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Beyond Individual-Level Theorizing in Social Norms Research: How Collective Norms and Media Access Affect Adolescents' Use of Contraception

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A B S T R A C T

Purpose: The role of mass media in promoting social norms surrounding contraceptive use among adolescents in developing countries has not received much attention. Hence, program planners have little guidance on how to design media messages that take advantage of existing social norms in promoting contraceptive use.
Methods: We analyzed data from the Demographic and Health Surveys in Ethiopia and Tanzania, restricting our sample to 15- to 24 year-old adolescents ($N = 6,230$ and $N = 5,138$, respectively). We proposed and tested the hypotheses that collective norms around contraception use would be associated with individual contraception use in that area and that this relationship would be stronger when media use is low, than when media use is high. Logistic regressions were run to predict individual-level contraception use from collective norms for contraception use, media use, and their interaction, controlling for age, urban versus rural location, marital status, wealth, and education, taking into account intraclass correlations within clusters.
Results: Collective norms were associated with individual contraception use in both samples. Media use attenuated the association between collective norms and contraception use in Ethiopia but not in Tanzania. ($\beta = -.22$, $p = < .01$ in Ethiopia and $\beta = -.08$, $p = .10$ in Tanzania).
Conclusions: Mass media can serve as external agents of change to attenuate the impact of collective norms on individual behavior. A deeper examination of how and why media use attenuates the relationship between collective norms and individual contraception use in some subpopulations more than others is warranted.
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IMPLICATIONS AND CONTRIBUTION

These findings contribute to the social norms litera-ture and highlight factors that social norms–based interventions should con-sider before intervention design. The first is the dis-tribution of the commu-nity collective norms and the second is level of com-munity access to the outside world through media and other forms of interactions.

Adolescence is a period of rapid sociocognitive development, when the social environment plays a significant role in identity formation, development of value systems, and internalization of modes of conduct [1–4]. This is also a period when social in-fluences take on greater significance in decision-making and behavioral enactments [5,6].

Even though the broader literature on the influence of social norms on adolescents is extensive [7–9], relatively little is known about the impact of social norms on adolescents' use of

modern contraception, particularly through interventions-based work.

Despite billions of dollars and decades of international work to increase contraception use among sexually active adolescents, uptake and compliance remain well below the desired rates [10,11]. Among various factors, social norms have been identified as significant barriers to contraceptive use among adolescents in low- to middle-income countries, even after accounting for access and availability [12]. As more knowledge is being gained on how impactful norms are on adolescents' willingness or ability to use contraception, donors have begun to react. In 2015, the United States Agency for International Development invested in developing and testing scalable approaches to foster social norms that support family planning for adolescents [13]. As a result, the field of adolescent sexual health is beginning to uncover what is necessary to address unhealthy norms.

The study of norms has been gaining significant momentum recently, one of the key findings from that work, as revealed by a systematic review of the norms literature, is the almost exclusive focus of studies at the individual level, with little attention being paid to factors at the sociocultural levels [14—16]. Authors of that review call for studies that conceptualize and assess contraceptive use norms beyond the individual level; this article responds to that call.

It seems odd to think social norms would operate at any other level beside the society as a whole. The term "social" in social norms, after all, involves at least a dyad, but more generally it is indicative of processes whose emergent properties operate at a macrolevel. This is not consistent, however, with recent conceptualizations of social norms, particularly in the social psychology and communication literature [17], where they are defined exclusively at the individual level [18,19]. The social aspect of norms is particularly important during adolescence.

We begin by noting that social norms conceptualized at the larger societal level allows for studying emergent properties of communities that emanate not only from characteristics of their constituent individuals but also from making cross-community comparisons. In the social norms literature, collective norms constitute the concept that captures this macrolevel conceptualization [20], although other authors also use the term community norms [21]. Operating at the community level, collective norms are defined as "prevailing codes of conduct that either prescribe or proscribe behaviors that members of a group can enact" [22]. It is akin to the idea of social exposure, "the composite of ways in which people come in contact with or experience a particular product or behavior in their environment" [23].

It is also important for social norms—based interventions to incorporate the variability of collective norms within the intervention time period. If, as is often the case in global public health work, the intervention lasts 2 to 3 years, collective norms around a particular topic may not change, but they may vary across population segments. Gender-based power dynamics that exist in a community, for example, fall under this category: They are unlikely to change over a brief intervention cycle, but particular pockets within the population may differ from each other in their gender-based relationships. In this case, interventions can tailor their approach according to the prevailing collective norms.

To establish the importance of collective norms (which reflects community-level practices), it is important to demonstrate their impact on individual behaviors. Our first hypothesis tests this relationship in our adolescent sample:

H1: We expect a positive association between collective norms and individual behaviors.

We also expect the magnitude of this association to remain moderate at best. After all, individuals seldom adopt behaviors solely on the basis of collective norms they are subject to. Rather, the association between collective norms and individual behaviors are likely to be moderated by the diversity of information impinging on communities. At one extreme, if a community is completely isolated, without media or other means of access to the outside world, we expect the association between collective norms and individual behaviors to be high.

At the other extreme, if a community has unfettered access to the outside world—through, for example, travel or media exposure—we expect collective norms emanating from within the community to constitute only one source of influence, among many, impinging on individuals. In this case, the association between collective norms and individual behaviors would be significantly attenuated. In between these two extremes, we expect underlying associations between collective norms and individual behaviors to vary according to the magnitude of exposure to the outside world. This is also the finding reported by Rimal et al. [24] in their study of communities in Nepal. Similar to that study, we, too, operationalize community access to the outside world through individuals' media use: greater the media use, higher the diversity of information impinging on communities. Hence, the following statement is our second hypothesis

H2: The association between collective norms and individual adolescent behavior will be moderated by media use such that higher media use will attenuate the relationship (and vice versa).

Method

Data for this study come from the 2016 Ethiopian and the 2016 Tanzanian Demographic and Health Survey (DHS). Given the focus of this special issue on adolescent health, we selected and included only a subset of the sample—adolescents between the age of 15 and 24 years (DHS; $N = 15,683$) and the 2016 Tanzanian DHS ($N = 13,208$).

An advantage of using the DHS data sets is that, because the underlying sampling methods and operationalization of key concepts are identical, we are able to use the same key variables across multiple countries. We chose to study these two countries from sub-Saharan Africa because they are similar on many demographics (see Table 1), and their DHS data sets are both recent and obtained from the same year.

The primary sampling unit in the two DHS data sets we analyzed was the "enumeration area" (EA), which is analogous to a census track in the United States. The DHS uses a cluster sampling design; enumeration areas are sampled first, and then individual households are sampled within enumeration areas. We restricted our sample to those between 15 and 24 years, which resulted in the inclusion of $n = 6,230$ adolescents in 645 EAs in Ethiopia and $n = 5,138$ adolescents in 608 EAs in Tanzania.

Measurement

Standard demographic measures used in this study included age, urban or rural area of residence, education (as the number of years of formal schooling), wealth (standardized measure of household possessions adjusted for rural and urban areas of residence), and marital status.

Media use. Participants in both data sets reported the frequency with which they used four media sources: how often they read newspapers, listened to the radio, watched television, and used the Internet. Responses were recorded on three-point scores (0 = not at all, 1 = less than once a week, 2 = more than once a week). To create an overall media use index, we converted responses to each media source into z-scores (with a mean of 0 and standard deviation of 1) and computed their average ($\alpha = .42$ in Ethiopia and $\alpha = .72$ in Tanzania).

Contraception use (behavior). Participants in both data sets reported use of a modern method, a traditional method, or a folkloric method of contraception. Modern contraception is defined as a product or medical procedure that interferes with reproduction (e.g., condoms, oral contraceptives, injectables, intrauterine devices, and implants) [25]. We created a binary variable for modern contraception use, scored 0 if respondent reported using traditional methods, folkloric methods, or no method, and 1 if respondent used a modern method. In our sample, 14.14% of Ethiopian adolescent women and 14.98% of Tanzanian adolescent women reported using modern methods.

Collective norms for contraception use. We calculated collective norms following the "nonself mean" process described by Kaggwa et al. [21]. We sorted the data sets by cluster, each cluster representing an enumeration area. Within each enumeration area, we added the individual modern contraception use among all participants, except the target respondent, and then computed the average. Thus, in this procedure, the collective norm for modern contraception use includes the scores of everyone in the target person's enumeration area (who was in the sample) except the target person herself. We limited our sample to enumeration areas with at least 15 people in both Ethiopia and Tanzania. The reason for excluding very small enumeration areas is that, when the number of individuals in a group is small, the value of the mean and that of the individuals become unstable [26].

Statistical analyses

Analyses were performed in four steps. First, we calculated descriptive statistics (Table 1). We then performed bivariate (Table 2) and multivariate (Table 3) analyses to identify associations between contraceptive use and individual and community-level factors. Zero-order correlations and logistic regressions were used to analyze the data. All analyses were conducted using STATA, version 14. To obtain a robust variance estimate that adjusts for within-cluster correlation, we used the Huber-White clustered standard errors command [27]. To compute the adjusted odds ratios (and 95% confidence intervals) for the effect of collective norms on contraception use at low and high levels of media use (−1 and +1 standard deviation from the mean), we used the postestimation command "lincom." Also, we deliberately did not weigh our data because we used a subsample of the DHS data by restricting our participants to only adolescents.

Results

Preliminary results

Description of the sample included in our study is shown in Table 1. The average age of adolescents in both countries was

Table 1
Description of the sample (adolescents aged 15—24 years) in Ethiopia and Tanzania

	Ethiopia (N = 6,230); M (SD) or %	Tanzania (N = 5,139); M (SD) or %
Age	19.10 (2.8)	19.17 (2.8)
Education		
None	21.62	7.53
Some primary school	43.27	12.92
Completed primary school	5.17	39.35
More than primary school	29.94	46.55
Urban	36.97	32.92
Married or cohabitating	38.20	37.53
Radio listening		
Not at all	62.23	20.72
Some	37.77	79.28
Newspaper or magazine reading		
Not at all	77.48	52.62
Some	22.52	47.38
Television viewing		
Not at all	59.52	41.51
Some	40.48	58.49
Internet use		
Never	87.34	89.78
Some/any	12.66	10.22
Using modern contraception	14.14	14.98

Age is reported in terms of mean (M) and standard deviation (SD); other variables are reported in terms of percentages.

approximately 19 years. The Ethiopian sample had less education than the Tanzanian sample: 47% of the Tanzanian sample completed more than primary school compared with 30% of the Ethiopian sample. The Ethiopian sample was slightly more urban, 37% compared with 33% in the Tanzanian sample. Overall, the Tanzanian sample used more media: 79% listened to some radio compared with 38% in the Ethiopian sample and 58% watched some television, compared with 40% in Ethiopia. In both samples, approximately 38% of adolescents were married, and contraception use was approximately 14%.

Table 2 shows the zero-order correlations among the variables used in this study, for both Ethiopia (above the diagonal) and Tanzania (below the diagonal). In both countries, education was associated with urban location ($r = .26$, $p < .001$ and $r = .44$, $p < .001$ in Ethiopia and Tanzania, respectively) and wealth ($r = .71$, $p < .001$ and $r = .56$, $p < .001$ in the two countries). Urban location was also significantly associated with media use ($r = .55$, $p < .001$ and $r = .38$, $p < .001$ in the two countries). In both countries, individual contraception use was associated with collective norms around contraception use ($r = .19$ $p < .001$ in Ethiopia and $r = .24$, $p < .001$ in Tanzania).

Hypothesis 1

We hypothesized a significant relationship between collective norms and behaviors. Results from the first test of this hypothesis are shown in Table 2. In both countries, the zero-order correlations between contraception use collective norms and contraception use were significant and positive ($r = .19$, $p < .001$ and $r = .24$, $p < .001$ in Tanzania and Ethiopia, respectively). The second test of this hypothesis was conducted through logistic regression equations, controlling for other factors in the model (age, education, wealth, urban vs. rural location, marital status and media use), results of which are shown in Table 3.

Table 2
Zero-order Pearson correlations (Ethiopia above and Tanzania below the diagonal)

	Age	Urban location	Education	Wealth	Media use	Contraception use (CU)	CU collective norm
Age	**1.00**	.06**	.14**	.04*	.04*	.28**	.04**
Urban location	.02	**1.00**	.44**	.71**	.55**	.02	.05**
Education	.11**	.26**	**1.00**	.49**	.53**	.04*	.10**
Wealth	.00	.56**	.45**	**1.00**	.56**	.08**	.18**
Media use	.06**	.38**	.48**	.51**	**1.00**	.02	.06**
Contraception use (CU)	.26**	.06**	.03	.02	.06**	**1.00**	.19**
CU collective norm	.02	.12**	.01	.06**	.07**	.24**	**1.00**

Correlations above the diagonal pertain to the Ethiopian sample and those below the diagonal pertain to the Tanzanian sample. Contraception use (CU) collective norm is calculated as the nonself mean of respondents within each enumeration area (without the target person).
*p < .01, **p <.001.

In both samples, older adolescents, compared with younger ones, were significantly more likely to use contraceptives. Marital status was positively associated with use of contraceptives in both samples ($\beta = 2.68$, $p < .001$) in the Ethiopian sample and ($\beta = .40$, $p < .001$) in the Tanzanian sample. Media use was associated with use of contraceptives in the Tanzanian sample only ($\beta = .17$, $p < .01$).

Test of hypothesis 1 showed that, controlling for age, education, wealth, urban versus rural status, marital status, and media use, contraception use collective norms were significantly associated with use of contraceptives in both samples ($\beta = .49$, $p < .001$ in the Ethiopian sample and $\beta = .59$, $p < .001$ in the Tanzanian sample). Hence, hypothesis 1 was supported.

Hypothesis 2

Our second hypothesis predicted that the association between collective norms and behaviors would be attenuated by media use. Results of the test of this hypothesis are shown in Table 3, through tests of the associations between collective norms x media use interaction terms and use of contraceptives. As shown in the table, the interactions were significant only in the Ethiopian sample ($\beta = -.22$, $p < .01$ in the Ethiopian sample and $\beta = -.08$ in the Tanzanian sample, respectively). Adjusted odds ratios (and 95% confidence intervals) also showed that the association between collective norms and contraception use was stronger when media use was low than when media use was high in both countries, but the interaction was only significant in Ethiopia: low media use $\beta = 2.05$ (confidence interval: 1.77, 2.38), compared with high media use $\beta =1.31$ (confidence interval: 1.10, 1.55). Patterns of the significant interactions are shown

Table 3
Multivariate predictors of contraception use in Ethiopia and Tanzanian women, from logistic regression equations

	Ethiopian sample (N = 6,230)	Tanzanian sample (N= 5,139)
Age	.14***	.26***
Urban	−.10	.24*
Marital status	2.68***	.40***
Education	.08*	−.01
Wealth	.29***	−.04
Media use	.11	. 17**
CUCN	.49***	.59***
Media use × CUCN	−.22**	−.08
(Adjusted R-squared)	(.29***)	(.15***)

Cell entries are unstandardized betas from logistic regression equations.
*p < .05, **p < .01, ***p < .001.
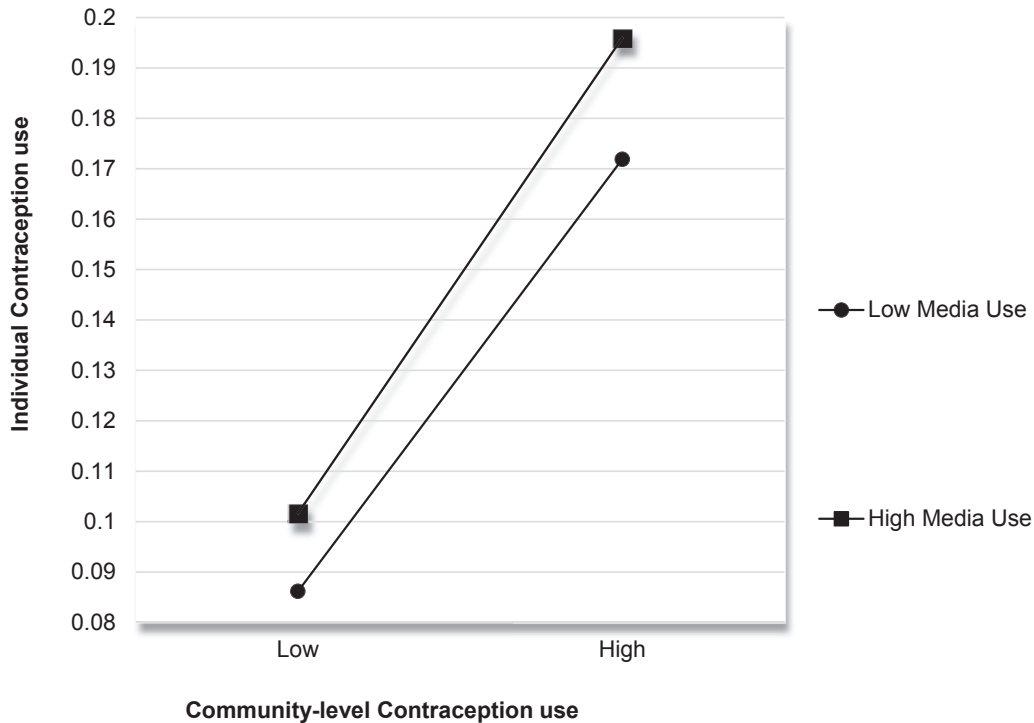CUCN = contraceptive use collective norms.

graphically in Figure 1 (Ethiopia). As shown in the figure, the relationship between collective norms and use of contraceptives was greater when media use was low than when media use was high in Ethiopia. The interaction between collective norms and media use was not significantly associated with use of contraceptives in Tanzania (and hence is not shown).

Discussion

The primary purpose of this study was to address a shortcoming in the norms literature, which has traditionally operationalized social norms almost exclusively in terms of individual-level perceptions—about people's perceived prevalence of behaviors in their midst (descriptive norms) and perceptions about pressures to conform (injunctive norms). In this article, we operationalized collective norms as the concept that spans the macrolevel with the individual level and tested its relationship with individual-level behaviors. Across two different tests of the hypothesis, in Ethiopia and Tanzania, collective norms were associated with individual behaviors. This finding has two implications.

First, it indicates that individual behaviors tend to conform to the aggregate of collective behaviors in their social midst. In both rural and urban settings, adolescents whose peers used contraceptives were themselves significantly more likely to do so, in comparison to those whose peers did not use contraceptives. This finding, in and of itself, is not surprising, as many other studies have documented the influence of peer behaviors on adolescents' own behaviors [28,29]. Two aspects of our study, however, are particularly noteworthy. First, the associations between collective norms and individual behaviors we report in this article emerged without taking into account individual reports about their affiliations with their peers. Rather, our findings are based on an aggregate level of behaviors impinging on adolescents. Second, the social unit around which we calculated collective norms was rather crude: it was merely the DHS enumeration area (akin to a census track in the United States), which tends to be large and diverse in terms of the number and types of individuals residing within them. In this regard, our tests are conservative in that the underlying heterogeneity of collective norms are likely larger (thus underestimating the effects). Indeed, had we been able to capture a socially more meaningful collective than the enumeration area (e.g., peer groups in a village, those in a school, etc.), the strengths of the associations would likely be greater. This is, of course, speculative, but it provides a testable hypothesis for future studies to test.

In the Ethiopia sample, the relationship between collective norms and individual behaviors was significantly attenuated by

Figure 1. Relationship between contraception use community norms (CUCN) and use of contraceptives for low and high media users in Ethiopia. The relationship between collective norms and individual contraception use is stronger among adolescents with low media use than adolescents with high media use.

media use. This signifies that the influence of collective norms tends to be greater in more isolated communities, ones with lower levels of access to the outside world. When communities have limited access to external sources of information, residents are more influenced by internal dynamics within the community, as compared to communities in which external influences are abundant. In this article, we operationalized external influence through media access (greater the access, the more the external influence). Our underlying hypothesis was supported in this operationalization in one of the two samples.

Our findings have important theoretical and practical implications. Theoretically, the primary contribution we make to the norms literature is the conceptualization of social norms independent of adolescents' perceptions. Based on individuals' behaviors in a bounded geographical space, we calculated collective norms as the sum total of the behavior impinging on each individual, after taking out the individual's own behavior. This "nonself mean," our operationalization of collective norms, represents the extent to which others in one's social environment engage in the focal behavior. When adolescents are surrounded by others who engage in the focal behavior—in this study, the use of contraceptives—they are more likely to engage in the behavior themselves, and vice versa.

Using this method, each community can be aligned according to the magnitude of collective norms surrounding the focal behavior. We should note that, in this conceptualization, individuals' perceptions about norms are not part of the equation. Although we are unable to assess the magnitude of these perceptions in this data set (as such questions were not part of the DHS), future studies can assess them, determine the magnitude of misperceptions (between what people think others do and

what they actually do) that exist in the community, and then test which of the three factors—collective norms, perceived norms, or the magnitude of their difference—are more reliable predictors.

Our conceptualization of collective norms allows interventions to accomplish an important goal. It facilitates the classification of communities—at the level of the community—according to their underlying support for or opposition to the practice being advocated for change. For example, intervention planners can assess the extent to which behaviors they are promoting (safer sex, modern contraception use, etc.) are currently being practiced and how much social support (or opposition) currently exists. We suspect being able to align communities in this way—along a continuum of collective norms on a particular topic—will prove to be enormously helpful to design interventions tailored to a community's readiness to change.

On a practical level, our findings suggest that, before social norms—based interventions are conducted, interventions can benefit from understanding two important factors: the distribution of collective norms in their focal communities and the extent to which communities have access to the outside world through media and other forms of interactions. It appears that the most challenging environment is one in which negative collective norms are highly prevalent in a community that also has limited media channels. In this scenario, collective norms are likely to exert strong influences on individual behaviors, and the best first step that interventions can take may be to provide greater access to media (and other forms of vicarious learning from other communities). Conversely, changing behaviors may be somewhat easier when the high prevalence of positive collective norms in a community is accompanied with lower levels

of media use. In this scenario, stimulating the link between collective norms and individual behaviors—for example, by promoting greater interpersonal communication—may be a useful strategy.

Limitations

The primary limitation of this study is our inability to define the geographical and social boundary in a meaningful way. By resorting to the enumeration area used for sampling purposes, we have likely underestimated the underlying effects. In this study, we also did not have access to adolescents' perceptions about others' behaviors, which did not allow us to compare the relative predictive ability of collective norms versus perceived norms. Finally, we should note that the cross-sectional nature of the study limits our conclusions to associations and not causal linkages, and we urge future studies to test the proposed theoretical predictions more rigorously through experimental designs.

In conclusion, collective norms impinging on individuals are consistently associated with adolescents' behaviors (in this study, use of contraceptives), and this relationship fluctuates in accordance with the extent to which communities are linked with the outside world (through media and other means). When communities have access to media, collective norms and individual-level behaviors are moderately related, but this relationship increases significantly when individuals have limited access to media. We encourage interventionists to assess both media use and collective norms before implementing social norms-based interventions.

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