HIV prevention in sub-Saharan Africa: a multilevel analysis of message frames and their social determinants

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SUMMARY
In light of the great threat that HIV/AIDS poses in sub-Saharan Africa, the current study assesses HIV/AIDS posters from this region with specific reference to health message frames, including HIV sources, consequences, self-efficacy, preventive means, and barriers and benefits to employing such means of prevention. There is a two-step methodology. First, the content of HIV/AIDS posters from 15 sub-Saharan African countries was coded for the six health message frames. Second, relationships between the health message frames and four social determinants (HIV rate, HIV awareness, condom use and uncertainty avoidance (UAI)) were assessed with hierarchical linear modeling (HLM). Analysis indicates that self-efficacy is the most common frame, but that almost one-quarter of the posters has none of the six health message frames. HLM indicates some favorable findings, including that health message frames are used most often in countries with the most troubling levels of HIV awareness and condom use. Less favorably, health message frames are used least common in countries that have high levels of UAI and high HIV rates. Improvements for related media practices and policy are articulated.

Key words: HIV; HIV messages; HIV media; message frames

The threat that HIV/AIDS poses to sub-Saharan Africa is staggering. The region accounts for ~73% of the world’s 40 million HIV cases (UNAIDS, 2002), with <30 000 of its 28.5 million infected having access to antiretroviral drugs. The disease is the leading cause of death in the region, projected to claim 68 million lives between 2000 and 2020.

With no vaccine or cure for HIV/AIDS, there have been calls for improvements in health communication, education and prevention (Livingston, 1993; Ratzan, 2000; World Bank, 2000; United Nations, 2001). Over the past two decades, HIV/AIDS public health campaigns have become common around the world, with research focusing primarily on the content and effects of public service announcements (Freimuth et al., 1990; DeJong and Winsten, 1992; Johnson et al., 1997; DeJong et al., 2001). In the developed world, the television medium has been found to be a much more effective means for HIV prevention than ‘small media’ such as posters (Ross and Scott, 1993).

Research in this area, however, leaves two important questions unanswered. First, what message frames are used in small media such as posters, pamphlets and flyers? Second, what are the social determinants of message frames in such small media?

Answering the first question is critical in Africa, where small-media campaigns are incredibly important (Okigbo et al., 2002; Peltzer and
Because of low literacy rates and low levels of infrastructure and technological development in African countries (Ibelema et al., 2004), small media such as posters, pamphlets and flyers are widely used. The benefits that such small media have over large media include their being more strongly rooted in African cultures, having longer periods of effectiveness (i.e. longer ‘shelf life’), and having effects that are more independent of literacy and education levels (Tomaselli et al., 2002). Research supports the effectiveness of small-media campaigns in different developing countries. For example, instructional flyers were the most effective media input when it came to influencing understanding and use of oral re-hydration therapy in Gambia (Rice and Foote, 2001), and posters were the most effective media input in a rat control promotional project in Bangladesh (Adhikarya, 2001). Despite the grave consequences of AIDS in Africa and the great potential that posters have for influencing public health change, the emphasis of related HIV/AIDS research has been on large media, not small media. In fact, no previous studies could be located that examine message frames in HIV/AIDS posters.

Answering the second question is also critical in Africa, where the study of the social determinants of health message frames can help health media professionals hone and implement more effective preventive campaigns. Little is known about what sub-processes may explain the content and effects of such messages. Although previous has theorized upon the multilevel determinants of media frames (Shoemaker and Reese, 1996; Scheufele, 1999), no studies could be found that have empirically tested such relationships.

The current study aims to answer these two important questions. The prevalence of six health message frames was coded in HIV/AIDS posters from 15 sub-Saharan African countries, and then the social determinants of these prevalence rates were examined.

**MESSAGE FRAMING**

The effects of a message result from the manner in which certain aspects of an issue or event are framed (i.e. emphasized or deemphasized) (Goffman, 1974). Such framing influences how media users make sense of events, set order to life experiences and construct perceptions of what is going on in the world (Iyengar, 1991; Scheufele, 1999). When news reporters frame an issue, they select certain aspects of a perceived reality and make them salient in news articles (Entman, 1993). Similarly, health media practitioners select and highlight some aspect of a health concern (e.g. the role of condom use in preventing HIV), which would be expected to spur change in the public’s information processing and attitudinal and behavioral development (Scheufele, 1999).

The current study relies on six message frames—consequences, preventive means, self-efficacy, sources, benefits and barriers—that have a general basis in public health theory (Rogers, 1983; Witte, 1992; Janz and Becker, 1994). Previous studies have followed a similar methodology of examining content for the core constructs of these theories (Perloff and Ray, 1991; Witte et al., 1998). These six message frames predict positive health outcomes, with self-efficacy and perceived barriers the most common predictors of HIV preventive behaviors (Fisher and Fisher, 2000). Other research has found that safe-sex practices were predicted by consequences, sources, benefits, barriers and self-efficacy (Mattson, 1999) and that condom use, STD testing, and HIV testing were predicted by self-efficacy (Zak-Place and Stern, 2004). Furthermore, as Krishnan et al. (1997) reported, explaining the consequences of non-compliance with preventive means can stimulate threat and fear in people, which, in turn, can stimulate an emotional reaction that leads to compliance.

**Social determinants of message frames**

The framing process is a continuous cycle (Scheufele, 1999). Input factors affect message frames, which affect audience or individual (cognitive) frames, which affect individual attitudes and behaviors, which, in completing the cycle, affect input factors. The current study considers the first link—that from input factors to message frames—which has been labeled ‘frame building’.

In viewing mass media content as ‘a socially created product’, Shoemaker and Reese (1996) offer a comprehensive overview of social determinants that influence the frame-building process, including organizational and interest group pressures, government policies and practices, and attitudes, ideologies, and values of
individual media workers. For example, in terms of altruistic democracy (Gans, 1979), it would be expected that health media practitioners would focus on creating media messages that could help remedy public health concerns in their country. The content of news, as well as public health, messages can also be influenced by other factors, including economic interests and health crises (Shoemaker and Reese, 1996). For example, if HIV is rampant in a country, government and interest group pressures would be expected to influence media practices and message framing.

The current study implements four social determinants, which can be viewed as an embodiment of the ideologies of health media practitioners in African countries, as well as the pressures that are placed on them. The first three social determinants—HIV rate, HIV awareness, and condom use (UNAIDS, 2002)—represent the magnitude of the HIV problem, as well as people’s related knowledge and behaviors. The fourth social determinant—uncertainty avoidance (UAI)—represents the cultural environments in African countries (Hofstede, 2003). In indicating the degree to which people of a specific culture feel threatened by uncertain or unknown situations, UAI can be used to compare the decision-making processes of different cultures (Hofstede, 2003). UAI has been applied in various communication contexts, including people’s need for mediated information as a means to decreasing uncertainty and making decisions (Vishwanath, 2003). It would make sense that people from high UAI cultures would seek out credible information to make important decisions (Moon and Tikoo, 1997), including those related to HIV prevention. As most previous health campaigns in Africa have failed to consider cultural contexts (Tomaselli et al., 2002), it is especially important to account for such cultural factors.

**METHODS**

**Content analysis**

The sample of media content consisted of 236 unique HIV/AIDS posters from the following sub-Saharan African countries: Botswana, Cameroon, Cote d’Ivoire, Ethiopia, Ghana, Kenya, Malawi, Nigeria, Rwanda, Sierra Leone, South Africa, Tanzania, Uganda, Zambia and Zimbabwe. The posters, produced from the late 1990s to present, constituted an exhaustive sample (under two categories: ‘AIDS’ and ‘HIV prevention’) from the M/MC Health Communication Materials Database. The posters were accessed via the Health Communication Partnership (www.hcpartnership.org).

Trained coders assessed the imagery and text of the HIV/AIDS posters for health message frames. Inter-coder reliability was calculated on 46 randomly selected posters, which account for ~20% of the overall sample (N = 236). Cohen’s kappa was used to assess the impact of chance (or error) in the manner in which coders applied the pre-defined frame categories to the poster content (Riffe et al., 2005). The mean Cohen’s kappa was 0.84, with a range from 0.65 to 1.00 for the different categories. This signifies that the different coders applied the content analysis instrument in a highly similar manner, indicating that the coding procedure was systematic and replicable.

This coding process involved six health message frames: sources, consequences, preventive means, self-efficacy, benefits and barriers (with descriptive statistics depicted in Table 1). These message frames were pre-defined with coding determining their presence or absence.

The following sources of HIV were coded: sex, commercial sex, multiple sex partners/casual sex, heterosexual sex, homosexual sex, transmission at birth and transmission via instruments of traditional practices. Responses to these dichotomous coding categories were added to create a variable with an eight-point scale.

Consequences of HIV/AIDS were measured in terms of death, health problems, marital effects, familial effects and monetary effects. Responses to these dichotomous coding categories were added to create a variable with a six-point scale.

HIV preventive means included condom use, safe sex (other than condom use), casual sex

**Table 1: Descriptive statistics for health message frames**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Prevalence^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources</td>
<td>0.46</td>
<td>0.94</td>
<td>25.00</td>
</tr>
<tr>
<td>Preventive means</td>
<td>0.65</td>
<td>0.99</td>
<td>41.95</td>
</tr>
<tr>
<td>Consequences</td>
<td>0.28</td>
<td>0.56</td>
<td>22.03</td>
</tr>
<tr>
<td>Benefits</td>
<td>2.12</td>
<td>0.62</td>
<td>26.27</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.98</td>
<td>0.78</td>
<td>68.60</td>
</tr>
<tr>
<td>Barriers</td>
<td>0.09</td>
<td>0.33</td>
<td>1.53</td>
</tr>
</tbody>
</table>

^Percent of posters with message frame.
avoidance, monogamy, IV drug use avoidance, communication between sex partners and avoidance of sharing instruments of traditional practices. Examples include ‘Use condoms’, ‘Avoid unsafe sex’ and ‘Don’t sleep around’. Responses to these dichotomous coding categories were added to create a variable with an eight-point scale.

Benefits have been considered in HIV message content in terms of costs and gains (Devos-Comby and Salovey, 2002) and gain and loss frames (Krishnan et al., 1997). Loss frames emphasize problems or downfalls related to HIV/AIDS, while gain frames emphasize benefits that can come from preventive HIV behaviors (Kahneman and Tversky, 1979). A loss frame would be, ‘If you don’t use condoms, you may die’. A gain frame would be, ‘If you use a condom, you will have a good life and marriage’. A three-point ordinal scale was created, with 1 indicating only loss frame, 2 indicating neither or both and 3 indicating only gain frame.

Self-efficacy is a coding category in previous HIV-related content analyses (Perloff and Ray, 1991; Witte et al., 1998). In the current study, self-efficacy was measured in terms of empowerment and the use of the second-person (Perloff and Ray, 1991). Empowerment involved whether posters encouraged individuals to take action in face of HIV/AIDS. Examples include ‘You can take precautions’ and ‘It’s not too late to help yourself’. Second person involved whether poster messages were in the second person. Examples include ‘You can help people with HIV’ and ‘Use a condom!’ A three-point ordinal scale was created.

Barriers involved ways to overcome problems related to performing HIV preventive behaviors. The following statements were used: (i) condoms are easy to carry; (ii) condoms or other means of safe sex are easy to use or implement; (iii) condoms or other means of safe sex do not reduce pleasure; (iv) condoms are easily attainable; (v) condoms or other means of safe sex are not embarrassing (Hingson et al., 1990). An example of a barrier frame would be, ‘Condoms are readily available at your local health clinic’. Responses to these dichotomous coding categories were added to create a variable with a six-point scale.

Social determinants of health message frames
There were four social determinants: HIV rate, HIV awareness, condom use and UAI. Country-specific data, from 1997 to 2001, were used for the first three measures (UNAIDS, 2002). HIV rate was measured in terms of the percent of adults 15–49 years old with the virus ($M = 15.27$, $SD = 10.32$). HIV awareness was measured in terms of the percent of females 15–24 years old who had heard of AIDS ($M = 90.29$, $SD = 10.36$). Condom use had one item for men and one for women, which both assessed the percent who had ‘used a condom the last time they had sex with a non-marital, non-cohabitating partner, of those who had sex with such a partner in the preceding 12 months’ ($M = 24.88$, $SD = 11.48$). The fourth measure was UAI (Hofstede, 2003). Data represented the following regions: southern Africa (Botswana, Namibia, South Africa and Zimbabwe); eastern Africa (Ethiopia, Kenya, Rwanda, Tanzania, Uganda and Zambia); western Africa (Cameroon, Cote d’Ivoire, Ghana, Nigeria and Sierra Leone). The UAI levels were as follows: southern Africa, 49; eastern Africa, 52; western Africa, 54.

Statistical procedure
These variables are at three distinct levels: (i) message content within different countries; (ii) social determinants of different countries (HIV rate, HIV awareness and condom use); (iii) social determinant of different regions (UAI). As the available samples were not large at Level-2 (15) and Level-3 (3), three decisions were made to mitigate potential problems in performing multilevel analysis (Raudenbush and Bryk, 2002). First, because there were only three units at Level-3, UAI was considered at Level-2. Second, restricted maximum likelihood estimation was used to mitigate concerns related to the Level-2 sample size. Third, for this same reason, least-squares estimates of fixed effects without robust standard errors were reported. This resulted in a dataset with the following two-level structure: (i) message content within different countries; and (ii) three social determinants of different countries (HIV rate, HIV awareness and condom use) and one social determinant of different regions (UAI).

Hierarchical linear modeling (HLM) was conducted with HLM 6 (Raudenbush and Bryk, 2002). HLM allows for testing the effects of the country- and region-level social determinants on the individual-level message frames free of
the assumption that the country- and region-level social determinants are independent of one another.

A two-step approach to multilevel modeling was implemented (Raudenbush and Bryk, 2002). In the first step, null models were tested as a means to determining what proportion of variance lay between countries. Such models, in having no predictors at Level-1 or Level-2, are fully unconditional. These models estimate the intercept in a random coefficients model and are equal to one-way analysis of variance (ANOVA) models with random effects. The multilevel equation for this null model is as follows:

Level-1 Model: $Y_{ij} = \beta_{0j} + r_{ij}$

Level-2 Model: $\beta_{0j} = \gamma_{00} + \mu_{0j}$

These two equations can be put together to make up the following:

$Y_{ij} = \gamma_{00} + \mu_{0j} + r_{ij}$

In this equation, $Y_{ij}$ represents the prevalence of a message frame for poster $i$ in country $j$. In addition, $\gamma_{00}$ is the grand mean, $\mu_{0j}$ is the country’s deviation from the mean and $r_{ij}$ is the individual poster’s deviation from the mean. Importantly, this model can be used as a basis for the calculation of intra-class correlations (ICCs), which signify the proportion of variance in an outcome variable that is between Level-2 units (Raudenbush and Bryk, 2002).

In the second step, conditional models, with predictors specified at Level-2, were tested. With the social determinants entered as predictors at Level-2, these intercept-as-outcomes models were run to assess the influence of country- and region-level social determinants on message frames (Raudenbush and Bryk, 2002). Level-2 variables were grand-mean centered (Hofmann and Gavin, 1998). The multilevel equation for this intercept-as-outcome model is as follows:

Level-1 Model: $Y_{ij} = \beta_{0j} + \gamma_{01}UAI + \gamma_{02}HIV + \gamma_{03}HIV awareness + \gamma_{04}condon use + \mu_{0j}$

Level-2 Model: $\beta_{0j} = \gamma_{00} + \mu_{0j}$

These two equations can be put together to make up the following:

$Y_{ij} = \gamma_{00} + \gamma_{01}UAI + \gamma_{02}HIV + \gamma_{03}HIV awareness + \gamma_{04}condon use + \mu_{0j} + r_{ij}$

Thus, error terms are essential to both models. Such ‘random effect’ models are used because of the likelihood that $\beta_{0j}$ may vary across countries (Raudenbush and Bryk, 2002). Finally, variance explained by the Level-2 social determinants can be calculated by comparing models in the first and second steps (Raudenbush and Bryk, 2002).

RESULTS

Prevalence rates for the health message frames are depicted in Table 1. Self-efficacy was the most common message frame, appearing in 68.60% of the posters. Barriers was the least common frame, appearing in only 1.53% of the posters. In addition, the posters had an average of 1.92 of the six message frames (SD = 1.35). Specifically, 22.00% of the posters had zero frames, 14.40% had one frame, 31.40% had two frames, 17.40% had three frames, 12.30% had four frames, 2.10% had five frames and 0.40% had six frames.

Results of the one-way ANOVA models are depicted in Table 2. There was support for the significance in terms of each of the message frames. This leads to the rejection of the null hypothesis that message frames are the same regardless of country. ICCs indicate that message frames varied primarily at Level-1 and only secondarily at Level-2.

Results of the intercept-as-outcome models are depicted in Table 3. HIV rate had a significant association with benefits ($\gamma_{01} = 0.036, t = -2.615; p < 0.05$). HIV awareness was significantly associated with consequences ($\gamma_{02} = 0.018, t = -1.996; p < 0.05$) and self-efficacy ($\gamma_{02} = -0.034, t = -3.156, p < 0.01$). Condom use was significantly associated with preventive means ($\gamma_{03} = -0.015, t = -2.694; p < 0.05$) and self-efficacy ($\gamma_{03} = -0.020, t = -3.150; p < 0.01$). UAI had significant associations with benefits ($\gamma_{04} = -0.130, t = -2.669; p < 0.05$) and self-efficacy ($\gamma_{04} = -0.122$, $p < 0.05$).

Table 2: Estimation of one-way ANOVA models for health message frames

<table>
<thead>
<tr>
<th>Fixed effects</th>
<th>Coefficients</th>
<th>SE</th>
<th>t-ratio</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers</td>
<td>0.134</td>
<td>0.062</td>
<td>2.156</td>
<td>0.363</td>
</tr>
<tr>
<td>Consequences</td>
<td>0.267</td>
<td>0.043</td>
<td>6.163***</td>
<td>0.066</td>
</tr>
<tr>
<td>Benefits</td>
<td>2.147</td>
<td>0.069</td>
<td>31.249***</td>
<td>0.142</td>
</tr>
<tr>
<td>Preventive means</td>
<td>0.713</td>
<td>0.111</td>
<td>6.400***</td>
<td>0.136</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.954</td>
<td>0.098</td>
<td>9.747***</td>
<td>0.175</td>
</tr>
<tr>
<td>Sources</td>
<td>0.465</td>
<td>0.065</td>
<td>7.198***</td>
<td>0.054</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001.
The current study examined HIV/AIDS poster content for six health message frames. The most common frame, self-efficacy (68.60%) and the least common frame, barriers (1.53%), are the health components that have been most commonly linked to HIV preventive behaviors (Fisher and Fisher, 2000). Importantly, 22% of the posters had no frames at all. This suggests that, although such posters mention HIV/AIDS, which could spur awareness, they do not have frames necessary to effect behavior change (Rogers, 1983; Witte, 1992; Janz and Becker, 1994), which is the end goal of the poster messages and the only current solution to the HIV/AIDS epidemic.

The results of multilevel analysis indicate both good and bad practices in regards to the creation of the HIV posters. Good practices are pointed out by the results related to HIV awareness and condom use. Countries with low—or inauspicious—levels of these two indicators were most likely to disseminate posters with important message frames, including consequences, preventive means, and self-efficacy, which are necessary to effect behavior change, which could spur awareness. Countries with high— or auspicious—levels of HIV prevalence are creating messages that, within the context of various public health theories (Rogers, 1983; Witte, 1992; Janz and Becker, 1994), are the least common frame: self-efficacy (1.53%) are the most common frame: preventive means (68.60%) and the most common frame: consequences (65.56%).

The percent of variance explained by the intercept-as-outcome models is depicted in Table 3. Because of the absence of significant intercepts and variables in the barriers model, it is not surprising that this model explained such a small percent in variance. This finding is also consistent with the low prevalence of this frame, which limits the variance.

Table 3: Estimation of the final HLM models for the health message frames

<table>
<thead>
<tr>
<th>Sources</th>
<th>Preventive means</th>
<th>Self-efficacy</th>
<th>Consequences</th>
<th>Benefits</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept ($\gamma_{00}$)</td>
<td>0.768 (0.106)</td>
<td>1.065 (0.054)</td>
<td>2.160 (0.064)</td>
<td>33.684*** (0.004)</td>
<td>19.751*** (0.013)</td>
</tr>
<tr>
<td>HIV rate ($\gamma_{01}$)</td>
<td>-0.009 (0.010)</td>
<td>0.016 (0.016)</td>
<td>-0.036 (0.010)</td>
<td>-2.615* (0.020)</td>
<td>-0.009 (0.019)</td>
</tr>
<tr>
<td>HIV awareness ($\gamma_{02}$)</td>
<td>-0.001 (0.007)</td>
<td>0.016 (0.009)</td>
<td>-0.011 (0.010)</td>
<td>-0.954 (0.020)</td>
<td>-0.009 (0.019)</td>
</tr>
<tr>
<td>Condom use ($\gamma_{03}$)</td>
<td>-0.004 (0.067)</td>
<td>0.004 (0.019)</td>
<td>-0.005 (0.007)</td>
<td>-0.730 (0.019)</td>
<td>-0.015 (0.019)</td>
</tr>
<tr>
<td>UAI ($\gamma_{04}$)</td>
<td>-0.108 (0.057)</td>
<td>0.040 (0.096)</td>
<td>-0.130 (0.064)</td>
<td>-2.669* (0.096)</td>
<td>0.040 (0.096)</td>
</tr>
</tbody>
</table>

*p < 0.05; **p < 0.01; ***p < 0.001.
influencing the development of positive health attitudes and behaviors. Such messaging strategies are indicative of a positive step forward in addressing HIV/AIDS in sub-Saharan Africa. These findings offer general support for the idea that health media practitioners, especially in countries with low levels of HIV awareness and condom use, would be pressured to creative potentially effective preventive messaging (Shoemaker and Reese, 1996).

Bad practices are highlighted by the findings related to HIV rate and UAI. That HIV rate was negatively associated with benefits suggests that countries in which HIV is the greatest concern place the least emphasis on benefits. This finding is inconsistent with the idea that sub-Saharan countries most in need of effective HIV prevention should have the best messages, as suggested within the context of various public health theories (Rogers, 1983; Witte, 1992; Janz and Becker, 1994). Similarly, there seems to be incongruence between the UAI-related informational needs and media messages of the sampled countries. Message frames were least prevalent in countries with cultures that tend to avoid uncertainty and, thus, would require greater levels of information when it comes to decision-making (Hofstede, 2003). Thus, it appears that people most in need of information as a means to diminishing uncertainty and increasing sound decision-making (Moon and Tikoo, 1997) are without such when it comes to HIV prevention.

These findings have important implications for related media practices and policy. Messaging decisions in regards to small-media HIV campaigns in sub-Saharan Africa should be based on the previous research in the areas of involving public health and culture. More to HIV poster messages in sub-Saharan Africa, potentially effective message frames should be infused in all HIV posters (not just 78%, as demonstrated by this study), benefit frames should be infused more often in the posters of countries with high HIV rates, and messages should be tailored with regards to specific country's cultures and related informational needs, especially in high-UAI countries, such as Ghana and Nigeria, that require enhanced levels of information (Hofstede, 2003). Such improvements, including the greater implementation of evidence-based message-making, could be achieved via the training of health media practitioners, whether working for the organizations of African countries or those of foreign countries; improvements in the formal education of future media practitioners in sub-Saharan Africa; advances in the media policies of organizations with HIV preventive efforts in this region; improvements in media policies of broader associations, including those with membership of health media practitioners and researchers. This multifaceted approach would take into account individual practitioner idiosyncrasy, as well as the organizational and country cultures of health media organizations. Such advances are critical to health media practitioners, who serve vital roles in HIV prevention. It is critical that media practitioners understand the strengths and weaknesses of their recent messaging efforts, with the goal of increasing evidence-based message-making and curtailing the historic trend of African health campaigns of not acknowledging the importance of culture (Tomaselli et al., 2002).

Five limitations of this study should be discussed. First, although an exhaustive sample from the M/MC Health Communication Materials Database, the coded posters are from only 15 countries in sub-Saharan Africa. Second, although Hofstede’s (2003) UAI offers useful data for constructing region-level cultural indicators for sub-Saharan African countries, it does not allow for the creation of more specific country-level markers. Third, correlation-based analyses, such as those conducted by HLM, do not determine causality. That said, the social determinants generally preceded the message frames in terms of time, which would justify their placement as predictors of the message frames. Fourth, the measurement of self-efficacy and benefits, in having only three data points, are ordinal in nature, but more limited measures than those used for the other message frames. Fifth, in having sampling error that is somewhat larger than ideal, the poster sample size (N = 236) could lead to cases of Type I error, in which the null hypothesis is rejected even though it is true (Agresti and Finlay, 1997).

The current study implements a unique multi-method, multilevel approach to examining public health message frames and their social determinants. It is hoped that public health practitioners will attend to the findings and, more broadly, continue good practices related to message framing, while making corrections in some bad practices. These efforts are especially
important in sub-Saharan African countries that have high HIV rates, such as South Africa, Botswana and Zimbabwe. Improvements in related messaging can be viewed as a potential step forward in HIV prevention and health promotion in these countries.

REFERENCES


