

If you have indicated on the question above a score of 4 or more, please read and complete the next section of this packet before handing in your entire packet to you teacher. If you indicated a score of 3, 2, 1 or 0 on both question on the previous page, please do not complete the second section of this packet, your participation is complete! Thank you for your time and please remember to turn in this entire packet to your teacher.

IPT Check Mark Date & Time Indicator

You have indicated on the previous pages of this packet that your intentions to donate

blood at the upcoming school blood drive are somewhat to very positive. Please read the

following instructions and "if/then" statement examples and then create your own "if/

then" statement and write it in the space provided. **Please hand in this entire packet to**

your teacher only after you have completed your own "if/then" statement.

An "if/then" statement is one in which you specify exactly when and how you will

perform a desired behavior, in this case donate blood.

Here is an example of a simple "if/then" statement for proceeding with an exercise plan:

If it is Monday, August 24 at 8:00 a.m., then I will go to the gym.

Notice also the highlighted "if/then" format of the above example.

Please proceed to the next page where you will create your own "if/then" statement.

Thinking through the available dates and times that blood drive professionals will

be at your school, please create an "if/then" statement for the exact date and time

that you plan to donate blood should you choose to do so. Please write the statement

in the provided lines below.

If it is _____(please indicate date) at _____ (please indicate time), then I will

donate blood.

Please turn in this page containing your "if/then" statement to your teacher along with the rest of your packet. Thank you for your intentions to support your school's blood drive and for considering giving the gift of life. ☺

Name: _____   Date: ___/___/___

Appendix C: Control Condition (Condition C)

Name:_____   Date:___/___/___

Date of Birth __/__/19__

High school name _____

Please circle your answers to the following:

Gender: Male   Female

You are a: Freshman   Sophomore   Junior   Senior

Have you previously donated blood? Yes   No

If yes, how many times?   Once   Twice   Three or more times

Your school's mobile blood drive will occur on Aug X and X from Ytime-Ztime.

Blood drive professionals will be available during the above stated times in the

(school gymnasium, etc.).

On a scale of 0-7 where 0 is strongly disagree and 7 is strongly agree, please indicate

(by circling a single number choice) how much you agree with the following

statement:

I intend to give blood at the upcoming school blood drive.

I_____I

    0   1   2   3   4   5   6   7

Strongly Disagree   Strongly Agree

If you have indicated on the question above a score of 4 or more, please read and complete the next section of this packet before handing in your entire packet to you teacher. If you indicated a score of 3, 2, 1, or 0 on both question on the previous page, please do not complete the second section of this packet, your participation is complete! Thank you for your time and please remember to turn in this entire packet to your teacher.

<div align="center">Control Condition</div>

You have indicated on the previous pages of this packet your intentions to donate blood at the upcoming school blood drive. Your participation is complete.

Please sign this page and turn this page along with the rest of this packet to your teacher. Thank you for your intentions to support of your schools' blood drive and for considering giving the gift of life. ☺

Name: _____   Date: ___/___/___

Curriculum Vitae

Rabecka A Martin

Education
• Walden Candidate -expected 2013
Dissertation Topic: Motivating altruistic behavior (Industrial /
Organizational Psychology)
• New York University/ University of Pitt: Masters Behavioral Sciences
• CCAC Post Grad Studies Chemistry
• University of Pittsburgh: B.S. Biopsychology/Neurosciences
• California University of Pennsylvania Liberal Arts Studies

Senior Medical Science Liaison, Rare diseases / MSL Team Leader
Aegerion Pharmaceuticals Inc, 101 Main Street Cambridge, MA 02142
(12/12-Current)

- Lead a team of Medical Professionals to identify and develop
  investigator initiated research projects from conception through
  completion and publication
- Develop key scientific messages based upon literature and key
  Aegerion study results in the area of Lipid sciences
- Present key Aegerion study results at regional and national medical
  symposia & frame findings within context of the lipid community
- Develop individuals on Medical team to become experts in the area of
  lipid sciences and scientific inquiry and discussion

Senior Medical Science Liaison, Hematology / Rare Bleeding Disorders
Inspiration Biopharmaceuticals, Inc. One Kendall square, Cambridge MA
02139 (5/2012-10/12)
• Worked with Medical Director and cross-functionally to develop MSL
team infrastructure: SOP's, Policies, Training platforms & materials, SRL's,
Publication Plans, Medical slide deck development, Territory/KOL
alignment
• Responsible for medical support of Dossier development team and medical
review of marketing strategy
• Responsible for developing disease state publication repository /
bibliography
• Worked cross functionally to develop IIS processes & policies

- Responsible for 3 direct report Senior MSL's with regards to organizational and motivational responsibilities
- Responsible for development of MSL team (hiring) along with director
- Worked with Medical Director and cross-functionally to develop MSL team infrastructure: SOP's, Policies, Training platforms & materials, SRL's, Publication

Senior Medical Science Liaison, Hematology / Rare Bleeding Disorders
Inspiration Biopharmaceuticals, Inc. One Kendall square, Cambridge MA 02139 (5/2012-Present)
• Worked with Medical Director and cross-functionally to develop MSL team infrastructure: SOP's, Policies, Training platforms & materials, SRL's, Publication Plans, Medical slide deck development, Territory/KOL alignment
• Responsible for medical support of Dossier development team and medical review of marketing strategy
• Responsible for developing disease state publication repository / bibliography
• Worked cross functionally to develop IIS processes & policies

Medical Science Liaison, Pain Management Cadence Pharmaceuticals: 1248 High Bluff Drive, Ste. 200. San Diego CA 92130 (11/2010-5/2012)
• **Recipient of the 2010 MSL "Above & Beyond" Award**
• Compliance and Regulatory Team Leader, HEOR research project team member, Team dynamics project lead, Due diligence and Business development project team member
• Establish, develop and maintain collaborative relationships with national and regional opinion leaders, speakers, and clinical

investigators in the areas of pain, surgery, ED, anesthesiologists and Trauma
• Develop and present medical/scientific education to internal and external groups resulting in over 60 local and national presentations per year.
• Work in conjunction with the medical affairs and clinical development teams to evaluate potential external clinical research collaboration opportunities

Senior Medical Liaison, Hematology / Oncology / Critical Care Novo Nordisk® Pharmaceuticals: 100 College Road West, Princeton NJ 08540 (4/04-11/2010)
• **Recipient of the 2009 MSL Circle of Excellence Award**
• **Recipient of the 2008 MSL Circle of Excellence Award**
• **Recipient of the Novo Nordisk Biopharmaceuticals Medical Liaison Rookie of the Year Award for 2004** .
• Worked in the PA/KY/OH region to support and drive hemostasis / oncology / educational and research initiatives from the Medical Affairs and Clinical Research departments
• Designed and implemented MSL info portal to increase MSL operations effectiveness
• National team project leader for HTRS registry patient entry facilitation

Medical Science Liaison Hemostasis / Surgery / Critical Care, Bayer Pharmaceuticals: 400 Morgan lane, West Haven CT 06516 (4/02-4/04)
• Responsible for the scientific development of key opinion leaders in the areas of Cardiothoracic surgery and Cardiothoracic Anesthesia
• Respond to off label request for information from health care providers & for providing formal scientific presentations in response to educational needs from the field
• Acted as a trainer and medical resource to the field sales force

Medical Science Liaison Oncology / Infectious Disease, Bayer Pharmaceuticals: 400 Morgan Lane, West Haven CT 06516 (2/00-4/02)
• Responsible for the scientific development of key opinion leaders in the areas of Infectious Disease, Urological cancer and ED
• Worked with Nationally known NYC Based urologist on an initiative to launch a new chapter of the American Urological Society in NYC

• Provided educational support for NYC urologist looking to increase knowledge base in the area of Erectile Dysfunction
• Respond to off label request for information from health care providers
• Acted as a trainer and medical resource to the field sales force

Sales / Product Management Experience
Product Management Intern, Bayer Pharmaceuticals: 400 Morgan Lane, West Haven CT 06516 (6/00-1/01)
• Responsible for internal public relations and internal awareness level for the launch of *Viadur* for prostate cancer
• Responsible for coordinating and developing sales training activities in preparation for the launch of *Viadur*
• Served as a business consultant to Sales Management and Product Management to guide the strategic development of the *Viadur* launch

CNS Specialty Representative, Bayer Pharmaceuticals: 400 Morgan Lane, West Haven CT 06516 (4/98-2/00)
• Responsible for pre-marketing educational activities, such as Alzheimers disease state education, prior to the launch of *Metrifonate*
• Achieved Avelox launch sales ranking in the top 10% of company gross sales
• Earned MSL promotion as well as District Business Manager Opportunity based upon sales success in my region

Pharmaceutical Sales Representative TAP Pharmaceuticals: 2355 Waukkegan Road. Deerfield , IL 60015 (5/97-2/98)
• Responsible for the sale of *Lupron* for the treatment of prostate cancer and endometriosis to over 200 Urologist and Gynecologist in NYC
• Graduated from TAP University training course in the top 2% of TAP alumni

Medical Device Sales Representative, Americair Corporation of South Western Pennsylvania: 700 Old Pond Road, Bridgeville, PA 15017 (8/96-3/97)
• Marketed home respiratory equipment and services to physicians and hospitals in the Pittsburgh Metropolitan area

• Averaged over 150% of monthly quota resulting in ranking of top sales representative in the North East for 5 consecutive months

Research Experience
Doctoral Research, The ITxM (Institute For Transfusion Medicine) & The University of Pittsburgh Central Blood Bank: " *Motivating individuals with high natural levels of motivation to donate blood towards blood donating behavior"* (5/10-present)
• Designed, implemented and analyzed research project designed to facilitate blood donation at mobile blood donation units at local area high schools through implementation intention planning intervention
• Project performed for completion of the degree of doctor of Philosophy in Industrial Organizational Psychology

Research Specialist, University of Pittsburgh Primate Facility; School of Medicine, Pittsburgh PA 15260 (6/92-6/96)
• Designed, implemented and analyzed pharmacology research trials to investigate the effects of proposed narcotic addiction blocking agents on the self medicating behavior of primates

Student Research Assistant, Pittsburgh Cancer Institute, University of Pittsburgh Medical Center; Pittsburgh, PA 15261 (5/93-5/94)
Student Research Assistant, University of Pittsburgh Department of Clinical Psychology; Pittsburgh, PA 15260 (1/92-5/92)
Clinical Experience:
Psychiatric Therapist Intern; UPMC Medical Center Western Psychiatric Center (5/2006-12/2007 – 2000 hours)
Psychiatric Therapist Intern ; Belleview Hospital Center NY, NY (5/2003-12/2004 – 2000 hours)