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Understanding the Public's Intentions to Purchase and to Persuade Others to Purchase Antibiotic-Free Meat

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Abstract

Extending the effectiveness of media-based campaigns into interpersonal networks has been a long concern for studies on persuasive messages, yet there is much to understand about why people attempt to persuade others to engage in health-related behaviors. This study investigated two alternative predictors of interpersonal persuasion: psychosocial determinants of behavior and homophily. We used the integrated model of behavior (IMB) to predict consumers' intentions to purchase antibiotic-free meat, and extended the model to predict consumers' intentions to encourage important others to do so. IMB variables predicted 44% of future purchasing intentions and 40% of future persuasion intentions. The findings support a homophily explanation for persuasion: people intend to persuade important others to do what they do. In addition, a person-centered analysis identified three audience segments based on antibiotic-resistance-related behaviors, cognitions, and experiences: Purchasers, Resisters, and New Adopters. The covariate analysis revealed that people who had more topic awareness of antibiotic use in animal husbandry, knowledge of someone with an antibiotic-resistant infection, and health mavenism were more likely to be Purchasers than Resisters or New Adopters. Anxiety, however, was highest among New Adopters and lowest among Resisters. Implications for theory and practice are discussed.

Keywords

antibiotic resistance; integrated model of behavior; persuasion; audience segmentation; health mavens

While norms are an important predictor of people's intention to engage in a behavior, little is known about how norms are created, such as why people attempt to persuade others to engage in health-related behaviors. Indeed, the diffusion of a new behavior depends not only on adoption of the behavior, but also on transmission of messages to persuade others to adopt it (Rogers, 2003). Scholars studying campaign effects (Hornik, 2002; Hwang, 2012; Southwell & Yzer, 2007) have argued that direct exposure to campaign messages changes people's behaviors as the messages influence their attitudes, norms, efficacy, and intentions. Campaign effects may also occur through indirect exposure to campaign messages (Hornik, 2002), as directly exposed people discuss the campaign with others (Hwang, 2012; Southwell & Yzer, 2007). Indeed, multiple campaign-evaluations have noted interpersonal conversations as an outcome of campaign activities and a positive association between campaign exposure and interpersonal conversation (see Hwang, 2012 and Southwell & Yzer, 2007 for reviews). Yet, there has been little attention to the predictors of these conversations, especially to people's attempts to *persuade* others to engage in a behavior. In this study, we tested two alternative predictions of consumers' intentions to encourage others to purchase antibiotic-free meat. In addition, we used a person-centered analysis to identify different segments of the public based on shared attitudes, norms, and intentions related to purchasing antibiotic-free meat.

Antibiotic Resistance and Purchasing Antibiotic-Free Meat

Antibiotic resistance is a serious threat to public health (Smith, M'ikanatha, & Read, 2014): over 23,000 people die each year from antibiotic-resistant infections in the U.S. (CDC, 2013). Antibiotic resistance occurs when bacteria undergo a genetic change that reduces or eliminates an antibiotic's ability to destroy them (CDC, 2013).

One critical focus for slowing antibiotic resistance is limiting bacteria's exposure to antibiotics. The health communication studies focusing on unnecessary exposure to antibiotics focus on prescriptions for human patients (Harrington, Norling, Witte, Taylor, & Andrews, 2007; Stivers, 2002). Yet, over 14 million kilograms of antimicrobials were sold in 2012 for food-producing animals (FDA, 2014), in comparison to 3.28 million (in 2011) for humans (FDA, 2012). While some antibiotics are used to treat diseases, 80–90% is used to promote weight gain and reduce mortality rates of livestock for consumer goods (Lusk, Norwood, & Pruitt, 2006). Some of the antibiotics given to livestock, such as penicillin, are also used by humans. Resistant bacteria can be transferred from animals to humans (Lusk et al., 2006) through, for example, poor kitchen hygiene.

Generally, consumers prefer to avoid risks from food production and processing (e.g., residual pesticides, use of antibiotics and growth hormones; Unnevehr et al., 2010). However, public awareness and consumer preference for food produced in antibiotic-free environment is growing. In a 2006 survey of over 12,000 Pennsylvania residents, 52% reported awareness of the use of antibiotics in animal feed (M'ikanatha, Dewar, Rankin, & Lautenbach, 2007). Furthermore, 54% reported concerns about antibiotic use in animal husbandry, and 25% reported buying meat (beef, pork, or chicken) labeled as "raised without antibiotics." The public's awareness may be related to media coverage of bills were introduced in Congress in 2002 and 2005. While the bills have never passed, consumer

groups continued to contest the issue. Claims by the food industry typically highlight drugs' benefits for animals while disputing evidence regarding non-therapeutic uses (National Turkey Federation, 2013). More recently, President Obama directed the Food and Drug Administration and Department to continue efforts to eliminate use of antibiotics for growth promotion in food producing animals (Obama, 2014). In addition, the media has covered the food industry's shift towards poultry produced without antibiotics (Godoy, 2014). Thus, the increased public discussion about the threat of antibiotic bacteria, and the room for diffusion, make it a relevant topic in which to study the public's intentions to *important others* to purchase antibiotic-free meat.

Persuading Others

Extending the effectiveness of media-based campaigns into interpersonal networks has been a long concern for studies on persuasive messages (e.g., Katz & Lazarsfeld, 1955; Park & Smith, 2010; Southwell & Yzer, 2007). An ideal situation for persuasive reach is for people who were directly exposed to campaign messages to persuade others to comply as well. Sharing research suggests that, to satisfy impression management (Berger, 2014; Cappella et al., 2014; Kim, 2015) or defense motives (Lyons & Kashima, 2001), people share efficacious information with others, often with the intent of encouraging them to engage in action (Cappella et al., 2014). *Efficacious* has been defined as valuable, true, and useful (Berger, 2014; Cappella et al., 2014). It is likely that information about acts judged as good, normative, and previously attempted, qualities that promote behavioral intentions according to the integrated model of behavior (Fishbein, 2000; Fishbein & Cappella, 2006), would be the kind of efficacious information people would share with others to be viewed positive, to defend their existing attitudes and actions. On the other hand, due to drives toward homophily, people may persuade others to do what they intend to do. These alternatives are explained next.

Psychosocial determinants of behavior

Drawing upon IMB (Fishbein, 2000; Fishbein & Cappella, 2006), we test whether predictors of engaging in the behavior also predict encouraging others to do so. The IMB's central claim is that the best predictor of people's behavior is their intention to perform the behavior, as long as their skills and environmental conditions support this intention (Fishbein, 2000). Thus, if the public intends to buy antibiotic-free meat, has the skills to do so, and has no constraints (e.g., unavailability of antibiotic-free meat), then it is highly probable that they will do so.

Intentions are determined by three factors: attitudes, norms, and self-efficacy (Fishbein, 2000; Fishbein & Cappella, 2006). Attitudes are judgments of the likely consequences of a behavior, such as expecting good outcomes. In this context, a relevant attitude is whether people judge antibiotic use in animal husbandry as likely to harm human health. Norms are the social pressures regarding a behavior. Herein, norms were considered as the degree to which important others encourage a person to purchase antibiotic-free meat. Self-efficacy is people's perceived ability to engage in a behavior. People may vary, for example, in their perceived ability to identify antibiotic-free meat from its packaging. The model posits that

people are motivated to engage in the behavior if they hold favorable attitudes, perceive support from important others (positive norms), and believe in their own capacity to perform the behavior. One predictor of attitudes, norms, and self-efficacy is past behavior (Fishbein & Ajzen, 2010). Generally past attempts to perform a behavior are associated with positive cognitions, and stronger intentions to engage in the behavior again. Empirically, past attempts to perform a behavior have explained variance in enacting the behavior in the present, even after controlling for intentions (Fishbein & Ajzen, 2010).

H1: More negative attitudes toward antibiotic use in animal husbandry, stronger perceived norms encouraging one to purchase antibiotic-free meat, and stronger perceived ease in identifying antibiotic-free meat from its packaging are associated with stronger intentions to buy antibiotic-free meat.

H2: A previous attempt to buy antibiotic-free meat is positively associated with intentions to buy antibiotic-free meats in the future.

Extending IMB to persuasion intentions

As stated earlier, people share information with others (often with the intent to persuade them to action) that they perceive as efficacious and consistent with their existing attitudes and prior behavior (Berger, 2014; Cappella et al., 2014). The judgments of a behavior that lead to a personal engagement may, then, extend to intentions to persuade others to perform it as well. Persuading others was conceptualized as a distinct behavior (Southwell & Yzer, 2007). Following the IMB, we expect that people's personal attitudes, norms, and efficacy toward the action should predict their intentions to persuade others to perform it. Furthermore, previous attempts to engage in a behavior may promote intentions to influence others, because these previous attempts bolster confidence in one's ability to understand the behavior, increasing perceptions of competency to promote it to others (Southwell & Yzer, 2007).

H3a: Personal attitudes, norms, self-efficacy, and previous attempt to buy antibiotic-free meat are positively associated with intentions to persuade others to buy antibiotic-free meat in the future.

A different rationale for people attempting to persuade others is homophily: people tend to be attracted to, spend time with (Newcomb, 1961), and maintain social network ties with similar others (Lazarsfeld & Merton, 1954). In order to maintain homophily, people's cognitions (attitudes, norms, self-efficacy) and previous actions may lead them to encourage close others to engage in a behavior. More simply, people may encourage their close contacts to do what they do.

H3b: Purchasing intentions are positively associated with persuasion intentions.

Audience Segmentation: Person Centered and Theory Driven

The IMB (Fishbein, 2000; Fishbein & Cappella, 2006) provides critical insights into the determinants of behavior. When we understand the attitudes, norms, self-efficacy, and previous behaviors of a population, then we can predict whether a population will engage in the behavior. We can then develop effective health communications to change behavior, be it

engaging in the action themselves or encouraging others to do so (Fishbein & Cappella, 2006). The public at large is likely to vary in their behavioral intentions and in the development of cognitions that predict these intentions. In the population, there are people who intend to persuade others to buy antibiotic-free meats and people who do not. Some people may have the relevant attitudes, but not the norms or self-efficacy, to engage in a behavior, while others may have self-efficacy without the attitudes or norms. To identify audience segments within a larger, heterogeneous population, it may be useful to uncover homogeneous subgroups based on shared intentions and theoretical determinants of those intentions.

Person-centered methods provide rigorous, quantitative methods to identify classes for audience segmentation. This study uses latent class analysis (LCA; Collins & Lanza, 2010). Like other latent variable models such as factor models, LCA attempts to capture latent constructs from measurable variables. LCA is used when the latent construct is categorical (Collins & Lanza, 2010), as with audience segments. The following research question is proposed:

RQ1: Is there a latent class structure that represents the heterogeneity in U.S. adults' intentions to purchase antibiotic-free meat?

The IMB (Fishbein, 2000; Fishbein & Cappella, 2006) outlines multiple demographic and individual-difference variables that may predict attitudinal, normative, or efficacy beliefs that, in turn, predict behavioral intentions. One advantage of LCA is that it allows for covariate analysis, in which one can identify variables that predict the likelihood of being in a particular profile. In this study, topic awareness, personal knowledge, anxiety about antibiotic-resistant infections, and health mavenism are individual difference variables explored as predictors of intention classes. Topic awareness of antibiotic use in animal husbandry, personal knowledge of someone with an antibiotic-resistant infection, and anxiety about antibiotic-resistant infections may lead to developing attitudes against antibiotic use and becoming aware of norms related to purchasing antibiotic-free meat. Health mavenism is an attribute of opinion leaders (Boster et al., 2011) focused on trying to maintain expertise in health, share that knowledge, and be a resource for others. For campaign purposes it is important to identify a health maven's profile of purchasing behaviors and theoretical determinants. The following research question is proposed:

RQ2: Do topic awareness, personal knowledge, anxiety about antibiotic-resistant infections, and health mavenism predict membership in particular latent classes of purchasing intentions?

Method

Participants

Participants ($N = 193$) were adults recruited through Amazon's Mechanical Turk. Analyses of the participants' answers to other questions appear in (Smith, Quesnell, Glick, Hackman, & M'ikanatha, 2015). When participants were asked about their meat purchasing habits, one response option was that it was not applicable because they did not buy meat. Vegetarians were dropped from the study; the final sample was 170 adults.

Participants (39% female) on average were 32 years old ($SD = 9.40$, $Median = 30$, $Minimum = 18$, $Maximum = 67$). Participants identified themselves as Caucasian (77%), Asian (10%), African American (9%), and Native Hawaiian or Pacific Islander (1%). Six percent identified their ethnicity as Hispanic. Thirty-four percent of participants reported being married and 37% reported having children. Participants self-reported their occupation as full-time student (15%), employee in a company they did not own (60%), self-employed (31%), or unemployed (17%). Five percent of participants attended high school, 48% graduated from high school, 41% graduated with an undergraduate degree, and 6% completed graduate education. Participants resided in 37 different states in the US.

Design and Procedures

The study used a cross-sectional design. An institutional review board approved the study before data were collected. This study was conducted through Amazon's Mechanical Turk. This research opportunity was restricted to US citizens and compensation was \$4.00. The average survey time was 30 minutes. The survey included items about intentions to engage in behaviors related to antibiotic stewardship, psychological scales, and demographics.

Measures

Following Rossiter's (2002) guidance for scales in campaign research, single-item measures were used to assess a concrete singular object (e.g., meat and chicken that has been raised without antibiotics) with a concrete attribute (e.g., buying intentions; Rossiter, 2002), while multiple-item measures were used to assess trait (e.g., mavenism), internal state (e.g., anxiety), and abstract collective object (e.g., antibiotic use). Attitudes toward antibiotic use in animal husbandry were assessed with four items (e.g., *Antibiotic use in the agricultural industry is harmful to people's health.*). Responses, marked on five-point scales (later coded as 1=*strongly disagree* to 5=*strongly agree*), were averaged into one score ($\alpha = .96$), with higher scores indicating stronger, negative attitudes toward antibiotic use in animal husbandry. Previous purchasing attempts were assessed with one item: *In the past, have you tried to buy meat or chicken that has been raised without antibiotics?* Norms were assessed with one item: *Do important people in your life [like family and friends] encourage you to buy meat and chicken that has been raised without antibiotics?* Ease of identification was assessed with one item: *In general, do you find it easy to identify on the packaging whether meat or chicken has been raised with or without antibiotics?* Purchasing intention was assessed with one item: *In the future, do you intend to buy meat or chicken that has been raised without antibiotics?* Persuasion intention was assessed with one item: *In the future, do you intend to encourage important people in your life [like friends and family] to buy meat or chicken that has been raised without antibiotics?* Previous purchases, norms, ease of identification, purchasing intentions, and persuasion intentions were marked as no or yes (later coded as -1=*no* and 1=*yes*).

Four covariates were explored in the analysis. Topic awareness of antibiotic use in animal husbandry was assessed with one item: *Are you aware of the use of antibiotics in animal feed?* Personal knowledge was assessed with one item: *Do you know anyone, personally, who has been diagnosed with an antibiotic resistant infection?* Topic awareness and personal awareness were marked as no or yes (later coded as -1=*no* and 1=*yes*). Anxiety about

antibiotic-resistant infections was assessed with three items on experience of (1) fear, (2) worry, and (3) uneasiness when thinking about antibiotic resistant infections. Responses, marked on five-point scales (later coded as 1=*none at all* to 5=*strongly*), were averaged into one score ($\alpha=.93$); higher scores indicate stronger anxiety. Health mavenism was assessed with four items (adapted from Boster et al., 2011; e.g., *I like to be aware of the most up-to-date healthy lifestyle information so I can help others by sharing it*). Responses, marked on five-point scales (later coded as 1=*strongly disagree* to 5=*strongly agree*), were averaged into one score ($\alpha=.86$); higher scores indicate stronger health mavenism.

Results

Descriptive Statistics

Table 1 reports means, standard deviations, and inter-item correlations for the variables. On average, participants reported negative attitudes toward antibiotic use in animal husbandry. Fifty-five percent had attempted to buy antibiotic-free meat or chicken. Norms were low: only 35% of participants reported that important people in their lives encouraged them to buy antibiotic-free meat and chicken. Most (67%) did not find it easy to identify on its packaging whether meat or chicken has been raised without antibiotics. Many intended to buy antibiotic-free meat or chicken (71%) and to persuade others to buy antibiotic-free meat (beef, pork, and chicken (69%). Sixty-one percent reported that they were aware of the use of antibiotics in animal husbandry. This varied by gender: 74% of women and 53% of men were aware of antibiotic use in animal husbandry, $X^2(1, 168)=7.76, p<.01, \Phi=.21$. Twenty-four percent reported knowing someone who has been diagnosed with an antibiotic-resistant infection, which also varied by gender, $X^2(1, 168)=5.76, p<.05, \Phi=.18$ (33% of women, 17% of men).

On average, participants reported some anxiety about antibiotic resistant infections. About 15% identified as health mavens, which is consistent with previous research (e.g., Boster et al., 2011).

Hypothesis Testing

H1-H2 predicted that positive intentions to buy antibiotic-free meat would be predicted by negative attitudes toward antibiotic use in animal husbandry, positive norms toward purchasing antibiotic-free meat, greater ease of identifying antibiotic-free meat from packaging, and previous attempts to buy antibiotic-free meat. To test these hypotheses, intentions was regressed onto attitudes, norms, ease, and previous attempts. The model was statistically significant, $F(4, 165)=31.98, p<.001, R^2=.44$. Negative attitudes toward antibiotic use, positive norms, and previous attempts to purchase antibiotic-free meat positively predicted future intentions to purchase antibiotic-free meat (see Table 2 for beta weights). Although ease of identification was correlated with purchasing intentions (see Table 1), its independent contribution in the regression was not statistically significant.

Persuading Others

H3a predicted that the theoretical variables of purchasing intentions also predicted intentions to persuade others to buy antibiotic-free meat. To test this hypothesis, persuasion intention

was regressed onto attitudes, norms, ease, and previous attempt. The model was statistically significant, $F(4, 165)=27.42$, $p<.001$, $R^2=.40$. Negative attitudes toward antibiotic use and previous purchasing attempts predicted intentions to persuade others to purchase antibiotic-free meat (see Table 2 for beta weights). Although norms and ease of identification were correlated with persuasion intentions (see Table 1), their independent contributions in the regression were not statistically significant. H3b predicted a positive association between purchasing and persuasion intentions; it was empirically supported $r(168) = .88$, $p<.05$.

LCA for Audience Segmentation

RQ1 investigated audience segmentation based on intentions to purchase and persuade, as well as their determinants. Previous purchases, norms, ease of identification, purchasing intentions, and persuasion intentions were all dichotomous (*no* or *yes*) and were recoded (see Table 3). The continuous variable—attitudes—had a mean of 4 (disagree) and was negatively skewed ($-.75$); it was dichotomized such that 1 to 3.5=1, and 3.5 to 5=2, in order to separate those with neutral and positive attitudes from those with negative attitudes. Table 3 shows the percentage of participants reporting each answer. To address RQ2, PROC LCA (Lanza, Collins, Lemmon, & Schafer, 2007) was used to calculate the fit indices for two- to seven-class models (see Table 4). Each test was run using 200 random starting values and multiple seeds. The lowest Akaike information criterion (AIC) and Bayesian information criterion (BIC) estimates were used to identify the best-fitting model (Collins & Lanza, 2010). The AIC and BIC estimates both converged at a minimum value on the three-class model. This suggests that there are three latent classes of people based on their intentions, cognitions, and experiences related to antibiotic-free meat, answering RQ1.

Table 5 shows the item-response probabilities for the three-class model and the likelihood of reporting an indicator (i.e., the responses that were coded as 2 in Table 3) within a class. The largest class (52%), labeled Purchasers, had high likelihoods of negative attitudes toward antibiotic use, previous attempts to buy antibiotic-free meat, positive norms toward buying antibiotic-free meat, intentions to buy antibiotic-free meat in the future, and intentions to persuade others to buy it. Purchasers may or may not have felt that it was easy to identify antibiotic free meat from packaging. A second class, labeled Resisters (28%), had low likelihoods of every indicator. The third class, New Adopters (21%), had a high likelihood of negative attitudes toward antibiotic use as well as future intentions to purchase and to persuade others to purchase antibiotic-free meat. However, New Adopters were unlikely to have previously attempted to buy antibiotic-free meat and had low likelihoods of experiencing encouragement from close others or easily identifying antibiotic-free meat from packaging.

RQ2 explored four covariates of class membership: topic awareness, personal knowledge of someone with an antibiotic-resistant infection, anxiety about antibiotic-resistant infections and health mavenism. The comparison group used for the analysis was Purchasers. All four covariates were statistically significant (see Table 6). Participants who were aware of antibiotic use in animal husbandry and who knew someone with an antibiotic-resistant infection had lower odds of being Resisters or New Adopters, compared to Purchasers. Importantly, in comparison to Purchasers, participants who were more anxious about

antibiotic-resistant infections were less likely to be Resisters but more likely to be New Adopters. Last, participants with higher health mavenism had lower odds of being Resisters or New Adopters than Purchasers.

Discussion

The diffusion of a behavior depends not only on adoption of the behavior, but also on transmission of messages to persuade others to adopt it (Rogers, 2003). This study investigated two explanations for people's intentions to persuade others to buy antibiotic-free meat: people persuade others to engage in behaviors they judge as good, normative, and action-able or people persuade others to do what they do. Overall, the IMB (Fishbein, 2000; Fishbein & Cappella, 2006) was useful for understanding consumers' attempts to purchase antibiotic-free meat. That said, the relationship between purchasing and persuasion intentions was very strong, which supports the homophily explanation: people intend to persuade close contacts in their social networks to do what they will do.

A LCA identified three audience segments based on antibiotic-resistance behaviors, cognitions, and experiences: Purchasers, Resisters, and New Adopters. People who had more topic awareness of antibiotic use in animal husbandry, knowledge of someone with an antibiotic resistant infection, and health mavenism were more likely to be Purchasers than Resisters or New Adopters. Anxiety, however, was highest among New Adopters and lowest among Resisters.

Theoretical Implications

The findings provide compelling evidence that the IMB may extend to predicting intentions to persuade others to engage in a behavior. In this study, we investigated the possibility that personal attitudes, norms, efficacy, and previous engagement in a behavior predict people's intentions to persuade others to do it. The rationale was that people should be inclined to persuade others to engage in acts that they judge as good, believe others promote, and have attempted in the past, because this makes it share-worthy information (Cappella et al., 2014; Kim, 2015). Our rationale contrasts with prior research, which focused on persuasion as the behavior, that is, investigating the attitudes, norms, and efficacy related to persuading others (e.g., is persuading others good, Southwell & Yzer, 2007). The regression showed that personal attitudes and previous purchasing predicted persuasion intentions. While the findings support our rationale, future research should consider both determinants related to persuading others and to the topic of influence.

Importantly, intentions to purchase and to persuade were very highly correlated ($r = .88$), more than could be expected if the theoretical variables were spuriously predicting both intentions. This finding supports the homophily explanation: people may intend to persuade close contacts in their social networks to do what they do. These results provide insight into the noted positive association between campaign exposure and interpersonal conversation (Hwang, 2012), and potential limits to diffusion through networks.

Importantly, while the correlation analysis showed small, statistically significant bivariate correlations between perceived ease of identifying antibiotic-free meat from packaging and

purchasing and persuasion intentions, the regression analysis showed no independent effect for ease on either intention. One possibility is that the dichotomous answer format (yes or no) limited variance, and thus predictive power, in responses. In addition, the variance in ease of identification may be too low: only 33% of the participants found it easy to identify antibiotic-free meat from packaging. Indeed, in the LCA, none of the classes found it particularly easy to identify antibiotic-free meat from packaging. It is also possible that the ease of identifying antibiotic-free meat from packaging is better thought of as a skill, as opposed to self-efficacy. If it is a skill, the IMB predicts that skills do not directly predict intentions. Instead they are predicted to moderate the effects of intentions on behaviors: even with high intentions, those without the skills to engage in the behavior are less likely to do so. Campaigns that teach this skill could be a critical predictor of actual purchasing behavior.

Implications for Practice

The findings have implications for designing health messages to persuade people to purchase antibiotic free meat and encourage them to persuade others to do so. The IMB broadly suggests two ways in which the messages should be adapted to maximize persuasive effects (O’Keefe, 2015). First, messages should be adapted to addressing the determinants that carry the strongest weights related to intentions. Although attitude was typically a strong predictor of intention, the relative contributions of these determinants are also context dependent (O’Keefe, 2015). As the first study examining in the context of buying antibiotic free meat, the current findings suggest messages designed to increase purchase as well as persuasion intention should address attitude and prior experience, which were equally strong predictors of both intentions. Second, message should be adapted to addressing relevant beliefs or characteristics underlying the determinants of the intentions. O’Keefe (2015) explicitly called for more research on identifying the differences between intenders (i.e. people who already plan to perform the behavior) and non-intenders (i.e. people who do not). We believe the current data speaks directly to that call. Specifically, the results of LCA suggested that new adopters differed from purchasers in terms of perceived norms, prior experience and self-efficacy in identifying the anti-biotic free meat, whereas resisters were found low on both intentions and their determinants. Following O’Keefe’s (2015) advice, we expect future research to use these results “as the basis for constructing persuasive messages —messages focused on changing those specific elements known to distinguish intenders and nonintenders” (p. 117).

Future research into labels is important. Furthermore, research provides a cautionary tale about the efficacy of these labels: in a recent analysis of chicken bought from 99 grocery stores from 17 retail chains in the US, bacteria with genes associated with resistance to antibiotics were found in packages labeled conventionally, “organic,” and “antibiotic-free” (Mollenkopf et al., 2014). Consumers are likely to expect that purchased meat labeled as ‘organic’ or ‘antibiotic-free’ will be less likely to contain antibiotic-resistant bacteria, and may be discouraged by this outcome. Pragmatically, in order to avoid the risk of contracting foodborne pathogens, appropriate kitchen hygiene must be encouraged regardless of how the animal was raised.

In comparison to the earlier findings (M'ikanatha et al., 2007) from a large study of Pennsylvania residents, this sample had a slightly higher percentage of people who were aware of antibiotic use in animal husbandry (61% versus 52%). In contrast to the earlier study, twice as many people in our study (55% versus 25%) reported buying meats labeled as 'raised without antibiotics.' The difference in reported behavior is surprising given the relatively small increase in awareness in the past decade.

Awareness was a strong predictor of purchasing profiles: people who were more aware of antibiotic use in animal husbandry and who knew someone with an antibiotic-resistant infection were much more likely to be Purchasers than Resisters or New Adopters. Importantly, the survey itself exposed participants to minimal information about antibiotic use in animal husbandry and antibiotic-resistant infections, just by asking questions about them. Notably, it is unclear how people consider antibiotic use in animal husbandry. Consumers might believe that antibiotic use in animal husbandry 1) increases the chance that they will ingest residual antibiotics, like residual pesticides on food (which is unlikely), 2) directly increases the risk that a resistant infection will arise in their body (which has been documented; Lusk et al., 2006), or 3) is part of problematic agricultural practices. A better understanding of consumer beliefs about antibiotic use in animal husbandry merits attention and may help shape messages about antibiotic-free meat, especially for classes with limited knowledge like New Adopters and Resisters. These aspects of awareness and their relative influence on purchase and persuasion intentions should be investigated in future research.

People who felt anxious about antibiotic-resistant infections were most likely to be New Adopters and least likely to be Resisters. New Adopters are a delicate class: they have limited knowledge but high anxiety, which may have prompted them to report negative attitudes about antibiotic use in animal husbandry and, consequently, about intending to purchase antibiotic-free meat. Recent research suggests that if New Adopters attempt to persuade others, they may be more likely to follow through on their purchasing intentions (Crook, Stephens, Pastorek, Mackert, & Donovan, 2015). On the other hand, New Adopters do not have the support of previous experiences, social norms, or efficacy to support taking action. Theories on reactions to fear appeals, such as the extended parallel process model (Witte, 1992), highlight that people motivated by fear to engage in behavior, without the efficacy to do so, may manage their fears through other means such as denying the problem or berating the source. In order to support New Adopters, campaigns need to focus on increasing social norms and increasing the ease of identifying antibiotic-free meat. Without these initiatives, New Adopters could (at best) lose their interest in buying antibiotic-free meat in the future or (at worst) start denying the problem and berating education sources.

Notably, health mavens were much more likely to be Purchasers, than Resisters or New Adopters. According to Boster and colleagues (2011), health mavens try to keep up with current health information. They may also engage in the latest health practices, which may drive their purchasing behavior. This finding is promising for campaign planning: our findings suggest that health mavens may serve as agents of change (Rogers, 2003), and their behavior may influence others' descriptive norms (Cialdini, Reno, & Kallgren, 1990).

Limitations

This study's results are limited by the sample, measurement, and self-report design. While the sample has some diversity, it is small compared to population-level studies, which should be done to assess how well these results generalize to the U.S. population. Variables assessing concrete, singular objects (e.g., meat and chicken that has been raised without antibiotics) with concrete attributes (e.g., buying intentions; Rossiter, 2002) were measured with single items, while traits (e.g., mavenism), internal states (e.g., anxiety), and abstract collective objects (e.g., antibiotic use) were measured with multiple items, following guidance by Rossiter (2002). Even though past research has found no difference in predictive validity of single- and multiple-item scales for concrete singular objects and attributes (Bergkvist & Rossiter, 2007), the use of single-items limited our ability to assess measurement reliability. Last, while self-reported intentions are useful for formative research and planning, the IMB (Fishbein, 2000) posits that intentions predict behavior, as long as the person has the skills and environmental conditions to support the intention. The skills and environmental conditions supporting the purchasing of antibiotic-free meat are important considerations, and they may vary in different parts of the U.S. Food decisions may also be influenced by culture. Future research should compare our findings to behavior and examine their generalizability across the country.

Conclusions

Interpersonal persuasion improves behavior change. As interpersonal persuasion about a topic increases it creates the perception of the action as being normative, and norms are also important predictors of behavior. This study provided theoretical guidance about factors predicting why people advocate their chosen behavior with others, providing insights into one mechanism by which social norms are created. Furthermore, by using IMB to identifying audience segments, we provided unique insights into different groups who may be targeted in future campaign efforts as diffusers. These findings provide different insights from the efforts to find persuasive people based on their charisma or social power, but on their motivations to share. Historically, people have never had a greater opportunity to encourage others to engage in behavior through interpersonal and mediated formats of communication (Cappella et al., 2014), which presents an opportunity to re-examine the foundational issues of why people persuade others to act.

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Table 1Descriptive statistics and inter-item correlations among variables ($N = 170$)

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1 Attitudes	4.00	.93									
2 Norms	-.31	.95	.26*								
3 Previous attempts	.09	1.00	.44*	.54*							
4 Ease of identification	-.33	.95	.21*	.29*	.42*						
5 Purchasing intentions	.41	.91	.58*	.42*	.50*	.24*					
6 Persuasion intentions	.38	.93	.55*	.36*	.51*	.26*	.88*				
7 Topic awareness	.22	.98	.37*	.18*	.32*	.13	.23*	.19*			
8 Personal awareness	-.53	.85	.05	.06	.28*	.16*	.11	.10	.13		
9 Anxiety	3.09	1.21	.32*	.11	.22*	.08	.42*	.38*	.28*	.04	
10 Health mavenism	3.23	.90	.22*	.18*	.26*	.23*	.29*	.31*	.07	.12	.27*

Notes. The dichotomous variables (norms, previous attempts, purchasing intentions, persuasion intentions, topic awareness, and personal awareness) were effect coded (1 = Yes, -1 = No) for this analysis.

* $p < .05$

Table 2
Regression Estimates for Future Intentions to Purchase Antibiotic-free Meat and to Persuade Others

	Purchase			Persuade others		
	b	SE	b*	b	SE	b*
Attitudes	.21*	.03	.44	.20*	.03	.40
Norms	.18*	.07	.19	.10	.07	.10
Previous attempts	.19*	.07	.20	.25*	.08	.26
Ease of identification	.01	.06	.01	.04	.07	.04
R^2	.44*			.40*		

Notes: Purchasing, $F(4,165) = 31.98, p < .001$; Persuade others, $F(4,165) = 27.42, p < .001$

* $p < .05$

Table 3Future Intentions: Indicators for Latent Class Analysis ($N = 170$)

Indicators	Code	Label	<i>n</i>	%
Attitudes toward antibiotic use in animal husbandry	1	Positive	50	29.4
	2	Negative	120	70.6
Previous attempt to buy AF meat	1	No	77	45.3
	2	Yes	93	54.7
Norms to buy AF meat	1	No	111	65.3
	2	Yes	59	34.7
Easy to identify AF meat from packaging	1	No	113	66.5
	2	Yes	57	33.5
Future intention to buy AF meat	1	No	50	29.4
	2	Yes	120	70.6
Future intention to persuade others to buy AF meat	1	No	53	31.2
	2	Yes	117	68.8

Note. AF = antibiotic-free

Table 4

Model Fit Information for Comparison of Latent Class Models

Number of classes	G ²	AIC	BIC	df
2	93.24	119.24	160.00	50
3	34.40	74.40	137.11	43
4	21.54	75.54	160.21	36
5	15.83	83.83	190.45	29
6	11.46	93.46	222.03	22
7	8.02	104.02	254.53	15

Note. Boldface type indicates the selected model. AIC=Akaike's Information Criterion; BIC=Bayesian Information Criterion; *df*=degrees of freedom.

Table 5

Item-Response Probabilities for Three-Class Model Given Latent Class Membership

	Purchasers 52%	Resisters 28%	New Adopters 21%
Negative attitudes toward antibiotic use	.93	.27	.71
Previous attempts to buy AF meat	1.00	.10	.00
Positive norms to buy AF meat	.61	.02	.11
Perceived ease in identifying AF meat from packaging	.52	.15	.11
Intend to buy AF meat	.96	.00	1.00
Intend to persuade others to buy AF meat	.95	.00	.94

Note. Percentages reflect the number of participants likely to be in each profile. Cells contain the likelihood of agreeing with the concept. Likelihoods over 50% appear in bold.

Table 6

Covariate Analysis with Purchasers as the Referent Class

	Resisters		New Adopters		LL ²
	<i>b</i>	<i>OR</i>	<i>b</i>	<i>OR</i>	
Topic awareness	-1.15	0.32	-1.22	0.30	10.80 [*]
Personal knowledge	-0.71	0.49	-2.02	0.13	10.74 [*]
Anxiety about AR infections	-0.65	0.52	0.20	1.22	17.57 [*]
Health mavenism	-0.69	0.50	-0.49	0.61	9.18 [*]

Note. AR = antibiotic resistant.^{*} $p < .05$