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Year 2004

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Research Synthesis

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Influences of social power and normative support on condom use decisions: a research synthesis

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Abstract *A meta-analysis of 58 studies involving 30,270 participants examined how study population and methodological characteristics influence the associations among norms, control perceptions, attitudes, intentions and behaviour in the area of condom use. Findings indicated that control perceptions generally correlated more strongly among members of societal groups that lack power, including female, younger individuals, ethnic-minorities and people with lower educational levels. Furthermore, norms generally had stronger influences among younger individuals and among people who have greater access to informational social support, including males, ethnic majorities and people with higher levels of education. These findings are discussed in the context of HIV prevention efforts.*

Introduction

Sexual contact remains a primary route of HIV infection throughout the world (e.g. Centers for Disease Control and Prevention, 2002; UNAIDS, 2002). As a result, numerous programmes have been implemented to encourage consistent condom use by sexually active adults and teenagers (for reviews, see Fisher & Fisher, 1992, 2000; Johnson *et al.*, 2003; Kalichman *et al.*, 1996; Prendergast *et al.*, 2001; Weinhardt *et al.*, 1999). The development and refinement of these programmes depend largely on a scientific understanding of the determinants of the behaviour (Fisher & Fisher, 2000; Gerrard *et al.*, 1996).

In the context of condom use, Ajzen and Fishbein's theories of reasoned action and planned behaviour have been especially relevant and popular (Ajzen, 1991; Ajzen & Fishbein, 1980, 2000; Ajzen & Madden, 1986; Fishbein & Ajzen, 1975). A recent meta-analytic review by Albarracín and colleagues (2001) showed that the theories of reasoned action and planned behaviour predict condom use reasonably well. These theories agree that the extent to which people use condoms is a function of their *intentions* or willingness to use them. Intentions, in turn, depend on *attitudes* (i.e. personal evaluation that condom use is desirable) and *social norms* (perceived normative support for condom use). The theory of planned behaviour adds that *perceived behavioural control* (assessments that one can use condoms if one wants to)

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should also affect behaviour, both directly and through indirect influences on intentions (Ajzen, 1991; Ajzen & Madden, 1986). Although the theories of reasoned action and planned behaviour were found to be highly predictive of condom use, Albarracín *et al.* (2001) also showed that the correlations underlying these models were not uniform across the contexts addressed in the studies. An examination of these contexts, therefore, is highly informative. The current meta-analysis examined the population and methodological factors that increase or decrease these associations in a sample of 129 datasets reporting correlations among condom use, intentions to use condoms, perceived behavioural control over condom use, attitudes toward condom use and subjective norms with respect to condom use. The population factors that we examined in this review included gender, age, ethnicity and education. In addition, we considered methodological factors such as measurement of condom use in relation to vaginal or non-vaginal intercourse, type of sexual partner (i.e. steady versus casual), context and time correspondence in the measurement procedures used in a study (Ajzen & Fishbein, 1980), and selection of measures of intentions, perceptions of behavioural control and attitudes. Importantly, the present meta-analysis represents the first comprehensive attempt to understand how population and methodological factors shape relations among the various psychological variables that can determine condom use.

Theories of reasoned action and planned behaviour

According to the theory of reasoned action, behaviours result from behavioural intentions, which in turn rest on attitudes and subjective norms concerning the behaviour (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; for a recent review, see Ajzen & Fishbein, *in press*). In the domain of condom use, attitude is the degree to which one has a positive versus a negative evaluation of condom use and is typically measured by a set of bipolar semantic differential scales (e.g. 'unpleasant–pleasant', 'unwise–wise', 'bad–good', 'unnecessary–necessary' and 'uncomfortable–comfortable'). A subjective norm is the perception that people who are personally significant think that one should or should not use condoms, and is typically measured by items such as, 'people who are important to me think I should use condoms' (Fisher *et al.*, 1995). In addition to these associations, the theory of planned behaviour added perceived behavioural control primarily as a predictor of behavioural intentions but sometimes as a direct cause of future actions (Ajzen, 1991; Ajzen & Madden, 1986). Perceived behavioural control refers to one's perception of control over the behaviour and is assumed to reflect the obstacles that one encountered in past behavioural performances or obstacles that one anticipates might be encountered in the future. Generally, perceived behavioural control is measured as an aggregate of assessments that (a) one can or cannot perform the behaviour if one wants to, (b) performing the behaviour is or is not up to oneself, and (c) performing the behaviour is easy or difficult (Ajzen & Madden, 1986).

According to the reasoned action and planned behaviour models, one's attitude toward the behaviour is a function of one's beliefs that performing the behaviour in question will lead to various outcomes and, concomitantly, the evaluations of those outcomes. An expectancy-value estimate of attitude is obtained by subjectively weighting each salient belief that the outcome will occur by the evaluative implications of that outcome. Thus, one is more likely to have a positive attitude toward using condoms if one believes that using a condom will lead to positive outcomes (e.g. 'will make sex more fun') and prevent negative outcomes (e.g. 'may help prevent sexually STDs'). For convenience and because of the assumption that beliefs and evaluations underlie and determine attitudes, the sum of weighted outcome beliefs is denoted as 'indirect attitude'. This component of the model is critical when researchers are interested

in understanding and modifying attitudes because attitudes are presumably based upon an analysis of behavioural outcomes.

The subjective norm is also influenced by a set of salient beliefs about the normative prescriptions of specific referents, weighted by the motivation to comply with each of those referents. For example, a man may perceive social pressure to use condoms if he believes that his partner thinks that he should use condoms and he is motivated to comply with him or her. For convenience and because of the assumption that subjective norm is based upon normative beliefs and motivations to comply, the sum of weighted normative beliefs is denoted as 'indirect subjective norm'.

In the domain of condom use, there is meta-analytic support for nearly all of the general theoretical associations proposed by the theories of reasoned action and planned behaviour: people are likely to use condoms when they intend to use them (Albarracín *et al.*, 2001; Sheeran & Orbell, 1998). Intentions, in turn, are influenced by the attitude toward using condoms, the subjective norm concerning condom use and perceptions of behavioural control over condom use; also, as expected, direct and indirect attitudes correlate, as do direct and indirect norms (Albarracín *et al.*, 2001). A graphic depiction of the model appears in Fig. 1, which represents the standardized associations among the variables proposed by the theories of reasoned action and planned behaviour in the domain of condom use (Albarracín *et al.*, 2001). To date, however, no quantitative review has examined whether the strength of each association posed by the theories varies as a function of population and methodological characteristics.

We hypothesized that the relative influence of intentions on behaviour and of perceived behavioural control on intentions and actual behaviour depend on the degree to which the populations have actual control over condom use (see Ajzen & Fishbein, in press). Societal groups that have limited *social power* (Lopez & Stack, 2001) may therefore base their condom use decisions more on their perceptions of behavioural control because these perceptions moderate the amount of effort they exert to reach something that is difficult for them. Similarly, people from societal groups who exchange information about sex and condom use

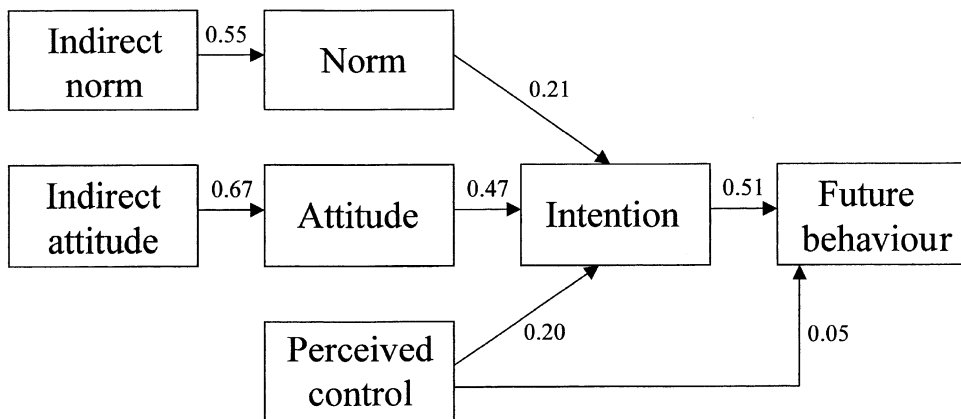


FIG. 1. Path analysis for the theory of planned behaviour with overall matrix of mean-weighted correlations adapted from an earlier review on condom use determinants by Albarracín *et al.* (2001). Path coefficients are presented next to each line. Indirect attitude refers to the belief-based measure of attitudes, which is a summary of the products of beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes. Indirect norm refers to the belief-based measure of norms, which is a summary of the products of beliefs about whether specific people (e.g. friends) support condom use and the participant's motivation to comply with those people.

with their social networks should be more likely to base their decisions on social norms; whereas people from groups with minimal *informational social support* may not possess relevant norms (for the role of social networks in HIV prevention, see Amirkhanian *et al.*, 2003; Ennet & Bauman, 1993; Friedman *et al.*, 1997; Kelly, 2004; Latkin *et al.*, 1995; Neaigus, 1998). Although Albarracín *et al.* (2001) conducted the most extensive review of the theories of reasoned action and planned behaviour to date, they did not examine moderators of the relations among behaviour, intentions, attitudes, norms and perceived behaviour control. The other two reviews, conducted by Sheeran and his colleagues, also provided little insight into these questions. Sheeran and Taylor (1999) examined predictors of condom use but did not conduct moderator analyses to determine whether the associations of intentions with attitudes and norms varied across populations. Further, although Sheeran and Orbell (1998) examined six of the same 14 moderators we examined, their findings were limited to the intention–behaviour relation and did not cover the other variables in the theories of reasoned action and planned behaviour. In addition to addressing issues that prior reviews did not address, our synthesis included 58 studies and 129 samples, which comprises the greatest collection of research in this domain available to date.

Influence of population and methodological factors on condom use. Because different populations may form intentions on the basis of different factors, it is plausible to expect that the strength of the key associations proposed by the models (see Fig. 1) will depend on characteristics of the population being considered (Ajzen & Fishbein, 1980; in press). If this hypothesis is plausible, researchers and practitioners who attempt to study and prevent infection with HIV and other STDs should consider representation of different genders, ages, ethnic groups and educational levels.

Relative influence of perceptions of behavioural control and intentions as a function of social power. Ajzen (1991) assumed that people who possess external control over their behaviour can simply enact their intentions. In contrast, when people do not possess such external control, enacting the behaviour is more difficult and requires a degree of persistence and effort that is facilitated by having high perceived behavioural control. Consequently, perceived behavioural control should correlate with behaviours and intentions more strongly when people lack the skills, external resources or interpersonal help that is necessary to perform a behaviour (Ajzen & Fishbein, in press).

We hypothesized that perceived behavioural control will be more influential in the domain of condom use when individuals lack the behavioural skills (Kelly & St. Lawrence, 1988) and the power (Amaro, 1995; Amaro & Raj, 2000; Ickovics *et al.*, 2002; Klein *et al.*, 2002; O'Leary & Martins, 2000; Parke, 2001; Parker *et al.*, 2000; Sumartojo, 2000) to actually implement and negotiate condom use, and when their access to condoms is difficult due to financial or environmental restrictions. Therefore, perceptions of behavioural control may have stronger correlations with intentions and condom use in unempowered populations, such as women (Amaro, 1995), teens (Lopez & Stack, 2001), individuals with lower levels of education (Greig & Koopman, 2003) and ethnic minorities (Ickovics *et al.*, 2002). The increase in the weight of perceived behavioural control may sometimes be accompanied by decreases in the weight of intentions, but such a hydraulic relation is not necessarily the case.

Relative influence of social norms and attitudes as a function of informational normative support. The theories of reasoned action and planned behaviour include an individual or attitudinal component (attitude toward the behaviour) and a social or normative factor (subjective norms). The extent to which people's decisions are based on attitudes, norms or both is

therefore a function of the extent to which people receive social information about condom use: some groups are more collectivistic and socially-oriented, whereas other groups value independence in decision making (Markus & Kitayama, 2001; Triandis & Suh, 2002). For example, teenagers are generally more attentive to their peers' opinions and behaviours than are adults (Kerr *et al.*, 2002) and may have greater informational support because of their participation in school activities. In addition, groups that have more social power generally have greater access to informational resources (see e.g. Lopez & Stack, 2001). Consequently, intended and actual condom use may correlate more highly with norms among males, people with higher education and ethnic majorities than among females, people with lower education and ethnic minority individuals.

Influence of measurement and other methodological moderators. We also examined the influence of general methodological aspects of the studies. Proponents of the theories of reasoned action and planned behaviour have argued that measurement factors are responsible for low correlations between attitudes and the outcome beliefs that presumably underlie these attitudes (Ajzen & Fishbein, 1980; in press; Fishbein & Middlestadt, 1995; Fishbein & Middlestadt, 1997). First, measures that correspond in terms of behaviour time and context should correlate more strongly than measures that reflect different times and contexts for the performance of the behaviour in question (Ajzen & Fishbein, 1977). Further, more precise measurement methods generally result in more valid assessments, particularly when self-report is involved (Jaccard & Wan, 1995). If this is true, measures that are more specific in terms of the type of sexual partners (e.g. steady versus casual) and the type of sex (e.g. vaginal versus non-vaginal) may also lead to stronger associations involving condom use, intentions, attitudes, norms and perceptions of behavioural control. Similarly, the time of measurement of behaviour, the adequate use of qualitative procedures to elicit the beliefs that are salient in the target population (Ajzen & Fishbein, 1980) and the use of different items to measure intentions or self-efficacy may lead to differences in the strength of the associations being considered (Ajzen, 2002; Ajzen & Fishbein, in press). Therefore, we examined whether variation in the theoretical associations of interest was contingent on measurement decisions (Ajzen & Fishbein, 1977; Ajzen & Fishbein, 1980).

Methods

Sample of studies

We first retrieved references from PsycLIT (1974–2000), the Educational Resources Information Center (ERIC; 1966–2000), MEDLINE, PUBMED, AIDSLINE and the Social Science Index (WSSI; 1983–2000) by means of selected keywords that included 'theory of reasoned action', 'theory of planned behaviour', 'Fishbein', 'Ajzen', 'expectancy value', 'intention', 'attitude toward behaviour', 'attitude toward act', 'subjective norm', 'social norm' and 'motivation to comply'. Other papers were located from the reference sections of these reports and by searching recent electronic or paper issues of journals likely to carry reports of this nature (i.e. *AIDS Care*, *American Journal of Public Health*, *American Journal of Community Psychology*, *Journal of Clinical and Consulting Psychology*, *Journal of Applied Social Psychology*, *Journal of Personality and Social Psychology*, *Health Psychology* and *Journal of Sex Research*). In addition to our efforts to retrieve published material, we contacted 25 NIH (National Institutes of Health)-funded researchers and requested unpublished reports, which led to the inclusion of 22 unpublished data sets in this synthesis. Reports that were available

by June 2000 were considered for inclusion in the sample of studies. A total of 58 papers met our inclusion criteria, as described below.

Condom-use behaviour. We included only studies that concerned condom use. Papers focusing on other safer-sex behaviours (e.g. abstinence) or behaviours only tangentially related to condom use (e.g. ‘buying condoms’ or ‘carrying condoms’) were excluded. This criterion served to make the sample of studies relatively homogeneous with regard to the target behaviour.

Presence of a measure of condom use behaviour or intention. Eligible studies had a measure of either intention or behaviour or both. Some studies included past behaviour, others included future behaviour and others included both. Composite measures of either intention or behaviour were accepted only when they concerned condom use behaviours (e.g. the average of condom use on different occasions, or the average of intentions to use condoms with occasional and steady partners). If composite measures included factors other than condom use (e.g. average of using condoms and engaging in a conversation about sexual history), the study was excluded to preserve the specificity of the meta-analysis.

Presence of measures of both attitudinal and normative factors. Eligible studies measured both attitudinal (i.e. either direct or indirect belief-based measure of attitudes) and normative factors (i.e. either direct or indirect belief-based measure of norms).

Presence of control perception measures. Eligible studies testing the theory of planned behaviour also included a measure of control, which could be either perceived behavioural control or self-efficacy (Ajzen, 2002; Ajzen & Fishbein, in press).

Presence of appropriate statistics. To be included, reports had to include at least the associations of either or both intention and behaviour, direct or indirect attitudes and direct or indirect norms. In addition, the studies based on the theory of planned behaviour had to report associations between control perceptions and either or both intention and behaviour. In some cases, these associations were obtained by contacting the authors of the studies.

Retrieval of correlations

We retrieved zero-order correlations from the studies and included separate samples when available (e.g. by gender, by risk group). Two of the authors retrieved the relevant coefficients independently with perfect reliability (i.e. 100% of agreement).

In order to minimize violations to the meta-analytic assumption of data independence, we selected the wave for which the most information was available when studies had multiple waves of data. The only case in which we retrieved various coefficients relevant to the same two variables was when the reports measured condom use and related variables in the context of different types of sex (e.g. vaginal versus anal) or with different types of partners (e.g. casual versus steady). This decision was made so that results could provide more exact information about the moderation of these two dimensions. Findings were not affected when we excluded statistically dependent data sets (Albarracín *et al.*, 2001). Collectively, the 58 studies provided 129 data sets (*k*) with studies providing 1 to 12 datasets. Out of these 129 datasets, 87 (67%) pertained to samples that were statistically independent and 33 (26%) to samples that we labelled as highly dependent (i.e. majority of the participants in one data set also appeared in another dataset). The remaining nine datasets included up to 7% of participants that also

appeared in another dataset (e.g. participants who had both steady and casual partners), which indicates that these datasets were not completely independent. In this synthesis, each of the 129 data sets was treated as the meta-analysis unit. In all, the studies included in this synthesis involved 30,270 participants, which represents the largest database ever available in this domain. The list of the reports included in the meta-analysis appears in the Appendix.

Dimensions coded from each study

In addition to retrieving effect sizes, we recorded (a) the characteristics of the report and the author, (b) the population features of the samples related to social power and informational normative support, and (c) the methodological aspects of the studies. The average percentage of inter-coder agreement in each section was 94.

Report and author. To describe the studies, we recorded: (a) the years of publication and study completion; (b) the publication form (i.e. journal article; unpublished reports, including unpublished theses, unpublished dissertations; and other published material); (c) the affiliation of the first author (i.e. behavioural science; medical science); and (d) the sample size. We also coded (e) the location of study by regions (i.e. North America; South America; Europe; Africa; Australia; Asia); and (f) the study setting (i.e. university; street; STD or drug-rehabilitation clinics; general-health clinic; high school or middle school; community organizations, such as churches or bars; and nationally representative samples surveyed over the telephone).

Moderators related to social power and normative support. We coded: (a) the percentage of males in the sample; (b) the age of the sample; (c) for samples from the US and other countries, whether the sample included at least 65% of ethnic majorities or at least 65% of minorities according to the ethnic composition of each country; (d) for studies conducted in the US, percentage of European Americans, African Americans, Latino Americans, Asian Americans, Native Americans and other ethnic groups; and (e) the percentage of participants who completed high school.

Measurement aspects of the studies. In recording the methodological aspects of the studies, we focused on the way the variables of interest were measured in each study. We coded: (a) the type of sex specified in the measures (i.e. vaginal; non-vaginal; unspecified), and (b) the type of partner specified in the measures (i.e. main or steady partner; casual, other or new partner; type of partner unspecified in measures). Further, measures in a study were compared pairwise for (c) their correspondence in action (i.e. use), target (i.e. condom), context (e.g. with a steady partner) and time (e.g. in the next month) dimensions (for a discussion of measure correspondence and attitude-behaviour relationships, see Ajzen & Fishbein, in press). When, for example, researchers measured intentions to use condoms with main partners in the next year and then recorded condom use behaviour in the next year irrespective of partner, the correspondence between intention and behaviour was scored 1 for time and 0 for context. These judgements led to a matrix of 60 indexes representing a low or a high correspondence (0 versus 1, respectively) among the measures of behaviour, intention, attitudes, subjective norms, control perceptions and belief-based measures. We then obtained overall correspondence indexes by adding the correspondence ratings for each pair of variables. Because action (use) and target (condoms) corresponded in all cases, these ratings ranged from 2 to 4. We also coded: (d) the nature of the intention measure (i.e. intention; self-prediction); (e) the time interval between assessment of intentions or perceived behavioural control and future

behaviour; (f) the dimensions included in the measures of control (i.e. self-efficacy; perceived difficulty; 'condom use is up to me'; 'I can do it if I want to'; see Ajzen, 2002); (g) the generality of the attitude measure (i.e. personal (e.g., 'my using condoms is good'); general (e.g. 'using condoms is good')); and (h) whether outcome and normative beliefs were elicited from the appropriate population (Ajzen & Fishbein, 1980). Finally, because we obtained correlations with measures of future and past behaviour, the influence of the behavioural measure was established by comparing these correlations using Z-tests.

Data analyses

Our data analysis followed two stages. We first calculated average estimates of the associations involving direct and indirect attitudes, direct and indirect norms, control perceptions (either a measure of perceived behavioural control or self-efficacy, or average of the two when both were available; for a discussion, see Ajzen, 2002), intentions, past behaviour and future behaviour from the studies. In doing so, we followed meta-analytic fixed-effects procedures to estimate weighted-mean correlations (Hedges & Olkin, 1985). In these procedures, correlations are converted using Fisher's *r*-to-*Z* transformations and weighted by $N-3$. For display and interpretative purposes, resulting weighted-mean *Z*-values were converted back to *r* using Fisher's *Z*-to-*r* transformation.

We also examined the correlations between: (a) intention and future behaviour, (b) control perceptions and future behaviour, (c) attitude and intention, (d) subjective norm and intention, and (e) control perceptions and intention as function of population and methodological moderators. To test the impact of the moderators, we regressed the *r*-to-*Z*-transformed correlations on the moderator values, using study weights of $N - 3$ applied with a statistical macro (Hedges & Olkin, 1985; Ho, 2001). The moderators were characteristics of the participants and the methodology used in each sample.

Results

Description of the studies

Descriptive characteristics of the studies appear in Table 1. The values in this table include *Ms*, *Mdns* and percentages, as well as the number of samples on which each value was based. Similar to the sample of studies summarized by Albarracín *et al.* (2001), the studies were published in relatively recent years, and great majority of the studies were conducted at community-based organizations (e.g. churches, gay or lesbian organizations) and universities. In all, the studies sampled 30,270 participants of a mean age of 25, of whom 48% were female and 77% completed high school. Ethnic minorities and majorities were both adequately represented in the sample. The samples were typically composed of heterosexual participants and of groups that have relatively high risk for HIV infection. As for the condom use measures used in studies, type of partner (i.e. steady or main versus casual or new) and type of sex (e.g. vaginal or anal) were not specified in about half of the studies, and researchers let about four months pass before measuring future behaviour.

Average correlations among model variables

Weighted-mean correlations appear in Table 2. As expected, correlations were all at least moderate in size and statistically significant. Condom use intentions correlated more strongly with future condom use ($r = 0.44$) than did control perceptions ($r = 0.24$; $p < 0.0001$ for

Table 1. Descriptive statistics for variables in the meta-analysis

Variable	Value	<i>k</i>
Report and author		
<i>Mdn</i> year of publication	1995	129
<i>M</i> year of publication (range = 1978–1999; SD = 3.69)	1994	129
<i>Mdn</i> year of study conducted (range = 1977–1997)	1992	54
<i>M</i> year of study conducted (SD = 3.21)	1991	54
Publication form ^a		
Journal article	87%	112
Dissertation, thesis, other published and unpublished materials	13%	17
First author affiliation ^a		
Behavioural sciences	94%	121
Medical sciences	6%	8
<i>M</i> sample size (range = 9–1516; SD = 328)	235	129
<i>Mdn</i> sample size	126	129
Location of study ^a		
North America (US Canada)	70%	90
South America	3%	4
Europe	15%	19
Africa	5%	6
Australia	7%	9
Asia	0.8%	1
Study setting ^a		
University	27%	32
Street	3%	4
STD or drug-rehabilitation clinics	13%	16
General health clinic	2%	2
High or middle school	8%	9
Community-based organization (e.g. church, homosexual bar or organization)	39%	46
Nationally representative sample (primarily over phone)	8%	9
Power- and normative support moderators		
<i>M</i> percentage of males in sample (SD = 43.89) ^b	51.84	129
<i>M</i> age (range = 14–41; SD = 6.7)	24.90	125
<i>Mdn</i> age	5.10	125
<i>M</i> % participants who completed high school ^b	77	64
<i>M</i> % of ethnic groups (only for studies in the US) ^b		
European American	38	58
African American	38	59
Latino American	15	54
Asian American	4	53
Native American	0.2	53
Other ethnic groups	5	58
Predominance of ethnic majorities or minorities (all samples with ethnicity data)		
Samples predominantly composed of majorities	53%	114
Samples predominantly composed of minorities	47%	114
<i>Other characteristics of participants</i>		
<i>M</i> % heterosexual participants ^b	72	65
Predominant (risk) group ^a		
Intravenous drug users	12%	16
Female partners of intravenous drug users	3%	4
Female sex workers	9%	12
Multiple-partnered heterosexuals	10%	13
College students	28%	36
High or middle school students	9%	12
STD and other health clinic attendees	22%	28
Nationally representative samples	7%	9
Other adults at low risk for HIV	2%	3
Methodological moderators		
Type of sex involving condom use ^a		
Vaginal	25%	32
Non-vaginal (anal, oral, digital)	19%	25
Intercourse specified as either vaginal or oral or anal	6%	8

Table 1 (Continued)

Variable	Value	<i>k</i>
Type of sex was unspecified in measures	50%	64
Type of partner involving condom use ^a		
Main or steady partner	23%	30
Casual, other, or new partner	30%	39
Type of partner was not specified in measures	47%	60
Measurement correspondence		
Behaviour and intention (SD = 0.40)	3.80	47
Behaviour and attitude (SD = 0.51)	3.71	46
Behaviour and subjective norm (SD = 0.79)	3.65	45
Behaviour and control perceptions (SD = 0.50)	3.59	25
Intention and attitude (SD = 0.59)	3.79	103
Intention and subjective norm (SD = 0.64)	3.69	101
Intention and control perceptions (SD = 0.30)	3.90	63
Attitude and subjective norm (SD = 0.43)	3.83	98
Attitude and behavioural beliefs (indirect attitude) (SD = 0.60)	3.68	88
Attitude and control perceptions (SD = 0.18)	3.97	58
Subjective norm and normative beliefs (Indirect subjective norm) (SD = 0.15)	3.98	83
Subjective norm and control perceptions (SD = 0.13)	3.98	58
Nature of the intention measure ^a		
Intention	53%	63
Self-prediction of behaviour	47%	56
Time between assessment of cognitions and future behaviour (30–365 days; SD = 95)	120	43
Self-efficacy included in control measure ^a		
Yes	60%	56
No	40%	37
Perceived difficulty included in control measure ^a		
Yes	55%	49
No	45%	40
'Condom use is up to me' included in control measure ^a		
Yes	24%	21
No	76%	67
'I can do it if I want to' included in control measure ^a		
Yes	27%	24
No	73%	64
Generality of the attitude measure ^a		
Personal	79%	80
General	21%	21
Measure of behaviour		
Neither past behaviour nor future behaviour was measured	30%	129
Only past behaviour was measured	24%	129
Only future behaviour was measured	25%	129
Both past behaviour and future behaviour were measured	21%	129
Elicitation of behavioural beliefs		
Elicited from appropriate population	81%	114
Not elicited or elicited from inappropriate population	19%	114
Elicitation of normative beliefs		
Elicited from appropriate population	80%	114
Not elicited or elicited from inappropriate population	20%	114

Note. *k* = number of samples. When entries in the value column are percentages, *k* in analysis equals the sum of the *k*s for all categories in the variable. For *M*s and *M* percentages, *k* is the number of samples on which the summary statistic was based. All percentages are calculated excluding missing values. The number of missing observations can be inferred after adding all relevant *k*s entering into a particular count or *M* or *Mdn*.

^a These variables are dichotomous or multichotomous and so percentages should add up to 100, with the exception of minor discrepancies due to random error.

^b *M* percentages are *M*s and are always smaller than 100.

contrast); attitudes correlated more strongly with intentions ($r = 0.60$) than did either subjective norm ($r = 0.42$; $p < 0.0001$ for contrast) or control perceptions ($r = 0.48$; $p < 0.0001$ for contrast). The indirect attitude measure (i.e. based on weighted behavioural

Table 2. Weighted mean correlations and homogeneity (*Q*) indexes

Variable	Future behaviour	Intention	Attitude	Norm	Behavioural beliefs	Normative beliefs	Control perceptions
Intention	$r_w = 0.44$ (0.42/0.46) $k = 47$ $N = 8622$ $Q = 475.37$	—					
Attitude	$r_w = 0.37$ (0.36/0.39) $k = 46$ $N = 8205$ $Q = 171.47$	$r_w = 0.60$ (0.59/0.61) $k = 78$ $N = 18505$ $Q = 565.58$	—				
Norm	$r_w = 0.25$ (0.23/0.27) $k = 45$ $N = 8102$ $Q = 160.82$	$r_w = 0.42$ (0.41/0.44) $k = 70$ $N = 16234$ $Q = 547.45$	$r_w = 0.46$ (0.45/0.47) $k = 74$ $N = 16456$ $Q = 481.25$	—			
Behavioural beliefs	$r_w = 0.31$ (0.29/0.33) $k = 27$ $N = 6430$ $Q = 880.4$	$r_w = 0.42$ (0.41/0.43) $k = 55$ $N = 14678$ $Q = 264.23$	$r_w = 0.57$ (0.56/0.59) $k = 61$ $N = 13538$ $Q = 539.86$	$r_w = 0.34$ (0.33/0.36) $k = 38$ $N = 9949$ $Q = 57.43$	—		
Normative beliefs	$r_w = 0.26$ (0.24/0.28) $k = 30$ $N = 6615$ $Q = 112.69$	$r_w = 0.43$ (0.42/0.44) $k = 53$ $N = 14560$ $Q = 311.89$	$r_w = 0.42$ (0.41/0.44) $k = 45$ $N = 11299$ $Q = 263.29$	$r_w = 0.47$ (0.45/0.48) $k = 61$ $N = 12510$ $Q = 453.34$	$r_w = 0.40$ (0.38/0.41) $k = 48$ $N = 13534$ $Q = 281.59$	—	
Control perceptions	$r_w = 0.24$ (0.21/0.26) $k = 25$ $N = 6541$ $Q = 69.16$	$r_w = 0.48$ (0.47/0.50) $k = 60$ $N = 17777$ $Q = 790.32$	$r_w = 0.47$ (0.45/0.48) $k = 48$ $N = 15343$ $Q = 556.21$	$r_w = 0.32$ (0.31/0.34) $k = 46$ $N = 14114$ $Q = 613.33$	$r_w = 0.37$ (0.36/0.39) $k = 33$ $N = 11536$ $Q = 159.84$	$r_w = 0.27$ (0.25/0.29) $k = 31$ $N = 11380$ $Q = 29.33$	—
Past behaviour	$r_w = 0.35$ (0.32/0.37) $k = 27$ $N = 6638$ $Q = 154.08$	$r_w = 0.52$ (0.51/0.53) $k = 40$ $N = 13385$ $Q = 1007.32$	$r_w = 0.42$ (0.40/0.43) $k = 39$ $N = 11383$ $Q = 290.57$	$r_w = 0.31$ (0.30/0.33) $k = 37$ $N = 11599$ $Q = 203$	$r_w = 0.33$ (0.31/0.34) $k = 22$ $N = 11308$ $Q = 146.57$	$r_w = 0.36$ (0.34/0.37) $k = 20$ $N = 9939$ $Q = 167.87$	$r_w = 0.33$ (0.31/0.34) $k = 31$ $N = 12367$ $Q = 184.59$

Note. r_w = weighted mean correlation; k = number of studies in the cell; N = total observations of individuals; Q = homogeneity statistic with $k - 1$ degrees of freedom. Each weighted mean correlation and Q is statistically significant, $p < 0.0001$. Confidence intervals (95%) appear parenthetically.

Table 3. Relative influence of perceived behavioural control and intentions as a function of population moderators

Population moderator	Statistic	Control and future behaviour		Control and intention		Intention and future behaviour	
		Association	<i>k</i>	Association	<i>k</i>	Association	<i>k</i>
Age	β	-0.34**	25	-0.14***	60	-0.46***	45
Percentage males in sample	β	-0.13	25	0.22***	60	-0.12	47
Percentage participants with complete high school	β	-0.47***	13	0.18**	24	0.12*	30
Percentage European Americans (US only)	β	-0.33*	19	-0.61***	25	0.29***	26
Predominance of ethnic majorities	β	0.24	22	-0.04	56	0.65***	42
Predominantly minority samples	<i>r_w</i>	0.23	19	0.49	37	0.37	25
Predominantly majority samples	<i>r_w</i>	0.32	3	0.47	19	0.64	17

Note. The table presents categorical and continuous fixed-effects models fitted in least-squares regression analyses with weights equivalent to the reciprocal of the variance ($N-3$). The dependent variable in each model is the correlation between the pair of variables indicated by the column headings. All *r_w* values are significant at $p < 0.001$. β = standardized regression coefficients. *r_w* = weighted-mean correlation within categories of a moderator.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 4. *Relative influence of attitudes and norms as a function of population moderators*

Population moderator	Statistic	Control and future behaviour		Control and Intention		Intention and future behaviour	
		Association	<i>k</i>	Association	<i>k</i>	Association	<i>k</i>
Age	β	-0.25***	70	-0.45***	59	0.15***	78
Percentage males in sample	β	0.17***	70	0.15*	61	0.02	78
Percentage participants with complete high school	β	0.20**	36	0.01	38	0.39***	39
Percentage European Americans (US only)	β	0.03	29	0.71***	29	-0.60***	35
Predominance of ethnic majorities	β	0.40***	64	0.56***	47	0.10*	72
Predominantly minority samples	<i>r</i>	0.35	36	0.41	24	0.61	42
Predominantly majority samples	<i>r</i>	0.50	28	0.58	23	0.59	30

Note. The table presents categorical and continuous fixed-effects models fitted in least-squares regression analyses with weights equivalent to the reciprocal of the variance; ($N-3$). The dependent variable in each model is the correlation between the pair of variables indicated by the column headings. β = standardized regression coefficients; *r* = weighted-mean correlation within categories of a moderator.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 5. Theoretical associations as a function of measurement factors

	Statistic	Intention and future behaviour		Control and future behaviour		Attitude and intention		Norm and intention		Control and intention	
		Association	<i>k</i>	Association	<i>k</i>	Association	<i>k</i>	Association	<i>k</i>	Association	<i>k</i>
Measurement correspondence	β	0.53***	45	—	—	0.50***	75	0.19***	67	0.30***	50
Type of sex specified in measures	β	0.56***	47	0.20	25	0.01	78	0.40***	70	0.05	60
Specified	<i>r</i>	0.37	25	0.23	22	0.60	46	0.38	41	0.49	38
Non-specified	<i>r</i>	0.60	22	0.32	3	0.60	32	0.51	29	0.47	22
Type of partner specified in measures	β	0.52***	45	0.21	25	0.00	78	0.42***	70	0.00	60
Specified	<i>r</i>	0.38	23	0.23	21	0.60	49	0.38	44	0.49	39
Not specified in measures	<i>r</i>	0.59	24	0.32	4	0.60	29	0.52	26	0.49	21
When specified, type of sex involving condom use	β	0.00	22	0.46***	20	0.07	39	0.37***	35	0.12	35
Vaginal	<i>r</i>	0.37	8	0.25	8	0.61	18	0.36	14	0.49	14
Non-vaginal (anal, oral, digital)	<i>r</i>	0.37	14	0.13	12	0.60	21	0.46	21	0.46	21
When specified, type of partner involving condom use	β	0.45***	23	0.26	21	0.29***	49	0.24***	44	0.25***	39
Main or steady partner	<i>r</i>	0.42	12	0.25	10	0.62	24	0.40	21	0.46	17
Casual, other or new partner	<i>r</i>	0.31	11	20	11	57	25	0.35	23	0.52	22
Nature of the intention measure	β	0.07	44	NA	NA	0.12	75	0.12	67	0.08	57
Intention	<i>r</i>	0.44	38	NA	NA	59	46	0.41	45	0.47	30
Self-prediction of behaviour	<i>r</i>	0.48	6	NA	NA	0.62	29	22	0.44	0.50	27
Time between assessment of cognitions and behaviour	β	-0.30***	43	0.23	24	NA	NA	NA	NA	NA	NA
Self-efficacy included in control measure	β	NA	NA	0.23	25	NA	NA	NA	NA	0.11	60
Yes	<i>r</i>	NA	NA	0.26	10	NA	NA	NA	NA	0.55	32
No	<i>r</i>	NA	NA	15		NA		NA	NA	0.49	28

Note. The table presents categorical and continuous fixed-effects models fitted in least-squares regression analyses with weights equivalent to the reciprocal of the variance ($N - 3$). The dependent variable in each model is the correlation between the pair of variables indicated by the column headings. β = standardized regression coefficients; *r* = weighted-mean correlation within categories of a moderator; — = not available due to low *k* or lack of variance; NA = not applicable. All *r* values are significant at 0.001.

*** $p < 0.001$.

beliefs) was highly correlated with the direct measure of attitude ($r = 0.57$), as was indirect subjective norm (i.e. based on weighted normative beliefs) with subjective norm ($r = 0.47$).

In order to assess the homogeneity of estimates of the correlations in the databases, we calculated Q , which has an approximate chi-square distribution with $k-1$ degrees of freedom, where k is the number of samples. As seen in Table 2, the significance of these values ($p < 0.001$ in all cases) suggests that, overall, mean correlations provide poor models of the underlying studies' relations and should be interpreted in light of the following moderator analyses.

Moderator analyses

Summaries of the moderator analyses appear in Tables 3–5. These tables include standardized regression coefficients to indicate the magnitude of the moderation when moderators were continuous. For categorical models, the tables present mean-weighted correlations for each level of the moderator, which permits an examination of the pattern of the effect.

Effects of social power on the associations among condom use, intentions and perceptions of behavioural control. We hypothesized that populations that are generally deprived of social power (younger people, women, individuals with lower education and ethnic minorities) would have stronger correlations involving perceptions of behavioural control relative to groups that enjoy social power (individuals older in age, men, individuals with higher education and ethnic majorities). The moderator analyses for age, gender, education and ethnic minorities appear in Table 3. As expected, the correlation between perceived behavioural control and behaviour (see second column of Table 3) was larger when participants were younger, the percentage of participants who completed high school in the sample was lower and the percentage of European Americans in US samples was lower. The correlation between perceived behavioural control and intention (see third column of Table 3) was stronger when participants were younger, the percentage of women in the sample was higher and the percentage of European Americans in the sample was lower, but the correlation was higher when participants had completed high school.

We also examined the effect of the population moderators of interest on the correlation between intention and behaviour (see Table 3). This correlation was stronger in younger samples, those with higher educational levels and samples with greater proportions of ethnic minorities (US and all samples). In sum, increases in the correlation between perceived behaviour control with intentions and behaviour were not accompanied with decreases in the correlation between intentions and behaviours expect with respect to European Americans (US samples). Therefore, the effects of perceived behavioural control and intentions on actual condom use appeared to be additive rather than mutually incompatible or hydraulic.

Effects of informational social support on the associations of intentions with attitudes and norms. Table 4 presents the moderator analyses for the correlations involving norms and attitudes. As predicted, younger individuals had stronger correlations involving norms than older individuals. There is probably more than one reason for this finding. For instance, as we have stated, teens are more concerned with their peers and may thus be more influenced by normative pressure from their in-groups. In addition, school enrollment among younger individuals may guarantee informational social support of the kind provided in school-based interventions.

We also predicted that individuals who enjoy greater social power such as males, those with higher educational levels and ethnic majorities would have stronger informational social support and therefore stronger correlations involving social norms than individuals who are socially more deprived. Consistent with these predictions, samples with more males, higher educational levels and more ethnic majorities (all samples) had stronger correlations between intentions and direct norms (see second column of Table 4). Further, samples with more males, greater proportions of European Americans (US samples), and greater proportions of ethnic majorities (all samples) had stronger correlations between direct and indirect norms.

We also assessed whether population differences in the weight of social norms were accompanied by changes in the weight of attitudes (see Table 4). There were four occasions in which people with stronger normative influences also had weaker attitudinal influences. Specifically, samples with younger participants and US samples with greater proportions of ethnic majority individuals were less likely to use personal attitudes as a basis for intentions relative to their older, European American counterparts. Similarly, the correlation between direct and indirect norms was stronger for older and male individuals, who also had smaller correlations involving attitudes. However, this hydraulic pattern in the influence of attitudes and norms was never the case for education and ethnic majority status in all samples, which were associated with higher associations with *both* attitudes and norms.

Measurement factors. We expected that increased correspondence and specificity in the measures would result in stronger associations. Measurement correspondence played an important role for all measures. As can be seen from Table 5, all correlations were stronger when correspondence was high rather than low. Further, measures that specify type of sex and partner could also increase the correlations involving behaviour, intentions, attitudes, norms and perceived behavioural control because more specific measures are often more reliable. This hypothesis received support for the correlations between intentions and future behaviour, and between norms and intentions. When the measures were specific to one type of intercourse, the correlation between control and future behaviour was stronger for vaginal than non-vaginal sex, and the correlation between norms and intentions was stronger for non-vaginal than vaginal sex. When the measures were partner-specific, those relative to main partners were linked to stronger associations in all cases, except for the correlation between control and intentions, which was stronger for casual than for main partners.

Five other methodological moderators were examined, four of which are reported in Table 5. As reported by Sheeran and Orbell (1998), the correlations involving intentions were similar when researchers measured intentions as self-predictions or as intentions (Table 5). As reported by Albarracín *et al.* (2001), longer times between the measure of intention and behaviour were associated with weaker correlations between intention and behaviour (Table 5). The use of self-efficacy or perceived behavioural control measures did not make a difference for either association involving control (Table 5). Further, as shown in Table 2, measuring past behaviour led to stronger associations of behaviour with both intentions and control ($r = 0.52$ and 0.33 , respectively, $p < 0.001$) than measuring behaviour in a prospective fashion ($r = 0.44$ and 0.24 , respectively, $p < 0.001$; for both contrasts, $p < 0.001$ in both cases).

Moderator analyses were also conducted for the relations between direct and indirect measures of attitudes and norms. The *correlation between direct and indirect attitudes* was larger when (a) measurement correspondence was high ($\beta = 0.24$, $p < 0.001$, $k = 56$), (b) the measures were specific about the type of sex ($\beta = 0.51$, $p < 0.001$, $k = 61$), (c) the measures were specific about the type of partner ($\beta = 0.38$, $p < 0.001$, $k = 61$), and (d) salient outcomes were elicited from the target population ($\beta = 0.47$, $p < 0.001$, $k = 59$). When the measures

specified a type of sex, the correlation was larger for vaginal sex ($\beta = 0.25$, $p < 0.001$, $k = 32$) than non-vaginal sex. When the measures specified a type of partner, the correlation was larger for main partners ($\beta = 0.23$, $p < 0.001$, $k = 32$) than casual partners.

The results from the moderator analyses for the *correlation between direct and indirect norms* indicated that this correlation was stronger when (a) type of sex and (b) type of partner were unspecified in the measures ($\beta > 0.43$ in both cases, $p < 0.001$, $k = 61$). When the measures were specific about type of sex, the correlation was larger for non-vaginal sex ($\beta = 0.22$, $p < 0.001$, $k = 32$) than vaginal sex. When the measures specified a type of partner, the correlation was larger for main partners ($\beta = 0.35$, $p < 0.001$, $k = 33$) than casual partners. The role of measurement correspondence could not be assessed because only two samples in the review had less than perfect correspondence. Similarly, the role of belief elicitation could not be examined because only two samples in the review had used inadequate elicitation procedures.

Discussion

Because risky sexual behaviour continues to put individuals at risk for infection with HIV (CDC, 2002; UNAIDS, 2002), the present work examined the determinants of condom use behaviour in different populations. The main contribution of this research is to identify the conditions that increase reliance on perceived behavioural control and social norms for condom use decisions. We found that people who lack social power have stronger correlations involving perceived behavioural control than people with greater power (see Table 3). Samples with lower age, less education and greater representation of ethnic minorities had stronger correlations between perceived behavioural control and actual condom use. In addition, the correlation between perceived behavioural control and intentions was stronger when the study samples contained greater proportions of younger individuals, females and ethnic minority individuals (see Table 3). Importantly, the influence of intentions on condom use was not weaker when the influence of perceptions of control was stronger. Instead, the influence of these two factors operated in a relatively independent, additive fashion.

Our meta-analysis also revealed that individuals who are most likely to rely on their social network for advice about sexual issues had stronger normative associations (see Table 4) than groups that presumably have less access to informational normative support. Samples with younger participants, more males, greater educational level and greater representation of ethnic minorities had stronger associations between norms and intentions. Further, samples with younger participants, more males and greater representation of ethnic majorities had stronger associations between direct and indirect norms. Overall, these findings suggest that samples that are most likely to rely on their social networks for condom use decisions had better defined norms and conferred greater importance to social norms. With the exception of education and inclusion of ethnic majorities (in all samples), the increase in associations between norms and intentions was associated with a corresponding decrease in the influence of attitudes. This hydraulic or 'trade-off' type of pattern supports previous research findings that people have tendencies to base their behavioural decisions on either attitudes or norms (Triandis & Suh, 2002).

Finally, the way in which researchers measured intentions, attitudes, norms, perceived behavioural control and beliefs had important implications for the magnitude of the correlations they observed. For example, condom use in unspecified types of sex or with unspecified types of partners was associated with larger correlations between intentions and future behaviour, norms and intentions, and direct and indirect norms, but with smaller

correlations between direct and indirect attitudes. Likewise, measurement correspondence increased the strength of nearly all associations from the two theories we summarized, eliciting beliefs from the target population had positive effects on the correlation between direct and indirect attitudes, and shorter times between the measures of cognitions and future behaviour increased the intention–future behaviour correspondence.

Implications of our findings for HIV prevention

The meta-analysis reported here suggests that different preventive programmes may be necessary depending on whether the target recipients are older or younger, male or female, an ethnic majority or minority, educated or illiterate. Perceived behavioural control and norms influence actual condom use more when power and normative support are scarce than when they are plentiful. There are two main implications of these findings for prevention. First, if interventions can only change the level of actual attitudes, norms or perceived behavioural control, then the intervention messages should target the factor that is most influential in a given population (for a review of the effect of messages targeting these and other components, see Albarracín *et al.*, 2003). Alternatively, interventions may attempt to influence the weight of attitudes, norms or perceived behavioural control, or even make structural changes to increase social resources or strengthen informational support for a given social group. We discuss these possibilities below.

Messages to increase perceived behavioural control or norms without modifying their weight in condom use decisions. One possible path for HIV intervention research is to simply find the most important determinants of risky behaviour and target those components. Within this traditional approach, our review suggests that interventions to improve control perceptions (e.g. behavioural-skills interventions; Kelly & St. Lawrence, 1988) and empowerment approaches (for a recent approach, see Hays *et al.*, 2003) are likely to be more effective for younger, female, ethnic minority and less-educated recipients than for older, male, ethnic majority and more educated individuals, because control perceptions have stronger effects in the former groups. Also consistent with our findings is the possibility that interventions designed to promote more positive subjective norms concerning condom use may be more effective for younger, male, more educated and ethnic majority individuals among whom norms are more influential than attitudes. Neither of these conclusions is new, but they nevertheless suggest that current prevention practices are on the right track, and that attempts to empower and increase social integration of groups that lack power is likely to lead to success.

Messages to alter the weight of perceived behavioural control or norms. Another important but understudied implication of this research is the possibility of designing interventions to increase the weight of perceived behavioural control and norms. One avenue would be to increase recipients' formation of strong positive evaluations of condom use and also increase attention to these attitudes, instead of simply assuming that attitudes have a lesser influence among males and exclusively designing normative messages to persuade them. For instance, people pay more attention to their attitudes when they are made aware of their private selves (Ybarra & Trafimow, 1998). Thus, creating messages that instill a sense of personal identity could increase the weight of personal attitudes in condom use decisions. One may start a condom use intervention by reviewing aspects of the recipients that make them unique and separate from their in-groups. Such messages may be efficacious in increasing formation of

attitudes based on these messages' information and also guarantee that these attitudes would be consequential for behaviour.

Similar strategies could be implemented to increase reliance on positive social norms (see Amierkhanian *et al.*, 2003; Ennet & Bauman, 1993; Friedman *et al.*, 1997; Kelly, *in press*; Latkin *et al.*, 1995; Neaigus, 1998). Based on prior findings that focusing on one's public self is likely to increase the use of social norms as a basis for behavioural decisions (Ybarra & Trafimow, 1998), it would make sense to have an audience think about its members' contribution to their in-group and the positive influences in-groups have on them. Such a message, accompanied with strong normative arguments, may increase the use of positive norms among people who currently lack influential norms, such as women, individuals older in age, people with lower levels of education or ethnic minorities.

With respect to the relative weights of perceived behavioural control and intentions, our research showed that generally these two factors have additive influences. That is, increases in the influence of perceived behavioural control are not linked to decreases in the influence of intentions. The exception, however, is what happens among ethnic minority individuals. Greater inclusion of ethnic minorities is associated with not only greater weight of control perceptions as predictors of condom use, but also with lower weight of intentions as predictors of condom use. Given this situation, the same approaches suggested that increasing the impact of personal attitudes might be beneficial to increase reliance on previously formed intentions to use condoms.

Structural interventions. Despite the best efforts of researchers and practitioners, persuasive communications and even more complex behavioural interventions are often insufficient to increase condom use. Albarracín and her colleagues (2003) reviewed the studies that gauged the impact of messages to increase condom use and observed that, although effects varied widely, the overall effect was quite small ($d=0.06$). One implication of this astonishing overall failure of pro-condom use communications is that to be successful, behavioural interventions ought to alter structural factors that prevent people from using condoms. One structural factor that has received attention in the past is the availability of condoms in the environment (Johnson *et al.*, 2003) as well as the price of condoms (Population Information Program, 1999). A different, equally important, factor is the availability of informational resources for all individuals in society as well as an adequate distribution of power across different societal groups (Amierkhanian *et al.*, 2003; Ennet & Bauman, 1993; Friedman *et al.*, 1997; Kelly, 2004; Latkin *et al.*, 1995; Neaigus, 1998). The widespread application of effective interventions seems essential for the availability of information and counselling for all individuals. Further, tightening informational networks and making them functional in the dissemination of information and pro-condom use norms are important steps in increasing informational social support. Based on our meta-analysis, it appears that this kind of intervention will be most beneficial to increase reliance on norms among older individuals, women, people with lower educational levels and ethnic minorities. In addition, these interventions may be readily effective in changing negative norms among groups that currently base their decisions largely on social norms, including younger people, men, people with higher educational levels and ethnic majorities.

Empowerment interventions may also be critical when behavioural decisions are highly dependent on perceived behavioural control. The recent literature on HIV intervention research presents abundant examples that these interventions increase preventive behaviour among women and generally among disadvantaged and stigmatized groups (Amaro & Raj, 2000; Ickovics *et al.*, 2002; Klein *et al.*, 2002; O'Leary & Martins, 2000; Parke, 2001; Parker *et al.*, 2000; Sumartojo, 2000). To take a well-known example, the use of techniques to

increase condom use negotiation includes instructions to stimulate assertiveness and sex refusal when the situation lends itself to unsafe sex (Kelly & St. Lawrence, 1988). Moreover, these interventions are particularly effective for women (Belcher *et al.*, 1998), who traditionally lack decision power in sexual and romantic relationships. Our review suggests that these efforts are well guided and should be extended to teens, ethnic minorities and less-educated individuals (see Johnson *et al.*, 2003).

Final note

Although our findings share the problems involved in any correlational research, the generalizability and precision we have obtained from this large synthesis may valuably enhance HIV prevention interventions. Yet, it is clear that not all the variance of condom use is explained by behavioural intentions and perceived behavioural control, and that other personal factors as well as the structural conditions we mentioned play major roles in determining condom use. For example, Marsh and her colleagues (2001; 2003) recently demonstrated that implicit attitudes toward condom use can drive condom use decisions outside of awareness. The next generation of research on the determinants of condom use is sure to expand our knowledge about these relatively unreasoned processes and to illuminate new ways to induce preventive behaviour, including condom use.

Acknowledgements

This research was supported by grants from the National Institutes of Health (R03-MH58073; K01-MH01861; R01-MH58563; R01-NR08325-01). We thank Darius Chan, William Fisher, Barbara Rye, Diane Morrison, James Westaby, Daniel Montaña, Danuta Kasprzyk and Christopher Agnew for providing unpublished data that we incorporated in this study. We also wish to thank Marcella Boynton and Kerry Marsh for feedback on an earlier version of this manuscript; Jodi Grace and Lori Scott-Sheldon for assistance with data retrieval; Ece Kumkale with editorial assistance; and Ringo Ho for preparing macros for the moderator analyses.

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