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Promoting HIV Vaccine Research in African American Communities: Does the Theory of Reasoned Action Explain Potential Outcomes of Involvement?

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Abstract

The HIV/AIDS pandemic continues to challenge the African American community with disproportionate rates of infection, particularly among young women ages 25 to 34 years. Development of a preventive HIV vaccine may bring a substantial turning point in this health crisis. Engagement of the African American community is necessary to improve awareness of the effort and favorably influence attitudes and referent norms. The Theory of Reasoned Action (TRA) may be a useful framework for exploration of community engagement outcomes including future attendance, community mobilization, and study participation. Within the context of HIV vaccine outreach, we conducted a cross-sectional survey in early 2007 with 175 African-American adults (≥ 18 years). Confirmatory factor analysis and structural equation modeling were performed and the findings support the potential of the model in understanding behavioral intentions toward HIV vaccine research.

Introduction

In the fifty states and the District of Columbia, the number and proportion of HIV/AIDS cases[1] among African Americans continue to highlight the need for new and effective prevention strategies. Since the inception of the US epidemic through 2005, African Americans encompassed approximately 42% of all AIDS cases. In 2005 alone, African Americans comprised 50% of the AIDS burden (CDC 2007) while making up only 12.8% of the general population (U.S. Census Bureau 2005). The AIDS rate among African American men (95.1/100,000) is eight times higher than that of white men (12.1/100,000) (Kaiser Family Foundation 2007). Among women this difference is even greater. AIDS rates are approximately 23 times higher for African American women (45.5/100,000) than for white

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[1] HIV/AIDS: This term is used to refer to (1) a diagnosis of HIV infection without the presence of AIDS, (2) a diagnosis of HIV infection with a later diagnosis of AIDS, and (3) concurrent diagnoses of HIV infection and AIDS. (CDC definition)

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women (2.0/100,000) (CDC 2007). An estimated 66% of new AIDS cases in women during 2005 were among Black/African Americans (CDC 2007). Regional HIV/AIDS data shows that the South has the highest proportion of newly reported AIDS cases among African Americans in the country, constituting 56% of all AIDS cases in 2005; as well as over half (51%) of all African Americans living with AIDS in the US (Kaiser Family Foundation 2007). Furthermore, Black females accounted for 72% of HIV/AIDS diagnoses among women in the South (CDC 2006).

With respect to the population of the Southern US, it has been suggested that factors such as poverty, unemployment, inadequate access to healthcare, and sociocultural environmental factors may explain the higher AIDS burden (Reif, Geonnotti, and Whetten 2006; Whetten and Reif 2006). Sociocultural factors that can impact risk behaviors include racial disparities, a lack of access to prevention and education, high levels of poverty and homelessness, suboptimal healthcare, and the inability to obtain adequate health insurance due to low income levels (Southern States AIDS Directors Work Group, National Alliance of State and Territorial AIDS Directors, and CDC Division of HIV/AIDS Prevention in the National Center for HIV/STD/TB Prevention 2003). Issues such as mistrust in the medical system also prevail (Gamble 1997; Whetten et al. 2006), resulting in greater health disparities amongminorities. Black/African Americans comprise 19% of the population in the South (19 million persons), making this racial/ethnic group much larger in this geographic setting compared to other regions such as the Midwest (6.5 million) (Southern States AIDS Directors Work Group et al. 2003). Black/African Americans who engage in high risk behaviors in the South may experience greater stigmatization with HIV prevention or care service utilization (Southern States AIDS Directors Work Group et al. 2003; Whetten et al. 2006).

HIV counseling and testing, as well as other evidence-based behavioral interventions, are available in many communities, but these measures alone have been unsuccessful in preventing the spread of HIV (Janssen, Holtgrave, and Valdiserri 2001). Inequitable decision-making and compromised power have been identified as primary obstacles to women’s ability to negotiate condom use (Aral and Wasserheit 1995; Jemmott, Catan, and Nyamathi 1995; O’Leary and Wingood 2000; Wingood and DiClemente 2002). With respect to condom use as a preventive measure, domestic violence and economic dependency on men have been recognized as key components driving this phenomenon (Aral et al. 1995).

The advent of the female condom provided new barrier options, yet adoption of the new prevention technology has not been widespread in the United States. Since its introduction on the market in 1993, it has not been consistently used as the method of choice by heterosexual women (Choi, Roberts, Gomez et al. 1999; El-Bassel, Krishnan, Schilling et al. 1998; Macaluso, Demand, Artz et al. 2000) and men (Seal and Ehrhardt 1999) given a lack of awareness about the product, inexperience with the device, and other psychosexual factors. As women are vulnerable to HIV infection through heterosexual transmission, and may lack control in condom negotiation, other biomedical prevention options such as a preventive HIV vaccine would be of great benefit.

While most agree that an HIV vaccine may not be available for some years (Solomon 2005; Tonks 2007; Tramont and Johnston 2003), the pipeline of preventive vaccines in clinical trials remains robust with more than 39 candidate vaccines in the testing process worldwide (IAVI 2007). These ongoing clinical trials necessitate the involvement of various groups to ensure social justice aims of the effort are fulfilled, to maintain scientific integrity, and for generalizability of study findings. Therefore, cultivating relationships with the community is critical to the success of HIV vaccine research and to future vaccine dissemination efforts.

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This is particularly important among minority populations who are underrepresented in HIV vaccine clinical trials (Djomand, Katzman, di Tommaso et al. 2005) and where research suspicion has been a significant barrier (Corbie-Smith, Thomas, and St. George 2002; Corbie-Smith, Thomas, Williams et al. 1999).

The role of community engagement in HIV vaccine research therefore figures prominently in addressing salient concerns among diverse groups. Previous findings related to clinical trial recruitment of African Americans suggest motivation differences exist among men and women from diverse communities (BeLue, Taylor-Richardson, Lin et al. 2006; Smith, Johnson, Newman et al. 2007). The results suggest the value of a strong researcher-study participant relationship for women in which study volunteers are made to feel comfortable, are treated well, and share rapport and good communication with the study team (BeLue et al. 2006). Moreover, women appreciate notification of research conducted in their locales, and of its importance and relevance to their communities. Researcher involvement in the local community also is a significant motivator in consideration of clinical trial participation (Smith et al. 2007). Men, however, express concern with the “business and profit elements of research” (BeLue, Taylor-Richardson, Lin, et al., 2006, p. 501). This includes issues such as compensation for participation, informed consent, and reputation of the research facility and the researcher. These issues highlight an array of attitudes and beliefs among men and women from African American communities on health research.

Given the ill-fated history of the Tuskegee syphilis study involving African American men, it is not surprising that minorities report lower levels of trust than their Caucasian counterparts in the assessment of health care providers and healthcare systems (Boulware, Cooper, Ratner et al. 2003; Gamble 1997). Moreover, negative experiences and perceived bias in minorities’ healthcare encounters influence trust perception of those in the medical establishment (McAlpine 2002; Saha, Arbalaez, and Cooper 2003). Direct experiences with providers and “social cues” from referent others and the environment (e.g., media), are incorporated in the formation of trust in providers and medical entities (Boulware, Cooper, Ratner et al., 2003, p. 363). Although there are similarities observed across studies, perceptions vary greatly among African American communities. McAlpine (2002) notes that the variations may be due to socioeconomic status, access to care, health service utilization patterns, insurance provision, and interpersonal dynamics of patients and physicians. With this assemblage of factors, interpersonal and perceived socioenvironmental normative pressures have an influential effect on health decision-making.

With the 1994 NIH mandate specifying inclusion of women and minorities in research, greater emphasis has been placed on recruiting and retaining these populations. Enrollment trends of racial/ethnic minorities in HIV vaccine studies from 1988 to 2002 indicate ≤ 26% enrollment of these groups in all Phase I and II studies (Djomand et al. 2005). Although minorities are not participating in health research at a level equal to Whites (Caucasians) (Corbie-Smith et al. 2002; Corbie-Smith et al. 1999; Moutsiakis and Chin 2007; Smith et al. 2007), it is important to recognize that knowledge of and access to health research activities may have a favorable impact on willingness to participate in health research (Wendler, Kington, Madans et al. 2006). In a large scale review study of 70,000 persons, minorities were found to be more willing to participate in clinical and surgical studies than Whites (Wendler et al. 2006). These findings indicate that little difference is seen in enrollment patterns when minorities are invited to participate in health research studies (Wendler et al. 2006). With these differences taken into account, the authors conclude that underrepresentation in health research is likely due to other factors.

Recent evidence on minority participation in health research indicate a desire for information of the research activity in the community, greater demand to understand the

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relevance of the research efforts in addressing medical problems, and occasions to learn about clinical research entities and study volunteer participants (Smith et al. 2007; Wendler et al. 2006). Thus, the creation of opportunities to serve these needs is a necessary precursor for effective community engagement with African American communities.

Involving Community: Issues affecting Participation

Community engagement involves multidirectional communication for the overarching purpose of enhancing the public's trust in the effort. Evidence-based methods include consultation, dialogue, and collaboration with communities (MacQueen, McLellan, Metzger et al. 2001) to develop shared understanding and meanings associated with the research programs (Swartz and Kagee 2006). This process also fosters voice in the research endeavor and a sense of empowerment (Dickert and Sugarman 2005; Strauss, Sengupta, Quinn et al. 2001). These methods are vital in reaching minority communities and women to sustain their involvement in medical research studies (Boulware, Ratner, Cooper et al. 2002; Brown-Peterside, Chiasson, Ren et al. 2000; Brown-Peterside, Rivera, Lucy et al. 2001; Crawley 2001; Djomand et al. 2005), and to promote favorable health outcomes in the population (Miller and Shinn 2005; Sengupta, Strauss, DeVellis et al. 2000). Through the NIH-sponsored Local Partnership Program (LPP) initiative, funding has been provided for the development of local community engagement programs in cities where HIV vaccine research studies are taking place.

The overarching objectives of these efforts include building awareness through effective information dissemination, increasing understanding through facilitation of learning opportunities, and cultivating public support for HIV vaccines (Allen, Liang, Salvia et al. 2005; Frew, del Rio, Clifton et al. 2008). This can be accomplished through synergistic program efforts and the support and involvement of collaborating partner organizations (Frew 2005). In cities across the United States, efforts are underway to reach, educate, and influence the American public on the importance of HIV vaccine research. These foundational efforts may potentially contribute to the realization of any number of outcomes including building sustained dialogue on issues affecting involvement and support for the cause, cultivating community mobilization, building social support, and generating interest in study volunteerism, although the existing evidence is ambiguous as to which of these will be achieved (Koblin, Holte, Lenderking et al. 2000; Swartz et al. 2006).

Previous research on AIDS volunteerism suggests a combination of factors (e.g., gaining knowledge and helping others) fuels participatory motivation (Reeder, Davison, Gipson et al. 2001; Simon, Sturmer, and Steffans 2000). Moreover, identification with an AIDS service organization significantly increases the likelihood of volunteerism (Simon et al. 2000), a finding similar to our own in the role of study site organizational identity in promoting HIV vaccine community involvement (Frew et al. 2008). Additionally, a high degree of individualism among heterosexuals, contrasting with greater collective identity among homosexuals, has been identified as an important intrapersonal motivation for AIDS volunteerism (Simon et al. 2000).

Earlier survey research with a population comprised primarily of African American women suggests that motivation related to HIV prevention volunteerism stems from concern for the community and a desire for HIV/AIDS knowledge (Reeder et al. 2001). These independent predictors rank above others of personal development, esteem enhancement, and knowing those with HIV/AIDS (Reeder etal. 2001).

It is useful to frame these socioecological issues within a historical perspective. Social networks arising from race and ethnicity powerfully structure the context in which knowledge, information, social experiences, attitude formation and sociopolitical action take

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place (McPherson, Smith-Lovin, and Cook 2001; Putnam 2000). Solidaristic networks generate a sense of trust and promote civic engagement based on concern for community (Knack 2003). African American communities experience an enhanced sense of social cohesion, at least as measured by participation in local groups aiding in the mobilization of members in lieu of difficult-to-obtain socioeconomic resources (Verba and Nie 1972). Verba and Nie (1972) argue that community membership exerts normative pressures promoting collective action. The salutary effects of African American cohesion on sociopolitical participation may be limited to a specific periods, however, since deeply rooted inequality precludes full community engagement (Chong and Rogers 2005; Putnam 2000; Skocpol, Liazos, and Ganz 2006).

Within the current context of HIV vaccine research, several studies have been conducted that specifically examine “willingness-to-participate” in HIV vaccine trials (Buchbinder, Metch, Holte et al. 2004; Colfax, Buchbinder, Vamshidar et al. 2005; Halpern, Metzger, Berlin et al. 2001; Newman, Duan, Roberts et al. 2006; Priddy, Cheng, Salazar et al. 2006) and HIV “vaccine acceptability” issues (Crosby, Holtgrave, Bryant et al. 2004a; Crosby, Holtgrave, Bryant et al. 2004b; Esparza, Chang, Widdus et al. 2003; Tello, Soong, Hunter et al. 1998). Overall, the HIV vaccine willingness-to-participate and acceptability literature indicate trust, confidentiality, side effects and safety concerns, social stigma, and other factors as barriers to involvement in the effort (Halpern et al. 2001; Hays and Kegeles 1999; Koblin, Heagerty, Sheon et al. 1998; Koblin et al. 2000; Priddy et al. 2006). However, altruistic participatory motives, a desire to represent the community, the ability to “bring an end to AIDS,” and other health benefits (i.e., free *HIV* testing, medical care, etc.) counter such impediments (Colfax et al. 2005; Newman et al. 2006). Additional work on social influences related to trial participation decision-making suggests a need for interventions targeting family and friends (Allen et al. 2005; Brown-Peterside et al. 2000; Newman et al. 2006).

Conceptual Framework: The Theory of Reasoned Action

The theory of reasoned action was selected as a useful model of inquiry for analysis of participant behavior. The TRA has been applied to HIV vaccine acceptability (Gagnon and Godin 2000) and other HIV/AIDS prevention studies (Koniak-Griffin 2006; Koniak-Griffin, Lesser, Nyamathi et al. 2003) including condom use (Mclaws 1996; Sneed 1998). More recently it has been applied to pneumococcal vaccination in urban settings (Zimmerman 2005). The TRA model is motivational in nature, with integration of individual (behavioral attitudes) and social (subjective norms) components in the formation of intentions which are predictive of behavioral outcomes of which persons have full volitional control (Ajzen and Fishbein 1980; Ajzen and Madden 1986; Fishbein and Ajzen 1975). This predictive model focuses on antecedent factors that conjoin in operation to explain behavior.

In the current study we utilize an established behavioral theory (TRA) to develop a predictive model of community engagement focusing specifically on the intentions of African Americans, with an emphasis on women. According to the TRA, formation of individual attitude is affected by behavioral beliefs and evaluation of behavioral outcome (Montano and Kasprzyk 2002). The salience of these beliefs (attitude), combine with the social factors - normative beliefs and motivation to comply (subjective norm formation) – and are weighted in relation to each other (Ajzen et al. 1986). The addition of the social component is useful for prediction of health behavior outcomes, particularly as the approval or disapproval of referent others (family, friends, colleagues), and importance afforded to these opinions can be important (counter) persuasive factors. In total, all of these form the basis for intention. As intention increases, the likelihood of realizing the behavioral outcome improves.

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Methods

Study sample

From April 2007 through June 2007, project staff members approached members of populations attending multiple Atlanta-based events: a Morehouse College health symposium, a Georgia Perimeter College health fair, two “AIDS 101” educational presentations, Atlanta Harm Reduction Center (AHRC) “house parties,” an HIV vaccine awareness day symposium entitled “There’s Hope in Our Soul” at Hopewell Baptist Church, The Atlanta Voice’s health outreach at a local mall, Atlanta Pride Festival, and a small group educational session on HIV vaccines with Americorps volunteers. These activities were organized and sponsored by the research study site (The Hope Clinic of the Emory Vaccine Center) and its community organizational partners with a focus on building HIV vaccine awareness and providing community education on HIV vaccine research.

Recruitment occurred at arbitrary times and days of each week, and throughout the duration of the activities. The recruitment area was limited to Atlanta, Georgia. Persons were eligible for study participation if they were at least 18 years of age and could read and speak English. Study staff made an effort to ensure that surveys were completed only once among attendees. Approximately two hundred people were invited to participate in the study. Of these, 175 were eligible and provided written informed consent (yielding a response rate of nearly 87.5%). A t-shirt or health promotion incentive for participation was provided. The Emory University Institutional Review Board approved the study protocol prior to study implementation.

Data Collection

Participants completed a 93-item self-administered questionnaire. The study staff and research assistants ensured that participants were provided with a semi-private area, or directed to nearby quiet spots (such as picnic tables) in outdoor locations, to complete the questionnaire. In addition, the staff and research assistants made themselves available to participants in the event that any of the instrument language required clarification.

Results

Participant Characteristics

The study population (Table 1) was comprised of 175 African Americans of which 70% were female, including one transgender person (male-to-female). Their median age was 37 years. Most were between 18 and 55 years of age (86.8%), single (55.4%), employed (62.3%), and many achieved postsecondary educational status (66.3%). The majority of the respondents indicated heterosexual orientation (84%, n = 147), and 12% reporting Gay/ Lesbian, Bisexual, Transsexual/Queer/Questioning (GLBTQQ) orientation, with 4% unknown. The annual household income range of participants varied, with most earning ≤ $40,000 per year (58.3%). Primary motivation for attendance included a desire for more scientific/medical information (34.3%, n = 58), an obligation to represent the community (23.1%, n = 39), to inquire about volunteer opportunities (10.1%, n = 17), to meet others with similar concerns about HIV/AIDS and medical research (12.4%, n = 21), and other reasons (21.1%, n = 34). Most participants (57.9%, n = 99) rated the sponsoring study site as “excellent/outstanding” and “good/very good” (39.8%, n = 68) and favorably assessed the community engagement event or activity as exceeding expectations (35.8%, n = 59) or meeting expectations (59.4%, n = 98).

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Scale Construction

Theory of reasoned action variables were constructed based on a review of the literature, from existing instruments (Frew et al. 2008; Priddy et al. 2006), and scaling options presented by the TRA progenitors (Ajzen et al. 1980). TRA variables cover volunteers' intentions or willingness to participate in HIV related events, and their subjective norms, attitudes, motivations and beliefs about engaging in HIV-related events.

Intentions—Three outcome variables were used to measure volunteers' willingness to participate in future activities and events, to mobilize others in the cause of HIV vaccine research, and to contact organizers about participating in the vaccine trials. The first outcome option was measured on a 3-point scale. Participants were asked to rate the probability that they would return to HIV vaccine community engagement activities as "very likely," "somewhat likely," or "not likely."

Of the initial 175 surveyed, most responses were captured (98%) with nearly 80% (n=137) who indicated that they were "very likely" to attend a similar event or activity in the future. To account for missing cases (n = 3) and "don't know" responses (n =2), along with other non-response items essential to theoretical assessment, the resulting dataset was reduced to N=126 for structural equation modeling of this outcome. Notably, only one person indicated "not likely" and this response was combined with "somewhat likely" to manage a potentially spurious outlier effect.

The second outcome represents the probability of involving others in the cause (i.e., "community mobilization"). Measured on the same 3-point scale, participants indicated that they would be "very likely" (35.4%, n=62), "somewhat likely" (34.9%, n=61)," or "not likely" (14.9%, n = 26). Although the response rate was 100% for this outcome, some selected "don't know" (14.9%, n = 26) and missing responses to essential items for theoretical analysis were identified. The dataset was subsequently reduced to N = 110 for modeling this outcome of interest.

Finally, the potential for study volunteerism (i.e., contact the study site about clinical trial participation) was investigated as the third outcome of interest. Results indicated that 25.4% (n=44) would be "very likely," 27.2% (n=47) "somewhat likely," and 31.8% "not likely" to contact the study site about clinical trial participation. Two cases were missing responses, and 15.4% (n = 27) indicated that they were unsure if they would contact the site about participation in a clinical trial. This again resulted in data reduction yielding N = 106 for final modeling analysis with complete responses to all items for those cases. (See Table 2, next page)

Attitudes—The influence of attitudes on the three outcome intentions was explored. Communication, particularly persuasive forms (Petty and Cacioppo 1983; Petty, Strathman, Cacioppio et al. 1994), plays a powerful role in attitude formation and alteration. It was therefore hypothesized that favorable responses to attitudinal items would increase intentions. Respondents indicated positive attitudes toward HIV research with statement agreement on 5 items within a scale including "I like to do good for others," "I like getting involved with HIV vaccine research," "HIV is a serious concern in my immediate community," "HIV testing is a benefit of an HIV vaccine study," and "I would benefit from the medical care associated with an HIV vaccine study."

Subjective Norms—Perceived "social pressure" (Ajzen & Fishbein, 1980, p. 246) to perform a behavior or forego it, is reflected in the "subjective norm" construct. In this study, participants were also asked if they thought people, including family and friends, might respond negatively to ones' participation. We hypothesized that negative social opinion of

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research involvement would reduce participatory intention. Influential normative concerns were directly measured through items including “people negatively judge those who participate in HIV vaccine research,” “I think some of my family members would be upset if I participated in an HIV vaccine research study,” and “I think my friends would negatively judge me if I joined in an HIV vaccine study.”

Behavioral Beliefs—Several questions measured volunteers’ salient beliefs about their role in HIV vaccine research. We hypothesized that beliefs about HIV vaccines and medical research favoring participatory behavior would increase intentions to participate in future activities, generate greater community mobilization, and study volunteerism. Beliefs pertaining to self-interest constituted modal scale 1 and those concerning the benefit to others arising from involvement were included in scale 2. Scale 1 items included “my community would really benefit from an HIV vaccine,” “My actions can inspire others to act,” and “I benefit from health science research.” Scale 2 items included “My participation in an HIV vaccine study would be very good,” “My involvement in this cause will result in more ethical research,” “My involvement in this cause will improve my community’s trust in medical research,” and “I would participate in an HIV vaccine research study because it would help to prevent AIDS.”

Outcome Evaluations—Consideration of outcomes related to study participation was uniquely assessed to understand negative salient beliefs related to volunteerism. Previous studies indicated logistical, physical, and psychological as barriers with respect to involvement in HIV vaccine research among ethnic minorities (Newman et al. 2006; Priddy et al. 2006). We hypothesized that reduced personal concerns, and decreased concern of negative health and social consequences specifically related to HIV vaccine study participation, would more likely result in greater participatory intention. Items therefore included in the scale were “My participation in an HIV vaccine research study would be more trouble than it’s worth,” “Even if I wanted to participate in an HIV vaccine research study, I just don’t have the time,” “Participating in an HIV vaccine research study seems risky,” “I would participate in an HIV vaccine research study, but I don’t like needles.”

Normative Beliefs—Two aspects of normative beliefs were considered. Those connected to beliefs about the effects of research on a community and beliefs about the effects of ones’ own participation in research for the greater good. We hypothesized that these motives would influence subjective norms and participatory intentions. Normative beliefs consisted of six questions based on these two dimensions. They include reference to specific individuals within the social realm who may affect individual decision-making. Items on the 5-point scale therefore included “I think my doctor would approve of my involvement in HIV vaccine research,” “I think my work colleagues would approve of my involvement in this cause,” “My immediate family is supportive of my involvement in HIV vaccine research,” “Most people important to me think my involvement in HIV vaccine research is good,” “Most people important to me usually support my interests,” and “If my pastor supported HIV vaccine research, I would be inclined to get involved.”

Motivation to Comply—Lastly, individuals might declare a willingness to participate or reluctance to get involved due to general compliance with referent opinion. The theorized influence of family, friends, and others on behavioral performance will exert social pressure to act or engage in avoidance. We hypothesized that greater self agency would lead to greater participatory intention. The items measuring this domain therefore include “I tend to be concerned about what people think of me, even if I don’t know them,” “I generally do what my family expects of me,” “I would not want to do something my friends disapproved

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of," "If my superiors told me to do something I disagreed with, I would obey their wishes," "Sometimes I do what my friends say to do, even though I know they are wrong."

Analytic Strategy

A covariance structure model was used to test the causal relationships between factors implied by the theory of reasoned action. We tested the effects of normative beliefs, outcome evaluations and motivation to comply on attitudes and subjective norms. At the same time, attitudes and subjective norms were used to explain respondents' intentions with respect to future involvement in HIV research, whether through attending future events, mobilizing others or participating in vaccine trials. A structural equation model is well-suited for this type of analysis because (1) it examines both direct and indirect paths to willingness to participate in an efficient (simultaneous) manner, (2) random measurement error can be taken into account, reducing its effect on parameter estimates, (3) non-random error can be explicitly accounted for, and (4) we can explicitly investigate the fit of these measures to TRA constructs thereby promoting their more general definition.

The basic structural equation model follows Jöreskog and Sörbom(1993):

$$\acute{\eta} = \beta \acute{\eta} + \gamma \xi + \zeta$$

where $\acute{\eta}$ and ξ are latent constructs based on vectors of observed variables (y and x); β is a matrix of coefficients expressing the mutual effects of endogenous variables; γ represents the effects of latent exogenous on endogenous variables, and ζ is a vector of random error. One underlying assumption of the model is that the errors are uncorrelated with latent constructs and uncorrelated among themselves.

Assessing the measurement of constructs is possible within this framework. It is done by incorporating factor analysis into the model. Although there is considerable prior knowledge about the dimensions of the theory of reasoned action, its application to this health issue may be beneficial to the field. We therefore include a provisional confirmatory factor analysis of measurement fit to establish the components of the factors by estimating the strength of the relationships between indicators and constructs. SPSS' Amos 7 was the software package used to generate maximum likelihood estimates of the parameters (Arbuckle 2006).

Factor Analysis

A preliminary confirmatory factor analysis using maximum likelihood estimation was undertaken to test the adequacy of the model measuring the underlying factors (Table 3). Each latent construct (intentions, attitudes, subjective norms, behavioral beliefs, outcome evaluations and normative beliefs) was identified by its corresponding measured variables. One indicator per construct was fixed to define the scales of the indicators. Results of the factor analysis generally support the validity of the constructs. Three exceptionally low factor loadings were: an outcome evaluation measure of the wish to participate but not liking needles; the attitude measure of HIV being a serious community concern, and, the subjective norm where respondents thought people judge HIV vaccine participants negatively. The GLS χ^2 was 454.24, df=407, $p>.05$ indicating the model fit reasonably well (the residual mean square error was .087).[2]

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[2] A generalized least squares χ^2 was run because Amos does not provide a maximum likelihood chi. Note also that while this model fits the data reasonably well, other measures of fit such as goodness of fit index were disappointingly low and associated with problems with the fit matrix. Increasing the sample size is one possible solution.

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The next set of findings refers to the causal model implied by the theory of reasoned action. Table 4 provides estimates of standardized regression coefficients measuring relationships among the theoretical constructs. Standardized coefficients can be interpreted as standard deviation unit changes in the outcome of interest for a unit change in its precursor. They also permit comparisons of the degree to which one variable influences another.

The pattern of significant and nonsignificant coefficients is similar across the three different measures of intention to engage in action around HIV research. Attitudes but not subjective norms had a positive affect on the likelihood of community mobilization (.698), study volunteerism (.687), and to a lesser extent, future attendance at HIV-related events (.311). Respondents' favorable attitudes about the importance of HIV vaccine trials were in turn shaped by their positive beliefs about their role in HIV research. The strength of the relationship was greater for beliefs linked to how respondents' viewed their own actions (e.g., .667 for the model with future attendance as the intention variable) in contrast to beliefs emphasizing how respondents' viewed the effects of their actions (e.g., .346). Negative beliefs (defined as outcome evaluations) were not related to either attitudes or subjective norms. Normative beliefs and motivations to comply, however, were related to both attitudes and subjective norms.

The effect of respondents' compliance to others wishes in general (e.g., "I would not want to do something my friends disapproved of") was linked to their subjective norms regarding participation in HIV research (e.g., "…my family members would be upset if I participated…"). The low degree of compliance with others' expectations was robust across models (i.e., .814, .811, .818, respectively). Not surprisingly, normative beliefs about doctors' and colleagues' encouragement to participate were less likely to be associated with negative judgments of others (i.e., −.186, −.185, −.188, respectively). Although these construct coefficients contrast, the pathways suggest that independent cognitive appraisal of the HIV vaccine effort has an effect on the formation of subjective norms. However, these are less likely to be influenced by normative beliefs and they are unlikely to shape intentions to participate in HIV research when other beliefs and attitudes are taken into account.

Discussion

This current study is significant because it utilizes an established behavioral theory (TRA) in predictive modeling of HIV vaccine community engagement. This study specifically focused on intentions of African Americans within the continuum of the decision-making processes about the role of the individual in the endeavor. In this study, special emphasis has been placed on African American women who are greatly affected by HIV/AIDS, and whose participation is needed in ongoing trials (Djomand et al. 2005; Moutsiakis et al. 2007).

This study also adds to the literature with information gathered among those attending HIV vaccine-related events and activities. As favorable attitudes, perceptions, and beliefs are theorized to be critical predisposing factors influencing future behavioral outcomes (Ajzen 1991; Fishbein et al. 1975; Maiman and Becker 1974), these attendees have the potential, at a minimum, to serve as allies in expanding needed social support for HIV vaccine research (Allen et al. 2005). Our results from this study offer evidence to reinforce this notion. Specifically, this study extends our earlier findings on factors influencing community engagement formation (Frew et al. 2008) with the addition of theory-driven assessment of outcomes anticipated with targeted community approaches.

The goal of the current study was to examine the theory of reasoned action covariates impacting respondents' willingness to participate in events surrounding HIV vaccine

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research. Overall, the hypotheses were mostly supported, with the exception of subjective norms and outcome evaluations, and the findings suggest the importance of theoretical guidance in predicting community engagement outcomes.

Important relationships materialized among constructs especially those related to self-empowerment beliefs on attitude, and counter-resistance (motivation to comply) to negative normative pressure (subjective norms). In particular, belief in one's participation resulting in positive, tangible outcomes for the community, research, and HIV/AIDS mediated through the attitude construct had a profound impact on the potential to mobilize the community for action (.698) and participate in HIV vaccine trials (.687). Attitude formation clearly is evidenced by the lower coefficient (.311) on future attendance, indicating the critical role of effective communication and community engagement programming in fostering positive attitudes towards the cause. Moreover, the set of self-empowering perceptions (.667) on attitude outweighed more generic beliefs related to involvement (.346) such as "I benefit from health science research."

Our findings support the need to clearly articulate as many concrete outcomes that can be expected from involvement in HIV vaccine research. A key assumption of the value-expectancy theories (i.e., TRA) is that some end will be achieved through the performance of a behavior. Yet, in the context of HIV vaccine development, it is unclear exactly what end will be met – will the vaccine partially or fully prevent infection? Or, among those living with HIV, will the vaccine reduce viral loads to prevent AIDS-related illness? Although it is likely that one of these outcomes will be achieved, participatory behaviors do not yet have clear consequences. In other words, people do not know what to expect of their involvement. Thus, the findings point to a need for effective communication citing specific examples of the role of African Americans in the realization of ethical oversight (i.e., participation on CABs, IRBs, etc.), improving community trust (e.g., increases in study participation rates), and preventing AIDS (e.g., risk reduction through greater condom use among study enrollees). Communication emphasis should be on individual self-empowerment to affect collective change.

In contrast to previous studies examining willingness-to-participate among predominantly minority populations (Corbie-Smith et al. 1999; Newman et al. 2006; Priddy et al. 2006) and among women (Mills, Nixon, Singh et al. 2006), logistical concerns relating to the formation of community engagement outcomes did not materialize. With respect to inconvenience, time constraints, risk perception, and use of needles in studies, these items as related to the "outcome evaluation" construct, did not impact attitudes. The findings related to outcome evaluation may be indicative of other issues. A lack of thorough consideration may have been afforded to these issues of practical concern given the high first time attendance rate of the majority of respondents (85.4%, n=146). Furthermore, the HIV vaccine messages promoted in these situations may have strengthened individuals' resolve to manage any concerns or logistical issues likely to be encountered in the future.

Obviously, the relationship of subjective norms to intention was not significant in this study population. This finding is consistent with a previous HIV vaccine study that tested TRA effects (Gagnon et al. 2000). The result could be due to a manifestation of measurement issues associated the items designed to measure subjective norms ($\alpha = .64$, $n = 3$ items) in combination with a small sample size. With consideration given to these shortcomings, the nonsignificant pathways between subjective norms to intention could represent a theoretical deviation. That is, negative normative influences may not causally impact community engagement outcomes. In contrast with other studies citing social harms (Francis, Heyward, Popovic et al. 2003) and negative social judgments (Koblin et al 1998) as barriers to

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participation, our nonsignificant finding suggests the possibility that our participants rejected the negative views of others related to behavioral intention.

Alternatively, the findings suggest the possibility that those who become engaged in HIV vaccine research exhibit a degree of independent thinking to resist counterattitudinal messages. Surprisingly, the strength of the relationship of the (lack of) motivation to comply with subjective norms resulted in powerful pathway effects (.814-future attendance, .811-community mobilization, .818 study volunteerism). Moreover, approval of doctors, family, pastors, work colleagues, and others in HIV vaccine research weakly, but significantly, offset negative opinion on involvement. Thus, it is likely that a degree of social support is valuable in promoting involvement, but not required for the formation of participant initiative.

It merits consideration that the emphasis on issue-relevant thinking (e.g., ending HIV/AIDS) in community engagement activity may result in greater psychological resiliency to withstand counterpersuasive normative thinking. Within this culture-centered context, albeit a supportive situation, it is likely that the conditions favorably predispose individuals to resist negative normative pressure encountered in “real world” conversations with others.

Research pertaining to HIV/AIDS volunteerism, clinical trials participation, and other forms of elective health behavior (i.e., bone marrow donation) suggest the decisional pathways are complex and have a strong affective component (Bagozzi, Lee, and Van Loo 2001; Curbow, Fogarty, McDonnell et al. 2006; Davis and Randhawa 2006; Reeder et al. 2001). In short, the emotional commitment accompanying a health behavior may sufficiently explain the decision to become a health research volunteer or support a cause (Eagly and Chaiken 1993). Others have argued that TRA is compromised in its ability to predict intention and behavior in the face of alternative options (Sheppard, Hartwick, and Warshaw 1988). Thus, the TRA model may have limited explanatory power to understand the complexity of the relationships in the broader socio environmental milieu of African American communities. Additionally, our findings would imply that a decision to forego involvement may be highly “rational” based on reasons pertaining to historical violations of trust.

Limitations

Findings are limited by several factors, including the inherent limitations of a cross-sectional study design, the venues where the participants were recruited, and the use of a small purposive sample consisting of primarily African American females. The views of this group may not be representative of others in the diverse African American population.

With the exclusion of cases missing data and uncertainty signals given to outcome responses (e.g., “don’t know”), the resultant datasets may have been limited in their ability to detect pathway effects within this complex model. Additionally, the study design does not allow for causal conclusions to be drawn. The study was solely concerned with relational modeling of various theoretical constructs thereby facilitating covariate evaluation. Although the data were collected at several activities, the study cannot be characterized as longitudinal in design.

An important limitation is that intent may not be strongly associated with future participatory behavior. It should also be noted that participation bias in a study of HIV vaccines and health behaviors is particularly likely (i.e., it is conceivable that people having strong beliefs and attitudes on HIV vaccine research may be the least inclined to complete the study questionnaire). Thus, even though the study achieved a response rate of approximately 88%, participation bias may have affected the results. However, we do not anticipate that these limitations resulted in large or systematic errors in data collection.

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Summary

The results from our study indicate the importance of developing favorable attitudes toward HIV vaccine research among African Americans living in Atlanta, Georgia. This construct yielded strong intentions related to community mobilization and study volunteerism intent.

Surprisingly, negative normative pressure had no effect on intentions. Normative concerns related to medical mistreatment are deeply embedded within the culture and therefore may be more resistant to change. Thus, a collective norm of mistrust and suspicion within these communities may be precluding the simultaneous realization of normative shirts within the TRA model. Despite this finding, there is powerful evidence of self-deterministic thinking (motivation to comply) in relation to these influences. The present research points to the valuable benefit of theory-driven inquiry, yet also highlights its limitations in understanding a complex array of relationships between the individual and the sociocultural context.

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Table 1

Selected Participant Characteristics

Characteristic (n=175)	Frequency	Percent
Gender		
Male	53	30.3
Female	121	69.1
Transgender (Male to Female)	1	0.6
Age (missing = 1)		
18 to 25	37	21.3
26 to 35	45	25.9
36 to 45	31	17.8
46 to 55	38	21.8
≥56 years	23	13.2
Education (highest level completed)		
K-8 or high school	59	33.7
Post-secondary education	116	66.3
Sexual Orientation (missing=3)		
Heterosexual	147	85.5
LGBTQ	25	14.5
Motivation for attendance (missing=6)		
Scientific/Medical Information	58	34.3
Volunteer Opportunities	17	10.1
Obligation to Community	39	23.1
Meet Others With Same Concerns	21	12.4
Other reasons, not specified	22	13.0
Multiple reasons, specified	12	7.1
Rating of Study Site (missing=4)		
Excellent/Outstanding	99	57.9
Good/Very Good	68	39.8
Fair/Poor	3	1.8
No opinion	1	0.6
Rating of Event (missing=10)		
Exceeds expectations	59	35.8
Meets expectations	98	59.4
Does not meet expectations	8	4.8

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Table 2

Potential Community Engagement Outcomes

Characteristic	Frequency	Percent
Likelihood of Attending Future Activity/Event		
Very Likely	98	77.8
Somewhat and Not Likely (1 case)	28	22.2
N=	126	
Likelihood of Involving Others in the Cause		
Very Likely	45	40.9
Somewhat Likely	44	40.0
Not Likely	21	19.1
N=	110	
Likelihood of Contacting Site About Study Participation		
Very Likely	29	27.4
Somewhat Likely	30	28.3
Not Likely	47	44.3
N=	106	

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Table 3

Descriptive Item Statistics. Measuring HIV Vaccine Community Engagement

Variable	**n (%)**	**Mean**	**SD**	**Min**	**Max**	**Factor Loadings[1]**
Dependent Measures[2]						
1. Future Attendance: Likelihood of returning to activity or event	172 (98)	1.24	0.53	1.00	4.00	.725
2. Community Mobilization: Likelihood of involving others in the cause	175 (100)	2.09	1.05	1.00	4.00	.817
3. Study Volunteerism: Likelihood of contacting the site about study participation	173 (99)	2.38	1.03	1.00	4.00	.810
Independent Measures[3]						
Behavioral Beliefs scale 1 (α =0.74)						
BB1. My community would really benefit from an HIV vaccine.	168 (96)	1.44	0.74	1.00	5.00	.779
BB2. My actions can inspire other to act.	166 (95)	1.77	0.79	LOO	5.00	.668
BB4. I benefit from health science research	167 (95)	1.66	0.77	1.00	5.00	.735
Behavioral Beliefs scale 2 (α=0.88>						
BB3. My participation in an HIV vaccine study would be very good	164 (94)	2.07	0.91	1.00	5.00	.782
BBS. My involvement in this cause will result in more ethical research.	167 (95)	2.01	0.92	1.00	5.00	.845
BB6. My involvement in this cause will improve my community’s trust in medical research.	167 (95)	2.03	0.93	1.00	5.00	.862
BB7. I would participate in an HIV vaccine research study because it would help to prevent AIDS.	169 (97)	2.20	1,06	1.00	5.00	.725
Outcome Evaluations (α = 0.76)						
OE1. My participation an HIV vaccine research study would be more trouble than it’s worth.	170 (97)	3.31	1.21	1.00	5.00	.856
OE2. Even if I wanted to participate in an HIV vaccine research study, I just don’t have the time.	165 (94)	3.05	1.18	1.00	5.00	.823
OE3. Participating in an HIV vaccine research study seems risky.	165 (94)	2.74	1.22	1.00	5.00	.653
OE4. I would participate in an HIV vaccine research study, but I don’t like needles.	163 (93)	3.12	1.26	1.00	5.00	.386
Normative Beliefs (α = 0.82)						
NB1. I think my doctor would approve of my involvement in HIV vaccine research.	165 (94)	2.38	0.93	1.00	5.00	.635
NB2. I think my work colleagues would approve of my involvement in this cause.	161 (92)	2.39	0.96	1.00	5.00	.634
NB3. My immediate family is supportive of my involvement in HIV vaccine research.	163 (93)	2.61	1.01	1.00	5.00	.738
NB4. Most people important to me think my involvement in HIV vaccine research is good.	161 (92)	2.45	0.92	1.00	5.00	.854
NB5. Most people important to me usually support my interests.	166 (95)	1.90	0.73	1.00	5.00	.612
NB6. If my pastor supported HIV vaccine research, I would be inclined to get involved.	163 (93)	2.50	1.08	1.00	5.00	.595
Motivation to Comply (α =0.85)						

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Variable	n (%)	Mean	SD	Min	Max	Factor Loadings[1]
MC1. I tend to be concerned about what people think of me, even if I don’t know them.	166 (95)	3.26	1.33	1.00	5.00	.605
MC2. I generally do what my family expects of me.	167 (95)	2.92	1.21	1.00	5.00	.558
MC3. I would not want to do something my friends disapproved of.	161 (92)	3.41	1.15	1.00	5.00	.691
MC4. If my superiors told me to do something I disagreed with, I would obey their wishes.	167 (95)	3.40	1.19	1.00	5.00	.621
MC5. Sometimes I do what my friends say to do, even though I know they are wrong.	164 (94)	3.74	1.19	1.00	5.00	.735
Attitudes (α =0.76)						
A1. I like to do good for others.	169 (97)	1.36	0.61	1.00	4.00	.507
A3. I like getting involved with HIV vaccine research.	167 (95)	2.15	0.89	1.00		.792
A4. HIV is a serious concern in my immediate community.	170 (97)	1.52	0.80	1.00	4.00	.427
A5. HIV testing is a benefit of an HIV vaccine study.	171 (98)	1.78	0.83	1.00	4.00	.633
A6. I would benefit from the medical care associated with an HIV vaccine study.	171 (98)	2.04	1.03	1.00	5.00	.742
Subjective Norms (α =0.60)						
SN1. People negatively judge those who participate in HIV vaccine research.	165 (94)	2.58	1.11	1.00	5.00	.482
SN2. 1 think some of my family members would be upset if I participated in an HIV vaccine research study.	164 (94)	2.80	1.27	1.00	5.00	.548
SN3. I think my friends would negatively judge me if I joined an HIV vaccine research study.	164 (94)	3.37	1.12	1.00	5.00	.895

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Table 4

SEM Maximum Likelihood Standardized Regression Coefficients

	Dependent Variables					
Independent Variables	**Future Attendance**		**Community Mobilization**		**Study Volunteerism**	
Attitudes	.311*		.698***		.687***	
Subjective Norms	−.036		.092		−.087	
Independent Variables	Attitudes	Subjective Norms	Attitudes	Subjective Norms	Attitudes	Subjective Norms
Behavioral beliefs-other	.346**	--	.347**	--	.288*	--
Behavioral beliefs- self	.667***	--	.676***	--	.723***	--
Outcome evaluations	.020	--	.005	--	<.001	--
Normative beliefs	--	−.186†	--	−.185†	--	−.188*
Motivation to Comply	--	.814***	--	.811***	.818***	
RMSEA	.077		.077		.079	
CFI	.829		.831		.831	
Chi-square	729.91		731.6		753.23	
N	126		110		106	

[†] Note: <.10

[*] p< .05

[**] p<.01

[***] p<.001: two-tailed tests.