

A 10-Year Systematic Review of HIV/AIDS Mass Communication Campaigns: Have We Made Progress?

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The purpose of the current study was to conduct a 10-year systematic review of HIV/AIDS mass communication campaigns focused on sexual behavior, HIV testing, or both (1998–2007) and to compare the results with the last comprehensive review of such campaigns, conducted by Myhre and Flora (2000). A comprehensive search strategy yielded 38 HIV/AIDS campaign evaluation articles published in peer-reviewed journals, representing 34 distinct campaign efforts conducted in 23 countries. The articles were coded on a variety of campaign design and evaluation dimensions by two independent coders. Results indicated that compared with the previous systematic review (1986–1998 period), campaigns increasingly have employed the following strategies: (1) targeted defined audiences developed through audience segmentation procedures; (2) designed campaign themes around behavior change (rather than knowledge change); (3) used behavioral theories; (4) achieved high message exposure; (5) used stronger research designs for outcome evaluation; and (6) included measures of behavior (or behavioral intentions) in outcome assessments. In addition, an examination of 10 campaign efforts that used more rigorous quasi-experimental designs revealed that the majority (8 of 10) demonstrated effects on behavior change or behavioral intentions. Despite these positive developments, most HIV/AIDS campaigns continue to use weak (i.e., preexperimental) outcome evaluation designs. Implications of these results for improved design, implementation, and evaluation of HIV/AIDS campaign efforts are discussed.

HIV/AIDS continues to exact an enormous toll in a multitude of regions and countries throughout the world. More than 33 million people are currently living with HIV/AIDS, and in 2007 alone, 2.5 million people became newly infected with HIV and 2.1 million lost their lives to AIDS (UNAIDS, 2007). Although recent data indicate that HIV incidence may be beginning to decline in many parts of the world, the prevalence of AIDS continues to grow. In fact, the number of people living with AIDS worldwide has grown steadily each year for the past 2 decades (UNAIDS, 2007).

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These data demonstrate the urgency with which coordinated large-scale efforts that broadcast effective prevention messages globally are needed. A strategy that has been widely utilized to fulfill such a purpose in the HIV/AIDS area is the mass communication campaign (Bertrand, O'Reilly, Denison, Anhang, & Sweat, 2006; The Henry J. Kaiser Family Foundation, 2006; Liskin, 1990; Maibach, Kreps, & Bonaguro, 1993; Palmgreen, Noar, & Zimmerman, 2008). Campaigns aim to generate specific effects in large numbers of individuals, typically within a specified period of time, and through a coordinated set of communication activities (Rogers & Storey, 1987). They employ single or multiple media at the national, regional, and local levels, either as stand-alone efforts or as part of multicomponent programs. Working under the assumption that the public health impact of a program is a function of both its efficacy and reach (Abrams et al., 1996), campaigns that achieve even small effects could impact HIV/AIDS in a meaningful and cost-effective manner (see Cohen, Wu, & Farley, 2005; Snyder et al., 2004). It is presumably this rationale that has led campaigns to have become such an integral part of HIV prevention efforts since the beginning of the epidemic (Freimuth, Hammond, Edgar, & Monahan, 1990; Holtgrave, 1997; Johnson, Flora, & Rimal, 1997; Liskin, 1990; Markova & Power, 1992; Myhre & Flora, 2000).

HIV/AIDS Mass Media Campaigns

Given the disturbing data on the AIDS epidemic reported above, the importance of campaigns for HIV/AIDS prevention in the near future is unlikely to wane. It is therefore critical that researchers continue to study such efforts in attempts to better understand the most efficient and effective methods for carrying out such campaigns. Early in the HIV/AIDS campaign literature, health communication researchers presented recommendations for how HIV/AIDS campaigns should be carried out:

Effective HIV/AIDS prevention campaigns must begin with careful campaign planning in which campaign goals are determined, the target audience's specific needs and orientations are examined, and the target audience is segmented into homogeneous groups. The communication strategy should be carefully analyzed to identify accessible and effective communication channels, design campaign messages, and test these messages for use with target audiences. . . . Finally, campaign outcomes must be carefully evaluated so that the influences of the campaign on health behaviors and directions of future risk prevention and health communication efforts can be identified. (Maibach et al., 1993, pp. 31–32)

What these researchers were articulating was the fact that to maximize the chances of success, HIV/AIDS campaigns should adhere to well-accepted principles of effective campaign design and evaluation (Maibach et al., 1993; Noar, 2006; Palmgreen et al., 2008; Randolph & Viswanath, 2004; Rogers & Storey, 1987; Salmon & Atkin, 2003). Specific principles include the following: (1) conducting *formative research* on and about the target audience; (2) *using theory* as a conceptual foundation; (3) *segmenting one's audience* into meaningful subgroups; (4) using a *message design approach* that is *targeted* to the audience segment(s); (5) utilizing effective *channels* widely viewed by and persuasive with the target audience; (6) conducting *process evaluation* and ensuring *high message exposure*; and (7) using a

sensitive *outcome evaluation design* that reduces threats to internal validity and allows causal inferences about campaign impact to be made. A question raised in the current study is the following: to what extent have recent HIV/AIDS campaigns in the literature adhered to such principles? While several reviews of HIV/AIDS mass communication campaigns exist (Bertrand & Anhang, 2006; Bertrand et al., 2006; Holtgrave, 1997; Myhre & Flora, 2000; Palmgreen et al., 2008; Vidanapathirana, Abramson, Forbes, & Fairley, 2005), the last comprehensive, systematic review of the literature appeared in the year 2000, and it included literature through only mid-1998 (Myhre & Flora, 2000). Thus, the current investigation updates this systematic review of HIV/AIDS mass communication campaigns, beginning precisely where Myhre and Flora's (2000) review ended (mid-year, 1998) and going up through 2007. This review is based on the key principles of campaign design listed above. In addition, our intention was to keep our review procedures similar to Myhre and Flora's (2000) in order to maximize the ability to make comparisons between that review (which spanned 1986–early 1998) and the current review (late 1998–2007).

Method

Search Strategy

A comprehensive, detailed strategy to search for peer-reviewed journal articles relevant to this review was devised and undertaken. The intent was to locate all articles relevant to this review that were published from late 1998 through October 2007 (in print or electronic form). First, comprehensive searches of the *PsycINFO* and *Medline* computerized databases were conducted. Numerous keywords were used in combination in the search, including “HIV,” “AIDS,” “condom use,” “safe(r) sex,” “testing,” “mass media,” “campaign,” “intervention,” and “social marketing.”

Second, reference lists of a number of reviews in the area of HIV/AIDS mass communication campaigns were examined for potential studies (including Bertrand & Anhang, 2006; Bertrand et al., 2006; The Henry J. Kaiser Family Foundation, 2006; Vidanapathirana et al., 2005). In addition, all issues (through 2007) of *Health Communication* and *Journal of Health Communication* were searched for relevant articles. Although campaign evaluations are published in a wide variety of journals, these journals were identified as potentially publishing several studies that might be relevant.

All articles that were considered for inclusion had to meet the following criteria in order to be included in the review:

- (1) Studies had to have been published in 1998 or later and *not* included in Myhre and Flora's (2000) review.
- (2) Mass media had to be a central or significant component of the campaign study.
- (3) As the focus was on HIV/AIDS campaigns, those campaigns that focused on increasing safer sexual behaviors, reducing risky sexual behaviors, or encouraging HIV testing were included. Sexually transmitted disease (STD) testing only and contraceptive only campaigns were excluded, unless those campaigns also promoted safer sexual behaviors or HIV testing or both, in which case they were included. Also, campaigns focused solely on injection drug use practices or harm reduction in the context of drug use were excluded.

- (4) Studies had to provide an empirical outcome evaluation assessing the impact of the campaign on at least one outcome variable. Studies examining only formative research with audiences, qualitative studies, and articles testing safer sex messages (but not campaigns) were excluded.
- (5) Consistent with Myhre and Flora (2000), studies had to be published in peer-reviewed journals. This ensured higher-quality campaign evaluations and avoided the inclusion of abstracts where limited information about campaign design and evaluation is reported.

Initial searches resulted in hundreds of abstracts that were examined for relevance. Approximately 66 articles that had the potential to be included in the review were located and examined for relevance. Of these, a number were *excluded*:

- Twelve studies (18%) were contraceptive only, emergency contraception only, or family planning campaigns rather than HIV prevention campaigns (e.g., Babalola & Vonrasek, 2005);
- Eight studies (12%) were formative studies that did not report any empirical outcome data on the campaign effort (e.g., Bull, Cohen, Ortiz, & Evans, 2002);
- Four studies (6%) were STD testing only campaigns that did *not* include safer sexual behavior or HIV testing components (e.g., Andersen, Ostergaard, Moller, & Olesen, 2001);
- Three studies (5%) did not focus on a particular mass media campaign, but rather focused very generally on prevention campaigns (Peretti-Watel, Obadia, Dray-Spira, Lert, & Moatti, 2005); and
- One study (2%) did not include any form of mass media, even though it was described as a “social marketing” effort (Cohen et al., 1999).

A final set of 38 articles (57% of the 66 articles) met criteria and were included in the review. In four cases, more than one article reported on the same campaign. In these cases, all articles were used to extract information on the campaign, and the broadest and most rigorous evaluation was listed in the results section. Thus, the 38 articles represented 34 distinct HIV/AIDS campaign efforts.

Article Coding

Articles were coded on 10 dimensions of interest (country, sample, target audience, formative research, use of theory, campaign channels/components, campaign slogan, message exposure, evaluation design, outcome measures) by two independent coders. After each article was coded, the coders and the first author met to compare the coders’ work and discuss any discrepancies that were present. Inter-coder reliability was calculated for each characteristic that was coded. Percent agreement was calculated by dividing the number of agreed-upon coding instances by the total, and was calculated for each coding category. For example, in the case of the *target audience* category, the coders agreed on 35 out of the 37 articles, or 95% agreement. Cohen’s (1960) kappa for inter-coder reliability, which corrects for chance categorizations, also was calculated. Percent agreement ranged from a low of 89% to a high of 100%, with a mean percent agreement of 95%. Cohen’s kappa ranged from a low of .78 to a high of 1.0, with a mean kappa of .90. These figures indicated very good agreement among the coders. All discrepancies between coders were resolved through discussion between the two coders and the first author.

Results

Myhre and Flora's (2000) review, spanning from the beginning of the epidemic through 1998, included 41 articles conducted in 17 countries. A comparison with the current set of 34 campaigns conducted in 23 different countries (1998–2007) reveals that this literature has continued to flourish over the past decade. Table 1 displays a number of characteristics of the campaign efforts, while Table 2 displays a summary of findings in the current review compared with those of Myhre and Flora (2000). Each dimension is now discussed in turn.

Formative Research

Formative research is concerned with gathering information and data about the target audience that ultimately helps ensure that a campaign effort is appropriately suited to its intended audience. Atkin and Freimuth (2001) define two phases of formative research: (1) *preproduction research*, where information regarding audience characteristics, the behavior at issue, and message channels are gathered; and (2) production testing, or *pretesting*, where initial messages are tested with target audience members in order to gain feedback on the appropriateness and persuasive impact of those messages. In the current review, 47% (16/34) of campaigns reported conducting some type of formative research activities. Such research included a variety of methods, including focus groups, ethnographic interviews, quantitative surveys, and literature reviews. While some studies were very clear about their use of several phases of formative research (e.g., Futterman et al., 2001; Ross, Chatterjee, & Leonard, 2004; Underwood, Hachonda, Serlemitsos, & Bharath-Kumar, 2006; Zimmerman et al., 2007), other studies reported only one activity (e.g., Agha & Van Rossem, 2002; Vaughan, Rogers, Singhal, & Swalehe, 2000b) or were more vague about what was done (e.g., Goldstein, Usdin, Scheepers, & Japhet et al., 2005). In addition, while many of the studies not reporting formative research likely did *not* conduct such activities, it may be that some did but did not report such activities due to space limitations in journal articles.

Among those reporting formative research, the most commonly reported activity was research about campaign messages, including pretesting messages or examining message preferences of members of the target audience. This was reported (or implied) in 11 of 16, or 69%, of studies employing formative research (see Table 1). Also commonly reported was research to understand what factors influence the behavior of interest, reported (or implied) in 10 of 16, or 63%, of studies. Formative research to best assess promising channels of interest or to assess how to place messages within selected channels was mentioned in only 2 of 16, or 13%, of studies. In addition, only two studies (13%) reported using formative research to develop or test evaluation measures. Unfortunately, Myhre and Flora (2000) did *not* look at use of formative research in their review, and therefore comparisons on this dimension cannot be made.

Use of Theory

Many theories can and have served as conceptual foundations for mass communication campaigns (Cappella, Fishbein, Hornik, Ahern, & Sayeed, 2001; Freimuth, 1992; Murray-Johnson & Witte, 2003; Noar, 2005; Slater, 1999). Theories can serve

Table 1. Characteristics of the 34 HIV/AIDS mass communication campaigns

Study	Country	Sample	Target audience	Formative research	Theory	Campaign components	Campaign slogan	Exposure	Outcome evaluation	Outcomes
Agha (2001)	Zambia	1,589 males & females	Females (primary target)	—	—	Radio, posters, magazines, point-of-sale materials, peer educators	Care	—	Posttest-only	Intention to use female & male condoms
Agha (2003)	Kenya	2,213 males & females	15–39 year olds	Focus groups to understand behavior	Revised Health Belief Model	Radio, TV	Trust	69% branded 64% generic	Posttest-only	Self-efficacy, condom efficacy, availability of condoms, openness to obtaining condoms, perceived severity, risk awareness
Agha & Van Rossem (2002)	Tanzania	2,712 males & females	Middle & upper income professional, aged 15–49	Focus groups to pretest messages	—	Radio, newspapers, peer education, provider support	Care: For Couples Who Care	38% media 6% peer education 6% provider support	Posttest-only	Intention to use female condom
Alstead et al. (1999)	United States	1,425 males & females Baseline: 341 Follow-up 478 Second follow-up: 606	Youth aged 15–17	Reviewed literature, interviewed service providers. Focus groups to understand behavior, determine channels, examine message preferences	—	Radio, posters, billboard/bus signs, community mobilization, promotional materials	Condoms: They Go Where You Go	73% any component 51% radio 35% posters 32% billboard/bus signs	Pretest–posttest independent samples design with additional posttest	Sexual experience, intention to use condoms, condom use

Bessinger et al. (2004)	Uganda	4,880 males & females Sample 1: 2,597 Males aged 15-54 2: 2,283	Females aged 15-49; Males aged 15-54	-	-	Radio, TV, newspapers, magazines, brochures, posters, community education	Stop, Treat & Destroy; Safer Sex or AIDS; Protector Condoms	Females: Time 1: 70% Time 2: 77% Males: Time 1: 81% Time 2: 88%	Posttest-only design with additional posttests	Knowledge of condoms, Condom use
CDC (1999)	United States	15,205 males & females	IDUs & their sex partners; non gay MSM; high-risk youth; residents in high STD prevalence areas	Ethnographic research	Trans-theoretical Model and other behavioral theories	Newsletters, pamphlets (role model stories), baseball cards, peer outreach, condom provision, bleach kits	-	54% (peak)	Time series design with 10 intervention and 10 matched control communities	Condom use stage of change with main and casual partners, bleach use stage of change, condom carrying
Farr et al. (2005); Smith et al. (2007)	Ethiopia	100 males & females	18-30 year olds	-	Social Cognitive Theory	Radio drama	Journey of Life	90% (among once-a-week radio listeners)	Posttest-only	Liking of program, perceived similarity to characters, behavior change
Futterman et al. (2001)	United States	946 males & females Baseline: 381 Follow-up: 565	Youth of color from high seroprevalence communities	Focus groups to understand behaviors; Pretest messages; Provider interviews; Literature review	-	Radio, cable TV, websites, fliers, magazines, transit ads, palm cards, community coalitions, hotline	HIV. Live With It. Get Tested!	Change from 68% to 90% exposure to any HIV testing advertising; 64% called hotline	Pretest-posttest independent samples design	Hotline calls, HIV testing
Geary et al. (2007a, 2007b)	Nepal, Brazil, Senegal	3,000 males & females (1,000 per country)	16-25 year olds	-	-	TV PSAs & programs, concerts, panel discussions, website	Staying Alive	Nepal: 12% Brazil: 23% Senegal: 82%	Pretest-posttest independent samples design	Interpersonal communication about HIV, beliefs about HIV prevention

(Continued)

Table 1. Continued

Study	Country	Sample	Target audience	Formative research	Theory	Campaign components	Campaign slogan	Exposure	Outcome evaluation	Outcomes
Goldstein et al. (2005)	South Africa	1,981 males & females	Black disadvantaged individuals	18 months of research, development, testing, & partnership development	Social & behavior change models	TV, radio, drama, booklets	Soul City	82% overall 68% TV 65% radio 64% print media	Pretest–posttest independent samples design	Knowledge, subjective norms, attitudes about AIDS, peer pressure, discuss HIV with partner, helped someone HIV+, asked partner to get HIV test, condom use
Keating et al. (2006)	Nigeria	Baseline: NR Follow-up: 3,279 males & females	15–49 year olds	–	–	Radio PSAs & programs, TV, print materials, radio discussion clubs, partnering with sports clubs	Vision Project	59% radio 47% print 24% TV	Pretest–posttest independent samples design	Discuss HIV/AIDS with partner, condom efficacy, condom use
Kennedy et al. (2000); Mizuno et al. (2002)	United States	1,402 males & females	Sexually active 14–18 year olds who use condoms inconsistently	–	–	Radio, posters, promotional materials, skill-building workshops, peer outreach, hotline	Teens Stopping AIDS	70% overall	Pretest–posttest independent samples design with multiple post tests	Condom use, condom carrying, safer sex attitudes, norms, self-efficacy, intentions

Kim et al. (2001)	Zimbabwe	2,826 males & females Baseline: 1,426 Follow-up: 1,400	10-24 year olds	Youth helped design campaign materials	Steps to Behavior Change Framework	Posters, leaflets, newsletters, radio, launch events, dramas, peer education hotline	Have Self Control; Value Your Body; Respect Yourself	97% any component 92% posters 87% launch events 70% leaflets 46% dramas 29% newsletters 18% radio 7% peer education hotline	Pretest-posttest independent samples control group design	Reproductive health/safer sex knowledge, attitudes, interpersonal communication, behavior (abstinence, refused sex, avoided risky partners), seeking of services, hotline calls
Lombardo & Leger (2007)	Canada	417 MSM	Gay men who engage in unprotected sex with partners of unknown serostatus	Focus groups to pretest messages	-	Print media, posters, billboards, transit ads, bathroom ads, postcards, condom packs, website, promotional items	Think Again: How Do You Know What You Know	79% overall	Posttest-only design	Safer sex attitudes, perceived safer sex behavior change
McOwan et al. (2002)	England	832 individuals getting HIV testing Campaign clinic: Pre: 65 Post: 292 Comparison clinic: Pre: 239 Post: 236	Gay & bisexual men of black or southern European origin, aged 24 or younger	-	-	Gay tabloid newspapers, posters, leaflets	Gimme 5 Minutes	-	Pretest-posttest independent samples control group design (comparison of HIV testing rates)	HIV testing

(Continued)

Table 1. Continued

Study	Country	Sample	Target audience	Formative research	Theory	Campaign components	Campaign slogan	Exposure	Outcome evaluation	Outcomes
Peltzer & Promtuss-ananon (2003); Peltzer & Seoka (2004)	South Africa	3,150 male & female students	Adolescents aged 14–18	–	Soul City Theory of Social and Behavioral Change	TV, radio, newspaper, school-based intervention	–	81% Soul City TV 62% Soul City radio 78% Soul Buddyz TV 60% Soul City Newspaper	Posttest-only design	Condom use, HIV, and contraceptive knowledge, attitudes toward people living with HIV/AIDS, self-efficacy, condom use, delay of sex
Pettifor et al. (2007)	South Africa	11,904 males & females aged 15–24	Youth aged 10–17 (particularly disadvantaged communities)	–	Love Life theoretical framework (Diffusion of innovation, ecological theory, theory of reasoned action)	Television, radio, print materials, bill boards, peer education, community outreach, reproductive health services, youth centers, hotline	love Life	85% overall 65%–4 or more components	Posttest-only design and posttest-only control group design	Condom use, HIV testing, known some one who died of AIDS, talk with parents about HIV, future optimism, participated in program, HIV prevalence
Plautz & Meekers (2007); Meekers et al. (2005)	Cameroon	8,563 males & females Time 1: 1,956 Time 2: 3,237 Time 3: 3,370	Unmarried youth aged 15–24	Focus groups to understand behavior & pretest messages	Comprehensive Behavior Change Framework	Magazines, radio drama, TV, billboards, radio call-in show, peer education, promotion at condom vendors	100% Jeune	50% overall 90% magazine 70% TV 59% radio spot 52% radio call-in show 32% radio drama 20% peer 12% peer education	Pretest–posttest independent samples design with additional posttest	Perceived risk, severity, perceived condom attributes & access, self-efficacy, social support, sexual activity, condom use, STD symptoms

Porto (2007)	Brazil	1,006 females	Adolescent females aged 13–19	–	Social Cognitive Theory	TV, radio, posters, billboards	Carnival campaign	81% TV posters 34% radio 25% billboards 11%	Posttest-only design	Interpersonal communication about AIDS and use of condoms; condom use social norms
Quigley et al. (2004)	Uganda	3,394 males & females	Sexually active HIV-negative men & women	–	Behavioral Change for Intervention Model	Drama, video, group meetings, one-on-one and group discussions	–	81% overall	Pretest–posttest independent samples control group design	Sexual partners, condom use, HIV incidence
Ross et al. (2004)	United States	Total: 1,630 males & females Baseline: 808 Follow-up: 822	African American communities with high syphilis rates	Interviews with those who interact with people with syphilis, gate keepers, and key participants; Focus groups and interviews to pretest messages	Social Learning Theory	Role model story brochures & posters, videos, billboards, promotional materials, condom provision community partners, promotional materials	Get Tested. Get Treated. Use Condoms	71% overall	Pretest–posttest independent samples control group design	Knowledge of syphilis, syphilis testing, condom use
Shapiro et al. (2003)	Ivory Coast (Cote d'Ivoire)	2,150 males & females	Individuals who engage in risky sexual behavior, aged 15–49	–	–	TV soap opera	AIDS in the City	65% women 62% men	Posttest-only design	Sex with risky partners, condom use
Sherr et al. (1999)	England	667 males & females	Homosexual men	–	–	Gay print media	Try this HIV Test	80% of MSM coming for HIV test; 13% of these MSM correctly recalled message	Posttest-only design	Agreement with campaign message; Perception that campaign influenced decision to get HIV test

(Continued)

Table 1. Continued

Study	Country	Sample	Target audience	Formative research	Theory	Campaign components	Campaign slogan	Exposure	Outcome evaluation	Outcomes
Tambashe et al. (2003)	Burkina Faso (sub-Saharan Africa)	1,796 male truckers & assistants Baseline: 764 Follow-up: 1,032	Truck drivers, seasonal workers, female sex workers	—	—	TV, radio, audio cassettes, billboards, peer and community education	My Surest Friend is the Condom!	95% billboards 45% TV 38% radio 34% peer/community education	Pretest–posttest independent samples design	Interpersonal communication about AIDS, intentions to use condoms, condom use
Tyden & Bergholm (1998)	Sweden	1,600 males & females Pre-post: 600 Post-only: 600 Control: 400	College students	Focus groups and quantitative assessment to pretest messages	—	Posters, brochures, baskets with condoms & promotional items, maps to STD clinic, hotline, peer education	—	Pre-post Males: 93% Females: 98% Post-only Males: 85% Females: 95%	Pretest–posttest independent samples control group design	STD knowledge, awareness of STD clinic, intention to get STD test, attitudes toward condom use
Ubaidullah (2004)	India	300 individuals	Truck drivers	Pilot study to develop measures; In-depth inter views to understand behavior	—	Films, folk media, group discussions, counseling	—	—	Pretest–posttest panel design	Safer sex knowledge, attitudes, use of condoms, risky sexual partners
Under wood et al. (2006)	Zambia	2,057 males & females Base line: 901 Follow-up: 1,156	Individuals aged 13–19 in urban areas	Focus groups & in-depth inter views to pretest messages; Youth brought in to help make campaign decisions	Revised Stage Theory of Behavior Change	TV, radio, music, music videos, posters, billboards, other print media	Helping Each Other Act Responsibly Together (HEART)	Overall (TV): 50% TV: 71% urban, 36% rural	Pretest–posttest independent samples design	Talked with others about ads, abstinence, condom use

Valente & Bharath (1999)	India	192 males & females Pre-post: 93 Post-only: 99	-	-	-	Drama plays	Are You Well?	100% (only those who saw drama selected for study)	Pretest-posttest panel design with additional post-only group	Knowledge about HIV/AIDS; attitudes about those with HIV/AIDS
Vaughan et al. (2000a)	St. Lucia	1,991 males & females Baseline: 753 Follow-up: 1,238	-	-	-	Radio soap opera	After the Pleasure	35% overall	Pretest-posttest independent samples design	Sexual and reproductive health knowledge, attitudes, behaviors
Vaughan et al. (2000b)	Tanzania	2,485 males & females Females, aged 15-49; Males, aged 15-60	-	In-depth interviews to understand behavior	-	Radio soap opera	Lets Go with the Times	58% overall	Pretest-posttest control group design with additional posttests	Number of sex partners, condom use, sharing razors & needles
Wackett (1998)	Canada	694 males & females Baseline: 366 Follow-up: 328	-	-	Mathematical Model for the Reproductive Rate of an STD; Information-Motivation-Behavioral Skills Model; Social Network Theory	Posters, brochures, radio	Style: Doing the Right Thing	-	Pretest-posttest independent samples design	Safer sex knowledge, attitudes, & Chlamydia testing

(Continued)

Table 1. Continued

Study	Country	Sample	Target audience	Formative research	Theory	Campaign components	Campaign slogan	Exposure	Outcome evaluation	Outcomes
Xiaoming et al. (2000)	China	748 males & females Baseline Campaign: 407 Control: 393 Follow-up Campaign: 366 Control: 344	18–30 year olds	Focus groups to develop and pretest survey; Quantitative survey to understand behavior	–	Print media, video, radio, group discussions, home visits, counseling, workshops, condom provision	–	–	Pretest–posttest panel control group design	Knowledge & attitudes about HIV/AIDS prevention, condom use
Yzer et al. (2000)	The Netherlands	3,730 males & females total (mean = 414 per group)	General public (some activities directed toward specific target groups)	–	Theory of Planned Behavior	TV, radio, cinema, posters, newspapers & periodicals, brochures, postcards	I Have Safe Sex or No Sex	–	Pretest–posttest panel design with additional post-only and multiple assessment groups	Safer sex attitudes, norms, self-efficacy, intention to use condoms, assessment to discuss condom use with partner
Zimmerman et al. (2007)	United States	4032 males & females (approximately 100 per month)	High sensation-seeking and impulsive decision-making young adults, aged 18–26	Focus groups to understand behavior, examine message preferences & pretest messages. Quantitative surveys to determine TV preferences	Sensation-Seeking Targeting (SENTAR); Framework of Common Theoretical Concepts	TV	Use a Condom. Every Partner. Every Time.	85%–96% overall	Interrupted time-series design with control community	Condom use self-efficacy, intentions to use condoms, condom use

Table 2. Comparison of findings of Myhre and Flora's (2000) review and the current review

Review article	Formative research	Use of theory	Target audience	Message design	Channels	Message exposure	Outcome evaluation
Myhre & Flora (2000)	Not reported	Fewer than 20% of campaigns used theory	100% reported target audience; 59% of campaigns directed at general public	63% reported campaign theme; 10% of slogans contain reference to behavioral change	93% reported channels used; Among those, 26% used single and 74% used multiple channels	62% reported on campaign exposure. Exposure varied from 394%, with mean exposure ranging from 45–62%	Pretest-posttest design used most often; Post-only design also used often; 17% used stronger quasi-experimental designs
Current Study	47% reported formative research. Most common activities: pre-testing messages, studying the behavior	44% of campaigns used theory	94% reported target audience; Among those reporting, 3% directed at general public	82% reported campaign theme; 24% of slogans contain reference to behavioral change	100% reported channels used; 21% used single and 79% used multiple channels	82% reported on campaign exposure. Exposure varied from 6–100%, with mean exposure ranging from 52–77%	Pretest-posttest design used most often followed closely by post-only design; 30% used stronger quasi-experimental designs

a number of important roles, including suggesting the following: (1) important theoretical determinants on which campaign messages might focus; (2) variables for audience segmentation; and (3) variables to be used in evaluating campaigns. In the current review, 15 of 34 campaigns, or 44%, reported using theory. This is in contrast to Myhre and Flora (2000), who reported that fewer than 20% of HIV/AIDS campaigns were theory based. Some of the theories and models reported among the current set of campaigns included the Health Belief Model, Theories of Reasoned Action and Planned Behavior, Social Cognitive Theory (also known as Social Learning Theory), the Transtheoretical Model and Stages of Change, and the Information-Motivation-Behavioral Skills Model. These theories tend to be widely used in the health behavior change literature generally (Glanz, Rimer, & Lewis, 2002; Noar & Zimmerman, 2005) and in the health media campaign literature specifically (Noar, 2006). Other theories reported included Steps to Behavior Change (Kim, Kols, Nyakauru, Marangwanda, & Chibatamoto, 2001), the Soul City Theory of Social and Behavioral Change (Peltzer & Seoka, 2004), Behavioral Change for Intervention Model (Quigley et al., 2004), loveLife theoretical framework (Pettifor, MacPhail, Bertozzi, & Rees, 2007), and a Framework of Common Theoretical Concepts (Zimmerman et al., 2007). Use of these more “integrated” theories and models may reflect the growing consensus around particular theoretical concepts that are important to behavior change (Fishbein et al., 2001). That is, while theorists in the area of health behavior do not agree on which particular theory is most precise (Weinstein, 1993), there is growing consensus on which concepts may be critical to behavior change (Fishbein et al., 2001; Noar, 2007; Noar & Zimmerman, 2005).

Audience Segmentation

Grunig (1989) describes the concept behind audience segmentation in the following manner: “The basic idea of segmentation is simple: divide a population, market, or audience into groups whose members are more like each other than members of other segments” (p. 202). Audience segmentation is employed in efforts to create homogeneous groups that can then be targeted with messages designed specifically for the audience segment(s) of interest (Atkin, 2001; Slater, 1996). In the current review, all but two studies (94%) reported information related to a target audience of interest. In addition, in only one case did this information suggest that a campaign was directed at the general public (Yzer, Siero, & Buunk, 2000), and even in that case campaign activities directed toward particular groups were reported, suggesting some segmentation practices. This is in stark contrast to Myhre and Flora’s (2000) finding that 24 of 41 campaign evaluations, or 59%, were directed at the general public, and is likely indicative of the shift of HIV/AIDS campaigns from tools of awareness to tools of behavior change. That is, while early HIV/AIDS campaigns largely focused on raising awareness about the disease, more recent campaigns have focused on sexual behavioral change among a number of high-risk groups (Bertrand et al., 2006; The Henry J. Kaiser Family Foundation, 2006; Holtgrave, 1997; Myhre & Flora, 2000; Palmgreen et al., 2008).

The current set of campaigns segmented audiences on a variety of variables, including gender (Agha, 2001; Bessinger, Katende, & Gupta, 2004; Quigley et al., 2004), race/ethnicity (Futterman et al., 2001; Goldstein, Usdin, Scheepers, & Japhet, 2005; Ross et al., 2004), sexual orientation (Lombardo & Leger, 2007; McOwan, Gillece, Chislett, & Mandalia, 2002; Sherr et al., 1999), age group (Alstead et al.,

1999; Geary et al., 2007a; Kennedy, Mizuno, Seals, Myllyluoma, & Weeks-Norton, 2000; Kim et al., 2001; Meekers, Agha, & Klein, 2005; Mizuno, Kennedy, Weeks-Norton, & Myllyluoma, 2002; Peltzer & Seoka, 2004; Peltzer & Promtussananon, 2003; Porto, 2007; Plautz & Meekers, 2007; Zimmerman et al., 2007), risk-taking behavior (Kennedy et al., 2000; Lombardo & Leger, 2007), geographic region (Futerman et al., 2001; Ross et al., 2004; Underwood et al., 2006), stage of change (CDC, 1999; Kim et al., 2001), and sensation-seeking and impulsivity (Zimmerman et al., 2007). Six studies, however, used fairly broad audience segments that included individuals between approximately 15–50 years of age (Agha, 2003; Agha & Van Rossem, 2002; Bessinger et al., 2004; Farr et al., 2005; Keating, Meekers, & Adewuyi, 2006; Vaughan, Rogers, Singhal, & Swalehe, 2000b). This raises the question of whether one set of campaign messages can be designed that resonates equally well with all members of such broad segments. By comparison, other studies segmented audiences into multiple, highly specific audience segments (e.g., CDC, 1999; Tambashe, Speizer, Amouzou, & Djangone, 2003).

Message Design

Once a meaningful audience segment has been created, messages effective with that segment can be developed. This is referred to as message targeting (Kreuter, Strecher, & Glassman, 1999). While a number of studies used formative research to pretest messages, which likely helped increase targeting effectiveness, it is unclear if the messages were theoretically based from the start. Although 44% of campaigns were theory based, most were behavioral theories rather than theories specific to message design or message effects. While behavioral theories are helpful in specifying message content (Fishbein & Cappella, 2006), they do *not* specify how to form that content into a persuasive message. For this, theories of persuasion, message design, information processing, and/or are needed (Cappella, 2006; Noar, 2006; Slater, 2006). Examples of such theories include Message Framing (gain and loss), Emotional Appeals, Sensation-Seeking Targeting, the Limited Capacity Model, Elaboration Likelihood Model, Message Tailoring, and use of narratives (Cappella, 2006; Devos-Comby & Salovey, 2002; Noar, Benac, & Harris, 2007; Salmon & Atkin, 2003).

Ten campaigns (30%) in the current review did use an entertainment education strategy and in that manner used narratives for message design. Four of these 10 studies, however, did not list or describe any theory as informing the campaign (Shapiro, Meekers, Tambashe, 2003; Valente & Bharath, 1999; Vaughan, Regis, & St. Catherine, 2000a; Vaughan et al., 2000b), leading one to question whether a behavioral theory was used to inform the narratives. Sensation-seeking targeting, a message design approach that targets high sensation seekers using messages high in “message sensation value” (Palmgreen & Donohew, 2003), was utilized in one campaign study (Zimmerman et al., 2007). Unfortunately, Myhre and Flora’s (2000) review did not address theory-based message design. Given that very few studies in their review reported use of any type of theory, however, it is likely that few campaigns used theory-based message design.

Also examined here were campaign slogans, which most campaigns (28 of 34, or 82%) did provide as an overall theme of the campaign. By contrast, Myhre and Flora found that only 63% of campaigns reported a theme or slogan. It is notable that a number of campaign slogans in the current review included active references

to the behaviors of interest, such as “HIV. Live With It. Get Tested!” (Futterman et al., 2001) and “Condoms: They Go Where You Go” (Alstead et al., 1999). In fact, 8 of 34 campaigns (24%) contained slogans with direct and clear messages related to behavioral change, including HIV testing, safer sex, or condom use. Myhre and Flora (2000), on the other hand, found that a number of very general slogans were used, including “Understanding AIDS,” “AIDS Awareness Week,” and “America Responds to AIDS.” Only four slogans (10%) in Myhre and Flora’s (2000) review contained direct reference to behavioral change.

Channels

Channel selection refers to the choice of medium through which one’s mass media messages are to be disseminated. Traditional campaigns often use one or a combination of media channels such as television, radio, and print media (e.g., newspapers, magazines), although many campaigns also have utilized nonmedia channels including community mobilization, peer education, and school-based components (Noar, 2006; Rogers & Storey, 1987; Salmon & Atkin, 2003). In addition, some campaigns utilize so-called “small” media such as leaflets, brochures, billboards, and newsletters. In the current review, all campaigns described channel use, with 7 of 34 campaigns (21%) using a single media channel, while the remainder (79%) employed multiple channels. This is similar to Myhre and Flora’s (2000) finding of 93% reporting channel use, with 26% using single and 74% using multiple media. Single channel campaigns in both Myhre and Flora (2000) and the current review tended to use television, radio, or print media as the channel of choice.

In addition, an examination of Table 1 reveals great diversity of channels and strategies used to “get the message out” in the multichannel and multicomponent campaigns. Not surprisingly, a new trend in the campaigns area is the use of Internet websites as an additional campaign channel (Futterman et al., 2001; Geary et al., 2007a; Lombardo & Leger, 2007). Campaigns also used a variety of creative materials such as baseball cards, postcards, condom packs, and other promotional materials as well as a variety of interpersonal strategies including peer education, skill-building workshops, provider support, and hotlines. Further, a number of campaigns attempted to engage the larger community in the effort by including community partners, community coalitions, and community education/mobilization in campaigns.

Process Evaluation and Campaign Exposure

Process evaluation, a key component of overall campaign evaluation, is concerned with the monitoring and collection of data on fidelity and implementation of campaign activities (Valente, 2001). A key focus of process evaluation is ensuring that the audience is exposed to campaign messages with adequate reach and frequency, as traditionally many campaigns have done poorly in terms of audience exposure (Snyder et al., 2004). Thus, we focus here solely on audience exposure to campaign messages (i.e., reach).

In the current review, 82% of campaigns reported on campaign exposure, which is a clear improvement from Myhre and Flora (2000), where only 62% reported such data. In order to examine message exposure levels, we calculated mean levels of exposure across campaign studies in both the current review and in Myhre and Flora (2000). Given that campaigns often report several figures related to exposure, we

calculated exposure two different ways, first using the lowest exposure value reported by the campaign and then using the highest value reported. When only one overall value was reported, the same value was used in both analyses. Using the lowest exposure values reported for any channel in the campaign, Myhre and Flora's (2000) campaign studies had exposure levels of between 3% and 94%, with a mean of 45%. In the current study, campaigns reported exposure levels of between 6% and 100%, with a mean of 52%. Using the highest exposure value reported for each campaign, Myhre and Flora's (2000) campaign studies had exposure levels of between 25% and 94%, with a mean of 62%. In the current study, campaigns reported exposure levels of between 35% and 100%, with a mean of 77%. Thus, newer campaigns clearly have achieved higher overall levels of exposure to campaign messages, although it should be noted that exposure often varies across channels within the same campaign, and exposure to one channel (e.g., billboard) may not be as important as exposure to another (e.g., radio drama; see Table 1). In addition, exposure *frequency* (in addition to reach) is very important. Unfortunately, many campaign evaluations report little on the *frequency* of exposure and when they do, it is difficult to make comparisons across studies due to differing ways of calculating and reporting exposure frequency.

Outcome Evaluation

Outcome evaluation is concerned with assessing whether a campaign had its intended impact. Without a strong outcome evaluation it is not possible to know if a campaign achieved its goals—for instance, increasing knowledge, fostering positive attitudes, changing risky behaviors, or all of these. In their review, Myhre and Flora (2000) found the one-group pretest–posttest design to be the most often used outcome evaluation design. They also found that post-only designs were frequently used. In addition, only 7 of their 41 campaign studies (17%) used a quasi-experimental design, which included a control group, although five of these five evaluations were of differing phases of the same large-scale campaign.

Among the current group of campaign evaluations, the one-group, pretest–posttest design was again the most commonly used design, being employed in 13 of 34 campaigns (38%). The vast majority of these studies collected “independent samples” at each assessment timepoint (few used panel data). This was followed closely by use of the posttest-only design, which was employed in 11 studies (32%). Thus, 70% of campaign evaluations in this literature used one of these two designs, which generally are considered to be weak outcome evaluation designs as they do not control for numerous threats to internal validity (Cook & Campbell, 1979; Valente, 2001).

Some stronger designs did emerge among this group of campaign studies, however. Seven studies (21%) used pretest–posttest control group designs, two studies used time-series designs that included control communities, and one study used a unique design that made use of multiple groups and multiple assessments, which had the effect of reducing internal validity threats (Yzer et al., 2000). Thus, while Myhre and Flora (2000) found that only 17% of campaign evaluations used stronger quasi-experimental designs, the current review finds 30% of campaign evaluations using stronger quasi-experimental designs with control groups. Such designs have higher internal validity and thus reduce the plausibility of alternative explanations for observed changes in outcome variables (Cook & Campbell, 1979; Valente, 2001).

Finally, with regard to outcome measures, Myhre and Flora (2000) found that knowledge and attitude measures were most common, with behavioral measures being less common. In the current review, 24 of 34 campaigns (71%) included behavioral outcome measures, often condom use or HIV/STD testing. Moreover, those studies that did not include behavior as an outcome measure tended to include behavioral intention or stage of change as primary dependent measures. Thus, the make-up of these outcome measures reveals that nearly every campaign in the current review was focused at some level on behavioral change. As can be seen from Table 1, a number of studies also examined theoretical mediators of safer sex, such as attitudes, beliefs, self-efficacy, perceptions of risk, interpersonal communication, and condom carrying, which is consistent with the fact that a substantial number of these campaigns employed theory.

Campaign Effects

With regard to perhaps the most compelling question, that of campaign effects, Myhre and Flora (2000) were not able to come to any clear conclusions concerning the impact of campaigns on outcomes of interest. Other reviewers of this literature have similarly taken the stance that because of the weak outcome evaluation designs used, estimation of typical effects of HIV/AIDS campaigns are difficult to make (Bertrand & Anhang, 2006; Bertrand et al., 2006; Holtgrave, 1997; Palmgreen et al., 2008). The previous section illustrates that the majority of recent outcome evaluations have had similarly weak designs, still making it difficult to come to clear conclusions about campaign impact.

Among the 30% of studies with stronger outcome evaluation designs, however, is there evidence for the proposition that campaigns can have a measurable impact on key attitudes and behaviors of interest? While 2 of the 10 quasi-experimental studies did *not* find effects of the campaign (i.e., Quigley et al., 2004; Tyden & Bergholm, 1998), the remaining eight studies *did* find *statistically significant* campaign effects on behavior or behavioral intentions. Indeed, when comparing campaign with control communities, the following results favoring campaign communities were found: (1) Kim and colleagues (2001)—youth initiated condom use ($p < .05$), continued abstinence ($p < .001$), said no to sex ($p < .001$), talked with others about safer sex ($p < .001$), reduced numbers of sex partners ($p < .001$), or all of these; (2) McOwan and colleagues (2002)—men who have sex with men (MSM) were more likely to get tested for HIV ($p < .001$); (3) Ross and colleagues (2004)—African Americans had greater condom use at last sex ($p < .05$) and more knowledge of syphilis ($p < .001$); (4) Vaughan and colleagues (2000b)—men and women exhibited reductions in numbers of sexual partners ($p < .01$) and increased condom use ($p < .05$); (5) Xiaoming, Yong, Choi, Lurie, and Mandel (2000)—young adults increased AIDS knowledge ($p < .001$), attitudes toward AIDS prevention ($p < .001$), and condom use ($p < .05$); (6) CDC (1999)—high-risk communities exhibited increased condom carrying ($p < .0001$) and higher condom stage of change scores with main ($p < .05$) and nonmain ($p < .05$) partners; (7) Zimmerman and colleagues (2007)—at-risk young adults increased condom use intentions and condom use ($p < .05$); and (8) Yzer and colleagues (2000)—among men and women, outcomes (attitudes, social norms, self-efficacy, intentions to use condoms) stayed the same or improved during campaign periods and worsened during the noncampaign period ($p < .05$ or better). Thus, the vast majority of recent well-controlled

HIV/AIDS campaign studies have demonstrated effects on behavior or behavioral intentions.

Discussion

The purpose of the current study was to systematically review HIV/AIDS mass communication campaigns published in the literature from mid-1998 through 2007 and to compare this set of campaigns with a previous systematic review spanning 1986–mid-1998 (Myhre & Flora, 2000). A comprehensive search yielded 38 articles representing 34 unique HIV/AIDS campaign efforts designed to address sexual risk behavior, HIV testing, or both, which then were coded on a variety of dimensions. All in all, the current review suggests that campaigns have changed and improved over time in a variety of ways. In fact, HIV/AIDS mass communication campaigns appear increasingly to be accomplishing the following: (1) targeting defined audiences developed through audience segmentation procedures; (2) designing campaign themes around behavior change (rather than solely knowledge or attitude change); (3) using behavioral theories to inform campaign design; (4) achieving higher message exposure to campaign messages; (5) using stronger quasi-experimental designs with control groups for outcome evaluation (although still far too few studies use these stronger designs); and (6) including measures of behavior change (or behavioral intentions) in outcome assessments. These developments are very important, as many of them indicate greater fidelity to key principles of effective campaign design and evaluation (Noar, 2006; Palmgreen et al., 2008; Randolph & Viswanath, 2004; Salmon & Atkin, 2003; Valente, 2001).

In addition, many of these developments represent a shift in the purpose of campaigns, from simply aiming to raise awareness about HIV/AIDS to attempting to impact safer sexual behaviors. Given such a shift, what a campaign is in the first place may need to be reconsidered. For instance, Salmon and Atkin (2003) point out that although campaign researchers agree on general definitions of what mass communication campaigns are, campaigns as they are carried out vary greatly in practice, including with regard to message dose, duration, channels used, and level of analysis. The campaigns reviewed in the current study reveal this kind of diversity. For instance, whereas 21% of campaigns used a single channel (and were typically media-only efforts), the remainder used a great diversity of multiple channels, components, and strategies to broadcast and reinforce the campaign message. These sometimes included peer education, skill-building workshops, other communitywide components, or all of these, as well a variety of small media and promotional materials.

A question we raise here is whether campaigns to raise awareness and campaigns to affect behavior change should be carried out in the same manner. Although in a sense all mass media campaigns in the HIV/AIDS area can be viewed as tools to raise awareness, an argument could be made that the shift toward campaigns for behavior change necessitates that interpersonal components be increasingly integrated into such efforts. One example of this would be integrating individual- or group-level behavioral interventions under the umbrella of larger HIV/AIDS campaign efforts, as such interventions have demonstrated widespread efficacy in HIV prevention (see Noar, 2008). Another potentially promising avenue is integrating newer computer- and Internet-based components into campaign efforts, given that the interactivity of such programs may help to build skills and foster behavioral changes (Bull, 2008; Noar, 2009; Noar, Clark, Cole, & Lustria, 2006). Thus, it may

be wise for campaigns to move more in the direction of multicomponent campaigns, which may have greater efficacy in terms of behavioral change.

Moreover, although a comprehensive analysis or meta-analysis could not be undertaken in the current review due to the lack of rigorous outcome evaluation designs used in many studies, an examination of those studies using more rigorous designs yielded promising results. Indeed, 8 of 10 campaign efforts using quasi-experimental designs with control groups demonstrated impact on key safer sexual behaviors such as condom use or HIV testing or impact on behavioral intentions to engage in these behaviors. This is consistent with the few existing meta-analyses of HIV/AIDS campaigns that suggest that HIV/AIDS campaigns can have behavioral impact (Snyder et al., 2004; Vidanapathirana et al., 2005). If more campaigns are evaluated in a rigorous manner, the literature over time will be more capable of producing reliable estimates of average campaign effects. Such a development would accomplish the following: (1) allow more estimates of cost effectiveness to be made, something researchers have long called for (Bertrand & Anhang, 2006; Bertrand et al., 2006; Holtgrave, 1997; Maibach et al., 1993; Vidanapathirana et al., 2005) as well as (2) provide data for meta-analyses examining whether features of campaigns believed to be associated with success actually do matter (Noar, 2006).

Why, then, have so many reviewers of HIV/AIDS campaigns called for more rigorous evaluation (Holtgrave, 1997; Maibach et al., 1993; Myhre & Flora, 2000), while so few have heeded the call? Even among the current group of campaign studies, 70% used preexperimental designs that are incapable of yielding strong casual evidence for campaign effects. Although studies using such weak designs often make claims of campaign effects, alternative explanations may include the following: (1) reverse causality; (2) fluctuations in sample characteristics; (3) secular trends, historical events or both; or (4) a combination of these factors (Valente, 2001).

The fact that less progress than desired has been made in the area of outcome evaluation of HIV/AIDS campaigns is not entirely surprising, however, since there are a number of barriers to rigorous evaluation of campaigns. These include the high cost of rigorous evaluation, the need to roll out campaigns quickly in countries with fast growing epidemics, and the fact that many campaigns are executed in entire regions or countries and as such do not lend themselves to randomized controlled designs (Do & Kincaid, 2006; Hornik, 2002; Pettifor et al., 2007). At a minimum, researchers and practitioners in this area should begin a dialogue about more sophisticated approaches to evaluation of HIV/AIDS campaigns (see Pettifor et al., 2007), and evaluations of national campaigns in other behavioral areas should be consulted (see Farrelly, Davis, Havilan, Messeri, & Heaton, 2005; Huhman et al., 2005). In addition, when weaker designs must be employed, newer sophisticated methodological innovations to control for confounding factors might be considered (Do & Kincaid, 2006; Hornik, 2002; Office of National Drug Control Policy, 2002).

Finally, a last area deserving attention is theory-based message design. Recently, authors have clarified the distinctions among different kinds of theories, pointing out that while behavioral theories are very useful for pointing to potential determinants of behavior change, they are silent on the issue of *how* to turn such determinants into persuasive messages. For such a purpose, theories specifically related to message design are needed (Fishbein & Cappella, 2006; Noar, 2006; Slater, 2006). While a number of such approaches currently exist (see Cappella, 2006; Devos-Comby & Salovey, 2002), there is room for improvement and for new approaches to be developed (see Cappella, 2006; Noar, 2006). Moreover, in the current review, very

few campaigns used theories to inform persuasive message design. In fact, it is likely that messages based on both behavioral theories, which specify message content, *and* message design theories, which specify how particular kinds of messages can be designed to be persuasive with a target audience, will be most persuasive and effective (see Cappella, 2006; Palmgreen & Donohew, 2003). For example, messages based upon a set of theoretical determinants from the Theory of Reasoned Action, but which fail to capture an individual's attention and engage that individual, are not likely to have an impact. On the other hand, creative entertainment education messages that capture attention and engage but lack theory-based content may similarly fail to spark behavioral change. Approaches that effectively combine both behavioral and message design theories are more likely to be successful than those that use one without the other.

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