Explaining Voluntary Blood Donation from a Communication Perspective

La donación voluntaria de sangre desde la perspectiva comunicativa

A doação voluntária de sangue a partir da perspectiva comunicativa

EULÀLIA P. ABRIL, University of Illinois at Chicago, Chicago, EE.UU. (eulalia@uic.edu)

ABSTRACT

Using the Communication Mediation Model, this study argues that interpersonal communication holds considerable potential to motivate and facilitate voluntary blood donation. To test this claim, three blood donation scenarios are used: past donation, future intention, and intention during an emergency. Results from path analysis using survey data from Colombia show that talking about blood donation is central to voluntary blood donation. The direct effects of blood talk on past donation and future intention are significant. Importantly, blood talk mediates the contribution of other variables in the model, including media use and pro-civic behaviors. Findings hold true for both first-time and repeat donors.

RESUMEN

Utilizando el Modelo de Mediación Comunicativa, se argumenta que la comunicación interpersonal tiene potencial como motivadora y facilitadora de la donación voluntaria de sangre. Para evaluar este argumento, se usan tres tipos de donación: donación pasada, intención futura e intención en caso de emergencia. Los resultados del análisis de ruta usando datos de una encuesta representativa de la población colombiana muestran que hablar sobre donación es central en la donación. Los efectos directos de la conversación sobre la donación pasada y la intención futura son significativos. De especial interés, esta conversación actúa como mediadora del uso de medios masivos y una serie de variables pro-cívicas. Los resultados aplican para donantes primerizos y repetitivos.

RESUMO

Utilizando o Modelo de Mediação Comunicativa, argumenta-se que a comunicação interpessoal tem potencial como motivadora e facilitadora da doação voluntária de sangue. Para avaliar este argumento, são usados três tipos de doação: doação passada, intenção futura e intenção em caso de emergência. Os resultados da análise de rota usando dados de uma enquete representativa da população colombiana mostram que falar sobre doação é central na doação. Os efeitos diretos da conversa sobre a doação passada e a intenção futura são significativos. Especial interesse apresenta a forma como esta conversa atua como mediadora do uso de meios massivos e uma série de variáveis pró-cívicas. Os resultados se aplicam para doadores por primeira vez e reincidentes.

While low- and middle-income countries consti-tute 82% of the world's population, they only benefit from half of the world's 108 million blood donations (World Health Organization, 2014). In Latin America, the situation is similar, with the region en bloc failing to meet the threshold for a safe level of blood supply (Pan American Health Organization, 2013). Apart from blood donation shortages, meeting blood transfusion needs in Latin American countries is also challenged by the presence of non-voluntary donations (Aslam & Syed, 2005; Pan American Health Organization, 2013). Voluntary blood donation is defined as the altruistic, non-remunerated act of donating blood (Beltrán, García & Rodríguez, 2009). Non-voluntary donation is the opposite: remunerated or bartered blood. Thus, examining factors that can lead to increased voluntary blood donation in Latin America is crucial.

Most previous studies have relied on demographic indicators, altruistic norms or behaviors to establish donor profiles that predict both first-time and habitual donors (Goncalez et al., 2008; Masser, White, Hyde & Terry, 2008; McMahon & Byrne, 2008; Piliavin & Callero, 1991). These studies show that past blood donation is a strong predictor of future donation (Godin, Conner, Sheeran, Bélanger-Gravel & Germain, 2007; Schlumpf et al., 2008). Yet, research in the area of donor profiles has not translated into significant increases in global blood collection (World Health Organization, 2014).

Multiple studies have stressed the need to study the communicative aspects of donation more systematically (Bettinghaus & Milkovich, 1975; Glynn et al., 2002; Ringwald, Zimmermann & Eckstein, 2010; Thomson et al., 1998), but few advances have been made (Piliavin 2013, personal communication). Notably, a study showed that interventions delivered in a personal way (face-to-face) tend to be more effective (Godin, Vézina-Im, Bélanger-Gravel & Amireault, 2011). Other results (Rojas & Puig-i-Abril, 2006) indicated that mass media variables had no direct effect on blood donation, but social capital and volunteerism were positively associated with blood donation. However, these results were limited in that conversation and the variables' causal ordering were not considered.

Despite the importance of interpersonal conversa-tions in health communication models, blood donation talk, either with friends or family members, has not been adequately explored. In the organ donation literature, talk is a strong predictor of donation behaviors (Bresnahan et al., 2007; Morgan & Miller, 2002; Morgan, Harrison,

Afifi, Long & Stephenson, 2008), so it is likely that it may be a factor in voluntary blood donation.

Using a national random sample from Colombia, this study examines the paths to blood donation using the Communication Mediation Model (CMM; McLeod et al., 1996), with blood donation talk as the facilitator of people's attitudes and predispositions toward voluntary blood donation. Considering the especially acute need for blood in lower-income countries (Bagozzi, 2006), the study focused the inquiry on these areas using the case of Colombia, a country that has the basic infrastructure for blood collection in place, yet has difficulty obtaining citizen participation.

BLOOD DONATION ANTECEDENTS

The majority of blood donation studies have focused on (a) establishing personal predispositions and social characteristics (orientations) associated with blood donation to potentially define a universal blood donor profile; and (b) studying the impact of communication variables on blood donation.

PERSONAL PREDISPOSITIONS AND BLOOD DONATION

Scholars have suggested that some pro-social values may foster blood donation, for instance, altruistic motivations (Ferguson, France, Abraham, Ditto & Sheeran, 2007; Glynn et al., 2002; Lee, Piliavin & Call, 1999). Altruistic values appear to be especially beneficial for converting occasional donors into regular donors (Belda Suárez, Fernández-Montoya, Rodríguez-Fernández, López-Berrio & Cillero-Peñuela, 2004; Boe & Ponder, 1981; Lee et al., 1999; Steele et al., 2008). The conversion process involves assimilating norms and values via repeated blood donation, akin to a positive cycle of virtue acquisition (Piliavin & Callero, 1991). Although not empirically tested, some argue that altruism may likely be an outcome of repeated donation rather than a predisposition (Piliavin & Callero, 1991).

Other variables typically attached to a donor profile are role–person merger or role identity, and fear (of needles or blood). Role–person merger facilitates the incorporation of both social structural and historical characteristics into the variable; it is a self-identification of the type of person who donates blood, internalizing the identity of a blood donor, thus creating a willing-ness to donate. Researchers have found role merger to predict blood donation when the context of the social structure (the existence of blood donor groups and blood needs) is placed at the center of blood donation

(Callero, Howard & Piliavin, 1987; Piliavin, Grube & Callero, 2002). Fear, on the other hand, has been associated with non-donor behavior (Nilsson Sojka & Sojka, 2007). Certain structural features, such as having a convenient place to donate, have also been considered as having a positive impact in blood donation (Nilsson Sojka & Sojka, 2007).

Other social aspects of the donation process are equally important. For instance, according to Bourdieu (1986), social capital can act as a resource network of a person deriving from one's social contacts and group memberships. Several studies have found a positive link between social capital and voluntary blood donation (see Alessandrini, 2007). Similarly, the positive link between volunteering and voluntary blood donation has been shown to be strong in several other studies (Callero, Howard & Piliavin, 1987; Lee, Piliavin & Call, 1999).

Finally, being familiar about the blood donation needs in one's network or at the societal level could help potential donors to decide to donate. In effect, knowing about the blood donation needs of the population as well as the needs of friends, family, or acquaintances has been associated with more voluntary blood donation (Beltrán et al., 2009).

COMMUNICATION AND BLOOD DONATION

Two communication variables have been studied in relationship to voluntary blood donation: mass media (Rojas & Puig-i-Abril, 2006) and interpersonal communication (Godin, Conner, Sheeran, Bélanger-Gravel & Germain, 2007; Healy, 2000; Royse & Doochin, 1995; Thompson, 1993). Although Rojas and Puig-i-Abril did not find a relationship between mass media and voluntary blood donation, their variables were not donation-related per se; they were general media use items. So it remains to be seen whether mass media, for instance health news, are related to voluntary blood donation. Literature on cancer communication indicates the importance of health news to educate and disseminate information for better cancer health, both for the affected individual and for members of the community; so, it is a likely factor (Abril et al., 2015).

In terms of interpersonal communication, individuals are more likely to donate blood if other people within their social networks also do so (Godin et al., 2007; Healy, 2000; Royse & Doochin, 1995; Thompson, 1993). Gillespie and Hillyer (2002) concluded that 75% of donors have family members or friends who have donated blood at least once, while Nilsson and colleagues (Nilsson, Sojka & Sojka, 2007) found that

47% of first-time donors gave blood due to a friend's influence. Interpersonal networks have an enormous capacity to relay information about blood donation experiences: Members of these networks can act either through peer pressure (Boe & Ponder, 1981) or as socializing devices that encourage donating blood (Lee et al., 1999).

The relationship between family talk about donation and donation is significant in the organ donation literature (Afifi, Morgan & Stephenson, 2006; Guadagnoli et al., 2001; Morgan, 2004; Smith, Kopfman, Massi Lindsey, Yoo & Morrison, 2004)—and researchers even consider talk the ultimate independent variable before donating an organ (Bresnahan et al., 2007). Furthermore, many campaigns for organ donation include components specifically designed to spark discussion with family members (Morgan, Harrison, Afifi, Long & Stephenson, 2008). A recent report looking at blood donation patterns for the city of Bogotá, established that non-donors, donors, and habitual donors differed in frequency of talk (about blood donation), but not in their demographic characteristics or attitudes about altruism or solidarity (Rojas, Suarez, Puig-i-Abril, Camacho & Rebollo, 2010).

Still, to fully compare blood to organ donation key differences between them must be considered. First, blood donation is a recurrent behavior (within physical limits), whereas organ donation is generally not. Second, individuals decide for themselves whether to give blood, while organ donation predominantly takes place postmortem, giving family members a clear stake in the decision to donate (Morse et al., 2009), or even the last word (Morgan, 2004). Hence the path from talk to organ donation is *necessarily* mediated by family consent. Finally, in the case of postmortem organ donation there is no one-to-one relationship between being a donor and donating an organ, which contrasts sharply with the case of blood donation. Thus, while it may seem appropriate at first to use existing organ donation models (Afifi, Morgan & Stephenson, 2006) to analyze blood donation, organ donation is not equivalent to blood donation, and thus its models are not suitable for blood donation. Let us review, in turn, the relationship between talk and blood donation.

TALK AND THE COMMUNICATION MEDIATION MODEL

A recurrent theme in blood donation studies is that interpersonal communication matters (Geyer, 2005). Blood donation is more prevalent in people who

associate with others—and presumably talk about donating blood—in social groups or associations (Rojas & Puig-i-Abril, 2006), while volunteering for a community project (Alessandrini, 2007), or simply via email contact (Geyer, 2005). Some health campaigns focus on actually stimulating talk rather than triggering a certain behavior (Sood, Shefner-Rogers & Sengupta, 2006)—with talk ultimately expected to encourage the behavior the campaign intends to promote. In fact, talk is expected to mediate the effects on blood donation.

The notion that talk mediates behavioral outcomes is far from new. Numerous scholars in the communication literature have looked at the role of everyday talk or conversations using the CMM, or in the context of health communication (Pecchioni, Thompson & Anderson, 2006; Pecchioni & Keeley, 2011; Welch Cline, 2011). In its original form, the CMM reflects an O-S-O-R model (Markus & Zajonc, 1985). The first O (Orientations) considers individual attributes, core values, and community or context; the S (Stimulus) considers communications such as media use and interpersonal discussion; the second O represents subsequent Orientations (attitudes, knowledge, cognitive complexity, or political efficacy) that can mediate the relationship between communication and participation; and the R represents the subsequent behavioral Response (Markus & Zajonc, 1985).

Under the rubric of communication mediation, the work of McLeod (McLeod et al., 1996; McLeod, Scheufele & Moy, 1999; Sotirovic & McLeod, 2001) and subsequent authors (Eveland, 2001; Eveland, 2002; Eveland, Shah & Kwak, 2003; Rojas & Puig-i-Abril, 2009; Shah et al., 2007) has shown that interpersonal networks of political discussion as well as surveillance uses of media (news seeking) result in increased and civic participation (broadly defined). Communication practices can affect participation directly or indirectly through gains in knowledge, efficacy, or changes in attitudes. Through the years, a series of upgraded CMM models have emerged, each emphasizing parts of the model that were under-specified. For instance, an O-S-R-O-R model indicated the importance of reasoning for the individual between stimuli and subsequent orientations (S-R-O; Cho et al., 2009; Shah et al., 2007), while and O-S-O-R-R specification indicated a chain of related behaviors at the end (R-R; Rojas & Puig-i-Abril, 2009).

Many pro-civic behaviors are similar to blood donation in nature. Donating money, time, or both are behaviors that are repetitive, incur a cost to the individual, and whose consequences fall upon a third party—much like blood donation. In fact, these similarities have already been established (Lee et al., 1999).

Hence, this study proposes using insights from communication mediation that emphasize blood talk in explaining blood donation. Specifically, it is hypothesized that talking about donating blood can promote blood donation and that the path to donation includes talk as a mediating process. While a mediating relationship is proposed, this is not to say that there is a perfect mediating relationship (Baron & Kenny, 1986). This study leaves open the possibility that some attitudes and predispositions have a direct effect on blood donation, above and beyond their mediating role. Studies using CMM models have also included direct links from stimuli or orientations to responses (Cho et al., 2009; Shah et al., 2007).

THE SITUATIONAL CONTEXT IN BLOOD DONATION

One important aspect of blood donation is the situational context in which donation takes place. Past blood donation (Ferguson & Bibby, 2002; Goncalez et al., 2008; Piliavin & Callero, 1991), future intentions (Buciuniene, Stonienë, Blazeviciene, Kazlauskaite & Skudiene, 2006; Ferguson & Bibby, 2002; Gillespie & Hillyer, 2002; Godin, Conner, Sheeran, Bélanger-Gravel & Germain, 2007; Schlumpf et al., 2008), and intentions during an emergency (Buciuniene et al., 2006) have all been established in the literature as outcome variables of blood donation in separate studies. This study, however, compares these different donation contexts side by side with the purpose of exploring similarities and differences that can shed light on how to theorize about the role of talk in blood donation. Because the literature indicates that behavior varies according to situational contexts (Buciuniene et al., 2006), the interest lays in observing the CMM under each scenario. In particular, this study seeks to explore whether the CMM using blood talk at the center applies to all scenarios.

A few blood donation studies have centered on how external factors such as natural disasters or social tragedies can stimulate blood donation (American Red Cross, 2005). However, although these factors mobilize people to donate blood quickly, disasters do not guarantee a steady supply of donors (Cruz Roja Colombiana [Colombian Red Cross], 2013). Yet, examining donations in these contexts could be helpful in identifying latent characteristics (such as wanting to help) that could motivate people to donate blood.

Therefore, it is critical to compare blood donation as a regular act versus as an emergency response.

By employing behavioral intentions in two of the models, the assumption is that intentions are a strong predictor of (future) behaviors (Ajzen & Fishbein, 1970), even though the relationship is not one-on-one. Indeed, intentions to donate blood are the main determinant of blood donation, but they do *not necessarily* lead to donation (Godin, Vézina-Im, Bélanger-Gravel & Amireault, 2011).

HYPOTHESES AND RESEARCH QUESTION

Three mediation models will be tested, one with past blood donation as the outcome variable (Model 1), and two behavioral intention models: willingness to donate blood in the near future (Model 2) and willingness to donate blood in response to an emergency or disaster (Model 3). Past donation is used as a control variable in Models 2 and 3 (Ferguson & Bibby, 2002).

The proposed hypotheses follow a CMM depiction, with blood talk at the center and original Orientations (O_1: demographics and general orientations) residualized in the analysis to simplify it since they were not the focus. In addition, five direct paths are freed corresponding to the variables directly linked to blood donation in literature (altruism, civic duty, convenience, fear, and role merger). The differences between the three models are also explored given the three-scenario consideration.

The positive (negative for fear) relationship between all the independent variables (altruism, civic duty, convenience, role merger, health news, individual blood need awareness, societal blood need awareness, health-related social capital, and volunteering) and

H1a: voluntary blood donation,

H1b: future intention, and

H1c: emergency donation.

will be mediated by blood donation talk.

Altruism, civic duty, convenience, fear, and role merger will be positively (negatively for fear) related to

H2a: voluntary blood donation

H2b: future intention, and

H2c: emergency donation.

RQ1: Will the three proposed models—past blood donation, future blood donation intention, emergency blood donation intention—differ in fit to the data?

METHODS
THE CASE OF COLOMBIA

The World Health Organization (World Health Organization, 2010) recommended in 2010 that 40–50 units of blood be available for every 1,000 citizens. In Colombia, the national average is only 11 units for every 1,000 citizens (Camacho, 2004). Some areas like the capital city of Bogotá have a higher average, 26 units per 1000 citizens (Instituto Nacional de Salud [National Institute of Health], 2008), yet other areas remain very low (World Health Organization, 2008).

In areas where voluntary blood donation lags, donation through replacement or purchase prevails despite the limited quality of these methods (Healy, 1999; Oswalt, 1977; Vallejo, Quiceno, Ospina, Fajardo & Valencia, 2004). Further, people who do not donate voluntarily, for instance via replacement[1] or for money, tend to have higher rates of HIV, hepatitis viruses, and other blood-borne infections as compared with voluntary blood donors (Domen, 1995; World Health Organization, 2014). Some organizations, such as the Pan American Health Organization, estimate that only 20% of the total blood collected in Colombia comes from voluntary donors (Pan American Health Organization, 2004). A more recent WHO estimate gives a percentage of 61% (World Health Organization, 2008), but blood donation is still far from being 100% voluntary (the required level). Because the Colombian situation is rather generalizable in Latin America (Beltrán et al., 2009), study results could help explain and design blood donation efforts in the region.

DATA

This study relied on national random survey data collected in August 2008 in 10 cities in Colombia that represented Colombia's adult urban population. Seventy-six percent of Colombia's 44.5 million inhabitants live in urban areas (Departamento Administrativo Nacional de Estadística [Colombian National Department of Statistics], 2005).

Survey respondents were selected using a multistep stratified sample procedure that selected households randomly, proportionate to the city size recorded in census data. Once the number of households was allocated for a given city, city blocks were randomly selected proportionate to housing districting and strata. Individual households were randomly selected within each block, and finally, an individual respondent was randomly identified by selecting the adult in the

household that most recently had a birthday. Up to three visits to each household were made to increase survey participation. A local professional polling firm in Bogotá collected the data; 1,033 face-to-face completed responses were obtained (83% response rate as calculated by using American Association for Public Opinion Research guidelines). However, only 791 responses were retained for analyses because participants that could not donate blood for medical or age-related reasons, or due to past behaviors prohibiting blood donation (such as having a tattoo or a piercing) were excluded.

The study protocol was approved by the host university's IRB board. Informed consent was obtained for each participant in writing.

MEASUREMENT

Dependent variables. *Blood donation talk* (talking about blood donation) was measured with a statement indicating the extent to which individuals talked about blood donation with family members or friends using a Likert scale from "totally disagree" (0) to "totally agree" (5). Prominent surveys such as Pew Internet & American Life Project, Pew Research Center, and American National Election Studies quantify talk using a similar single-item measure like this one. *Past blood donation* was measured by asking how many times individuals had donated blood in the past year similar to Alessandrini (2007) and Nilsson Sojka and Sojka (2007). *Future blood donation* intention was measured by asking how likely individuals were to donate blood in the next six months, on a scale from "not at all likely" (0) to "very likely" (5). Finally, *emergency blood donation intention* was measured by asking participants whether they would donate blood if there were a disaster and a lot of people needed blood, on a scale from "not at all likely" (0) to "very likely" (5). See Table 1 for descriptive statistics on all measures. Donation intentions are operationalized akin to the mainstream literature on future donation intentions (see Schlumpf et al., 2008).

Independent variables. *Altruism* was gauged by averaging two semantic differential items, asking how much participants associated blood donation with "indifference" (1) or "solidarity" (7), and "business" (1) or "altruism" (7), (Pearson's r = 51). *Civic duty* was measured with three items that asked participants to evaluate three statements (a) receiving blood is a

Table 1. Descriptive Statistics and Partial Correlations among Variables

Variables	Mean/%	SD	Talk	Past	Fut	Eme	Alt	Duty	Con	Fear	Role	New	Ind	Soc	Cap
Talk	1.73	1.79	-												
Past donation	.18	.47	.29*	-	-	-	-	-	-	-	-	-	-	-	-
Future intention	2.54	1.94	.28*	.22*	-	-	-	-	-	-	-	-	-	-	-
Emergency intent	4.02	1.58	.17*	.14*	.51*	-	-	-	-	-	-	-	-	-	-
Altruism	5.63	1.59	.14*	.15*	.31*	.43*	-	-	-	-	-	-	-	-	-
Civic duty	3.90	1.24	.26*	.16*	.32*	.38*	.39*	-	-	-	-	-	-	-	-
Convenience	5.06	2.17	.18*	.15*	.20*	.19*	.22*	.23*	-	-	-	-	-	-	-
Fear	3.67	2.29	-.17*	-.23*	-.26*	-.18*	-.21*	-.18*	-.52*	-	-	-	-	-	-
Role merger	2.07	1.95	.27*	.21*	.36*	.27*	.24*	.41*	.27*	-.34*	-	-	-	-	-
Health news	3.41	1.41	.15*	.03	.06	.10*	.08*	.09*	.05	-.03	.15*	-	-	-	-
Individual aware.	42%	-	.17*	.07*	.04	-.01	.01	.15*	.08*	-.08*	.13*	.12*	-	-	-
Societal awareness	42%	-	.02	-.00	.12*	.13*	.12*	.20*	.06	-.05	.09*	.07*	.09*	-	-
Health soc. capital	5%	-	.14*	.13*	-.01	-.00	-.01	-.01	.07	-.06	.04	.08*	.05	-.02	-
Volunteering	.19	.35	.14*	.07*	.10*	.08*	.13*	.16*	.05	-.06*	.12*	.12*	.11*	.09*	.09*

All correlations controlled for gender, age, education, income, and replacement. All correlations are Pearson, except for the ones with individual and societal need awareness and volunteering, which are Spearman. Significance levels: *p < .05;[5] N = 791.

Source: Own elaboration.

citizen's right, (b) giving blood is a duty of all citizens in the condition to do so, and (c) giving blood should be one of many good social habits, on a Likert scale from "totally disagree" (0) to "totally agree" (5), (Cronbach's α = .79). Both altruism and civic duty were models similar to Buciuniene and colleagues (2006). *Convenience* was measured as the degree to which participants felt blood donation was "difficult" (1) or "easy" (7). *Fear* was the degree to which participants associated blood donation with "fear" (1) or "tranquility" (7). Finally, for *role merger*, people were asked whether they wanted to be part of a blood donor organization, on a Likert scale from "totally disagree" (0), to "totally agree" (5) (Piliavin, Grube & Callero, 2002).

Health news was measured asking how much attention participants paid to news about health topics, on a scale from "no attention" (0) to "a lot of attention" (5) (Rojas & Puig-i-Abril, 2006). *Individual (blood) need awareness* was measured asking participants whether they knew anybody who had needed a blood transfusion (yes = 1). *Societal (blood) need awareness* was gauged asking people whether they thought that blood reserves in hospitals and blood banks were "abundant" (0) or "scarce" (5), and then folding the measure into a correct (1 = scarce reserves) and incorrect (0 = abundant reserves) variable as a measure of awareness of societal blood collection needs (Glynn et al., 2002). *Health-related social capital* was calculated by asking participants whether they were members of a health organization (not a gym), on a scale that included "no" (0), "yes" (1), and "active member" (2) (Rojas & Puig-i-Abril, 2006). Finally, *past volunteering* was determined by averaging whether participants had done any volunteer work and whether they had worked for a community project, (yes = 1), (r = 58) (Alessandrini, 2007).

Controls. *Gender* (57% female); *age* (M = 40 years, SD = 14); *education*, on a scale from "no formal education" (1) to "postgraduate degree" (8) (median = 5, "completed high-school"); and *income* (using the proxy house stratum; i.e., the stratum of the block where the household was located, which strongly correlates with income), measured from "stratum 1" (1) to "stratum 6" (6) (M = 2.9, SD = 1.1). A control variable representing whether an individual had donated blood via *replacement* (44% did) was also added to make sure the models only included voluntary blood donation. The controls were residualized by regressing all the measures on these controls, thereby creating a covariance matrix that was then used as input to fit the models to the data.[2]

ANALYSIS

Three path analysis models were used to test the hypotheses posed in this study. The MPlus' (version 6.0) Maximum Likelihood estimator with Robust standard errors (MLR) was used in all models, which runs robust maximum likelihood estimation using the Huber-White covariance adjustment. The MLR estimator is robust, which means that it can estimate path coefficients well even in instances of non-normality in the data.

RESULTS
PAST BLOOD DONATION

A partial correlation table on all variables appears on Table 1. The model predicting past blood donation had a very good fit to the data since the Likelihood Ratio test (LR) was non-significant (*p* = .14). Similarly, both the Comparative Fit Index (CFI) (.98) and the Tucker-Lewis Index (TLI), (.91) indicated a remarkable fit. Finally, the Root Mean Square Error of Approximation (RMSEA) also indicated a very good fit (.03), 90% CI [.00, .06].
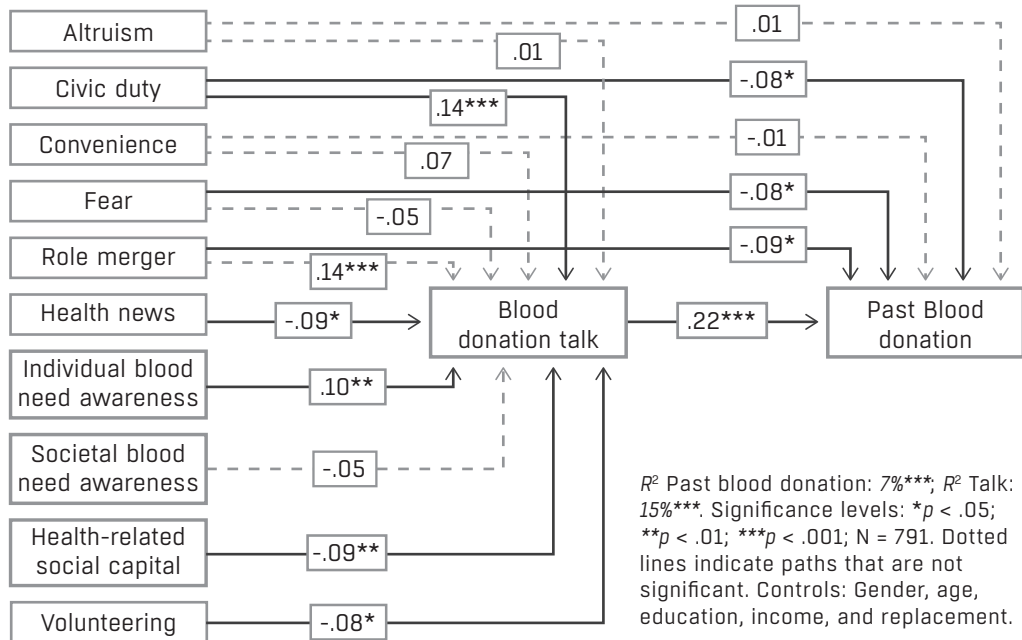
All betas given are standardized[3] for comparison purposes. Overall, results showed that the effect of *most* independent variables on past blood donation was positively (except for fear) mediated by talk, thus *partially* supporting H1a. Altruism, convenience, fear, and societal need awareness were not related to talk, but all the significant variables, except fear, were mediated through talk. The significant paths to talk were civic duty, role merger, health news, individual need awareness, health-related social capital, and volunteering. The coefficients on the paths in Model 1 are shown in Figure 1.

Civic duty, fear, and role merger—but not altruism or convenience—had a significant direct effect on past blood donation. These are variables typically used in blood donation research. This result partially supports H2a.

To assess the mediation hypothesis, the indirect relationship of the variables in the model was calculated. Of the 10 variables considered, four had no relationship to talk (altruism, convenience, fear, and societal need awareness). Of the remaining six, five had significant indirect effects to past donation: civic duty (β = .01, *p* = .00), role merger (β = .01, *p* = .01), health news (β = .01, *p* = .03), individual need awareness (β = .02, *p* = .02), and health-related social capital (β = .03, *p* = .02).[4] The largest contributor to blood donation was the direct effect of talk (β = .22, *p* = .00).

Model 1 explained 7% of the variance through past blood donation and 15% through talk. These

Figure 1. Results for Past Blood Donation

R² Past blood donation: 7%***; R² Talk: 15%***. Significance levels: *p < .05; **p < .01; ***p < .001; N = 791. Dotted lines indicate paths that are not significant. Controls: Gender, age, education, income, and replacement.

Source: Own elaboration.

were *residual* variances, with demographics and blood donation via replacement already accounted for. There were no modification indices suggesting a significant better fit through the addition or reduction of paths, and alternative non-nested models proved inferior, with higher Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC) (Kaplan, 2009).

FUTURE BLOOD DONATION INTENTION

Model 2, which predicted future blood donation intention, also had a very good fit to the data with a non-significant LR test (p = .47). Likewise, the CFI (1.00), TLI (1.01), and RMSEA indicated a remarkable fit (.00), 90% CI [.00, .05]. Past blood donation was added as an independent variable in this model, with paths to talk and donation intention to control for past donation.

Results indicated that, similar to Model 1, the effect of *most* independent variables on future blood donation intention was mediated by talk, thus *partially* supporting H1b. While civic duty, role merger, health news, individual need awareness, health-related social capital, past volunteering, and past blood donation were mediated through talk, altruism, convenience, fear, and societal need awareness were not. Talk was

positively related to future blood donation intention. The significant paths to talk were civic duty, role merger, health news, individual need awareness, health-related social capital, and volunteering. Past blood donation was also significantly related to intention. The coefficients on the paths in Model 2 are shown in Figure 2.

Altruism, civic duty, fear, and role merger (but not convenience) were significantly (and positively except for fear) associated with future blood donation intention, thus supporting H2b. The significant paths to future blood donation intention were altruism (β = .18, p = .00), civic duty (β = .11, p = .004), fear (β = –.11, p = .01), and role merger (β = .19, p = .00). Past blood donation was not related to future blood donation intention.

To assess the mediation hypothesis, the indirect relationship of the variables in the model was calculated. Of the 11 variables considered, four had no relationship to talk (altruism, convenience, fear, and societal need awareness). Of the remaining seven, five had significant indirect effects to future donation: civic duty (β = .03, p = .00), role merger (β = .02, p = .02), health news (β = .02, p = .03), individual need awareness (β = .06, p = .02), and past donation (β = .03, p = .02)—the largest. The largest contributor to blood donation was talk (β = .13, p = .00).

Figure 2. Results for Future Blood Donation Intention
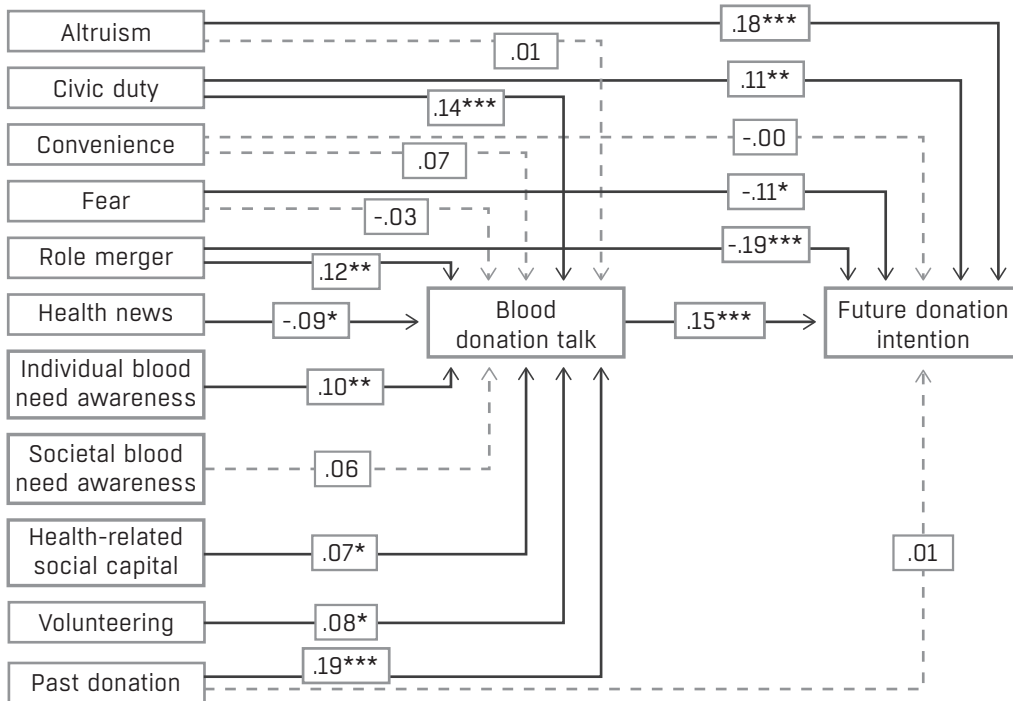
R^2 Past blood donation: *23%****; R^2 Talk: *19%****. Significance levels: **p* < .05; ***p* < .01; ****p* < .001;
N= 791. Dotted lines indicate paths that are not significant. Controls: Gender, age, education,
income, and replacement.

Source: Own elaboration.

Model 2 explained 23% of the variance through future donation intention and 19% through talk, a much larger explained R^2 than in Model 1. There were no modification indices suggesting any better fit, and alternative non-nested models also proved inferior (higher AICs and BICs).

EMERGENCY BLOOD DONATION INTENTION

Finally, Model 3, predicting emergency blood donation, also had a very good fit to the data, since the LR test was non-significant (*p* = .67). Likewise, the CFI (1.00), TLI (1.03), and RMSEA (.00), 90% CI [.00, .040], indicated a remarkable fit as well. Similar to Model 2, past blood donation was also added as an independent variable to control for past donor behavior.

Results showed that the effect of independent variables on emergency blood donation was not mediated by talk, thus support for H1c was lacking. Talk was not related to emergency blood donation intention and thus there was no possible mediation effect. The significant

paths to emergency blood donation were altruism, civic duty, and role merger—but not convenience, fear, or past blood donation, so partial support for H2c was achieved. Because talk was not significant, remaining variables having significant paths to talk were irrelevant. Figure 3 shows the coefficients on the paths in Model 3.

Model 3 explained 25% of the variance through emergency donation and 19% through talk (though they constituted two separate models given that talk was not related to emergency donation). There were no modification indices indicating any better fit, and alternative non-nested models also proved inferior (higher AICs and BICs).

The three models did differ in that talk was central in the past and future intention blood donation models, but it did not have a mediating role (in fact, it had no role) in the emergency blood donation model. Comparing the three models together using information criteria (RQ1)—past (AIC = 26313.60, BIC = 26407.07), future

Figure 3. Results for Emergency Blood Donation Intention
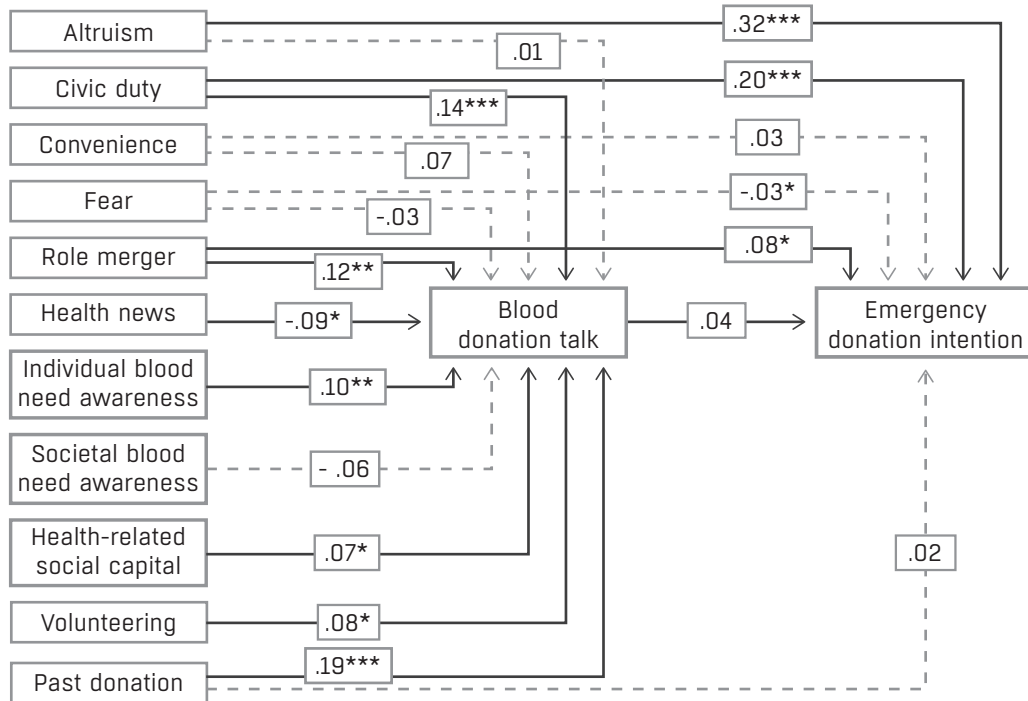
R^2 Past blood donation: *25%****; R^2 Talk: *19%****. Significance levels: **p < .05; **p < .01; ***p < .001;*
N= 791. Dotted lines indicate paths that are not significant. Controls: Gender, age, education,
income, and replacement.

Source: Own elaboration.

(AIC = 29370.24, BIC = 29473.05), and emergency (AIC = 29019.09, BIC = 29121.90)—the model explaining past donation had the best fit, followed by emergency blood donation and intention. It must be noted that the emergency model were two disconnected models, and so, the comparison is unwarranted.

DISCUSSION

With voluntary blood donation at low levels in most Latin American countries (Pan American Health Organization, 2013), the need to meet the demand for blood has never been more crucial. This paper explored blood donation from a communication perspective—a focus lacking in the current transfusion literature—for the case of Colombia. The results suggest that, in predicting past blood donation and future donation intentions, the effects from most independent variables were mediated through blood donation talk with family or friends. Although some variables, such as fear, only

affected donation directly, overall the results support a modified CMM hypothesis and extend its use to the transfusion and public health literature. With a few exceptions—notably, Kwon, Yoo, and Aguilar (2013), or Kam and Lee (2013), though the latter did not use the term CMM—the CMM has not been applied to the realm of health communication, and even less so to transfusion studies. Thus, the versatility of the CMM should be noted.

Similarly, CMM offers flexible mediation patterns. Study results here have shown that a (O_1)-SO_2-R-R structure prevails for voluntary blood donation, with O_1 taken into account in the controls. Because stimuli and subsequent orientations (S-O_2) are difficulty to separate (Shah et al., 2007), they have been bundled together in models 1-3. Similar to Shah and colleagues (Cho et al., 2009; Shah et al., 2007), blood talk may be the reasoning (Shah et al., 2007), expression (Puig-i-Abril & Rojas, 2007), or reception (Shah et al., 2007) communicative step that is necessary to connect the

stimuli-orientations to the dependent variable and so it offers another step in the mediation path.

The results imply that talking about blood donation is central to the regular provision of blood in Colombia. The mediation through talk most likely took place because talking about health news or volunteering, say, may be conversation material that can spur donation behaviors among those involved in the conversation. However, the specific mechanisms (e.g., reciprocity or additional mediators) that lead talk to mediate the effect of the independent variables on blood donation were not tested—a development that should be examined in future studies. Talk was the largest predictor of blood donation in the past donation model (Model 1), but not in the model regarding future intentions to donate (Model 2) despite remaining a strong predictor. In the scenario of emergency donation, the mediation of talk was halted, suggesting that (a) rather than talking about blood donation, almost everybody was aware of it and decided to act, or that (b) everybody talked about the situation, and hence the variable no longer had any relationship. This implies that talking about blood donation is critical to donating blood or intending to do so, but less so in emergency situations.

Altruism, once thought of as an important antecedent of blood donation, had no relationship with past blood donation, echoing Ferguson and colleagues (Ferguson, Farrell & Lawrence, 2008) who found that benevolence, and not altruism, predicted donation. However, altruism was a significant antecedent in the models for intentions to donate blood, paralleling findings by Schlumpf and colleagues (Schlumpf et al., 2008). It could be that altruism and blood donation practices are unrelated, and the relationship is mediated through behavioral intentions or a phenomenon developed through donation, not before it (Piliavin & Callero, 1991). In order to find definitive answers, panel data is warranted.

Convenience had no bearing in any model, suggesting that emphasizing it may not benefit blood collection campaigns. Fear only correlated with past blood donation and future intentions, but not donation in an emergency, indicating that fear can be overcome in these situations. Finally, role merger or the importance of social structure had a strong correlation with on past and future donation, and a smaller one in emergency donation.

Notably, having volunteered was only a small antecedent in the past donation model, which contrasts with its focus in the literature (see, for example, Alessandrini, 2007, though the study did not test the direction of the relationship). Furthermore, health news was significant only in the past and future donation models, which underscores the importance of mass communication outlets to secure donations. The same result was obtained in the case of individual need awareness. Yet, in the case of societal need awareness, it was not significant in any model, which challenges campaigns' appealing to societal needs in a country or region to attract blood donors. Health-related social capital was significant, but only for regular donation. Thus, none of the independent variables, whose relationship was exclusively mediated by talk, had any effect on the model predicting donation in an emergency.

Overall, these results support the argument that regular blood donation and blood donation in emergencies are dissimilar and are predicted differently (Nilsson Sojka & Sojka, 2007; Schlumpf et al., 2008; Steele et al., 2008). While emergency blood donation generates a supply peak useful in the aftermath of a disaster or emergency, it does little for health systems needing a stable blood supply (Cruz Roja Colombiana [Colombian Red Cross], 2013). This does not mean that emergency blood donation is inconsequential because it could attract new donors if mechanisms were in place. Building on the CMM (McLeod et al., 1996), this study ultimately shows that talk matters for the kind of blood donation that is fundamental for a health system: regular, voluntary donation. Thus, in designing campaigns to attract donors, targeting the altruist is far less valuable than sparking conversations about blood donation. Future studies should investigate talk in connection with transforming first-time donors into repeat donors (Gillespie & Hillyer, 2002).

This study has some limitations. First, talk was operationalized with one item and involved only family and friends. Having only one item for this construct implies that its reliability cannot be assessed and thus measurement error could have affected our results. However, previous research in multiple fields about the role of talk has repeatedly used this variable with only one item (see datasets from Pew Internet & American Life Project, Pew Research Center, and American National Election Studies). Even the organ donation literature has many times configured donation talk this way (Afifi, Morgan & Stephenson, 2006)—and sometimes with a *dichotomous* item (Guadagnoli et al., 2001; Morgan & Miller, 2001; Morgan, 2004; Siminoff, Gordon, Hewlett & Arnold, 2001)—thus providing confidence in the results here. Nevertheless, future research needs to employ a more robust measure of

talk, which would not only provide more reliability in assessing this construct, but would also permit comparing different networks as well as different contexts of conversation. Similarly, suggesting that the mediating role of talk occurs within the family or the network of friends may not account for the possible importance of more heterogeneous talk (such as conversations with coworkers), which tends to bring new information into a system (Granovetter, 1973). Thus, study results may have erred on the conservative side.

Second, there is no information about the actual content of the talk regarding donation. The content of these conversations could be as influential as—or even more influential than—conversation networks. Future research should address the specific kinds of conversation that can increase or modify the effects found here, and identify strategies that could be used by health systems or blood donation campaigns.

Finally, the use of cross-sectional data does not allow claims about the direction of the effects. Even though

(a) competing path models in which the direction of causation was reversed had a worse fit than models 1-3; and that (b) previous literature testing interpersonal networks of political discussion (Eveland, 2001; Eveland, 2002; Eveland, Shah & Kwak, 2003; McLeod et al., 1996; McLeod et al., 1999; Rojas & Puig-i-Abril, 2009; Shah et al., 2007; Sotirovic & McLeod, 2001) supports the direction of effects shown here, only path analysis models using longitudinal data can ultimately put this issue to rest for the case of blood donation.

This study constitutes a novel contribution to characterizing and understanding voluntary blood donation in Colombia. The findings here expand the application of the CMM model beyond political participation and the O-S-O-R sequence, and offer, for the first time—with a few countless exceptions—the consideration of communication theory in the blood donation field. On a practical level, study results may directly benefit other Andean countries in the same predicament, such as Bolivia, Chile, Ecuador, Peru, and Venezuela (Schmunis & Cruz, 2005), as well as other countries in the Latin American region.

FOOTNOTES

1. Donation from a family member or friend as a barter exchange for the blood needs of someone receiving a transfusion.

2. Residualizing is a method to take into account the effect of controls so that they do not need to appear in the model. Some authors have criticized this method for having a conservative or liberal bias in estimating significant effects (see Darlington & Smulders, 2001). Although these shortcomings are acknowledged, (a) residualizing can be effective in conveying results that could be unnecessarily complex (Weymouth & Feinberg, 2011), and (b) the model has been estimated with and without residualization and the main results about the centrality of talk remain the same.

3. Standard coefficients use the variances of the continuous latent variables and the background and/or outcome variables (www.statmodel.com).

4. The standardized indirect effects coefficients are comparable, though no formal test has been employed here to test for their difference.

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ABOUT THE AUTHOR

Eulàlia P. Abril, assistant professor of communication at the University of Illinois at Chicago. She has a Ph.D. in mass communication from the University of Wisconsin-Madison. Her research areas include health and political communication with an emphasis on, new media effects. Her research has been published at the *Journal of Health Communication, Health Communication, Communication Research*, and the *Journal of Communication.*