The Effects of Perceived Normative Pressure and Observability of Behavior on Intention to Perform Sun Protection and Nutrition Behaviors on Behalf of Young Children among Parents

Nehama Lewis, Ph.D. [Lecturer]
Department of Communication, University of Haifa, Israel

Abstract

This paper describes research on two normative concepts thought to impact health behaviors: injunctive and descriptive norms. The study tests whether the extent to which the same health behavior is enacted in an observable or non-observable setting will lead to variation in normative influence on parent intention. In on-line experiments conducted in winter 2009, 467 participants were randomized to a behavioral scenario in which the health behavior was described as occurring in an observable or non-observable setting. For sun protection behaviors, observability primed the influence of descriptive norms on intention. For nutrition behaviors, observability primed the influence of injunctive norms on intention. Across both conditions, observability of the behavioral scenario increased the strength of the association between norms and intention.

Keywords

Norms; Observability; Priming; Sun protection; Nutrition; Parents

Introduction

This study addresses the question of whether manipulating the observability of a behavior, its public versus private nature, will affect the extent to which norms influence intention to perform preventive health behaviors. The focus is on normative variables that have been widely researched in the fields of health communication and social psychology - descriptive and injunctive norms - and have been thought to impact both risk and prevention behaviors. The interaction between descriptive and injunctive norms and observability of a behavior are tested in the context of nutrition and sun protection among parents of young children.

Childhood and Prevention of Obesity and Skin Cancer

The importance of promoting healthy eating habits has become a critical issue in light of the increasing prevalence of obesity and its adverse social, economic, and health outcomes. Nearly two-thirds of adults in the United States (Flegal, Carroll, Ogden, & Johnson, 2002) and an increasing percentage of the population worldwide (Seidell, 2003) are overweight or obese as defined by the World Health Organization (WHO Expert Committee on Physical Status, 1995). In the United States, the number of overweight children and adolescents has doubled in the last two to three decades, and similar doubling rates are being observed worldwide, including in developing countries and regions where an increase in Westernization of behavioral and dietary lifestyles is evident. In the United States,

overweight and obesity underlie 90,000 deaths from cancer per year, and 280,000–325,000 deaths from all causes per year (Allison, Fontaine, Manson, Stevens, & Van Itallie, 1999). Recent estimates suggest that the current medical expenditures attributable to obesity have increased in recent years and are estimated to be as high as $147 billion per year (Finkelstein, Trogdon, Cohen, & Dietz, 2009). One source contends that the impact of overweight and obesity in terms of both mortality and healthcare costs equals or exceeds that associated with tobacco use (Mokdad, Marks, Stroup, & Gerberding, 2004).

Alongside the focus on obesity-related behaviors, this study looks at the effects of observability cues and perceived norms on intention to perform sun protection behaviors among parents of young children. Public health practitioners have long recognized the importance of encouraging people to practice sun safe behaviors for themselves, and for their children, as a means of reducing the incidence of skin cancer. Skin cancer is the most common form of cancer in the United States and accounts for more than 1 million new cases of cancer diagnosed annually, nearly half of all cancers diagnosed in the United States (American Cancer Society, 2008). The incidence of skin cancer has also increased worldwide in the last decade (American Cancer Society, 2008; Jemal, Devesa, Hartge, & Tucker, 2001). More than 20 Americans die each day from skin cancer, primarily melanoma (American Cancer Society, 2008). The relative harmfulness of exposure on the early years of life is greater than later in life (Hill & Dixon, 1999). Children receive three times the annual UV-B dose of the average adult and receive a significant proportion of their lifetime sun exposure during this time period (Hebert, 1993; Truhan, 1991). The economic costs of skin cancer are also high; In 2004, the total cost associated with the treatment for non-melanoma skin cancers was more than $1 billion (Bickers, Lim, & Margolis, et al., 2006).

Parents of children aged five through age nine are the target population for this study as this age range has been shown to be an important biological and psychological stage at which parent's choices regarding preventive health behaviors can have an important impact on the child's later development. At a young age, parents are generally recognized to be the most fundamental agents for socialization (Maccoby, 1984) and play a central role in their children's health behaviors. Consequently, it is important to investigate the effects of message cues, such as the observability of a recommended health behavior, on parental intention to perform these healthy behaviors for their young child.

Theoretical Background

The focus of the present research is on the role of perceived norms – both descriptive and injunctive norms, on intention to perform sun protection behaviors for one's child, among parents. This study builds on research into normative influence generally, and on studies which have explored the association between norms and intention to perform health behaviors specifically. In "*Communication and normative influence: An introduction to the special issue*", Yanovitzky and Rimal (2006) argue that social norms exert a great deal of influence on human behavior, but that much research needs to be done in specifying the mechanisms and processes through which normative influence is exerted.

In the health domain, injunctive norms appear to play a particularly important role with regard to intention to perform healthful behaviors (Finlay, Traffimow, & Villareal, 2002). Terry and Hogg (1996) proposed that injunctive norms may be especially important in predicting health-related behaviors because, for these types of behaviors, people tend to be confident of what they believe their most important others think, which may not be as true of other types of behaviors. The importance of injunctive norms has also been directly applied in community interventions. Specifically Fishbein and his colleagues (Fishbein et al., 1993;

Fishbein et al., 1995) demonstrated the importance of injunctive norms in predicting and determining condom use.

However, there appear to be differences between descriptive and injunctive norms with regard to the norm-intention association. Cialdini, Reno, and Kallgren (1990) stressed the need to differentiate between descriptive norms (what is commonly done) and injunctive norms (what is commonly approved and disapproved). The authors stressed the need to differentiate between these constructs because each refers to a separate source of human motivation (Deutsch & Gerard, 1955; Kaplan, 1989). Subsequent research supported this distinction between these constructs by demonstrating that the two types of norms led to significantly different behavior patterns in the same setting (Reno, Cialdini, & Kallgren, 1993). The current study will examine the influence of the observability of behavior on normative influence on intention, differentiating between descriptive norms and injunctive norms.

Observability of behavior and the effect of perceived normative pressure on behavioral intention

The current study focuses on the effects of manipulation of the *context* of the health behaviors in question on the association between norms and intention, specifically the degree to which the behavior is enacted in a private or public setting. The study builds upon research that has found that the extent to which a behavior is enacted in a public or private setting has been shown to moderate normative influences (Bagozzi, Wong, Abe, & Bergami, 2000; Cialdini et al., 1990). For behaviors performed in public, pressures to conform, that is, engage in behaviors perceived to be acceptable in others' eyes, are likely to be substantial. This is because a privately performed behavior is not observable for others' scrutiny and people are less likely to engage in the interrogation of others (Berger & Calabrese, 1975) about largely private behaviors. For publicly performed behaviors in which referent others can observe others' behaviors, either directly or indirectly, social sanctions can be exercised for violating injunctive norms (Lapinski & Rimal, 2005).

The idea that conformity to the group will be greater under public than private conditions, when the group members can observe and identify any deviation, is central to the process of normative influence (Turner, 1991). Deutch and Gerard (1955) tested the effect of observability of behavior on conformity to group influence, and found that, in line with the concept of normative influence, subjects showed less conformity to the group in the anonymous (private) then in the face-to-face (public) setting. Allen (1965) has argued that more conformity in public than in private need not always indicate a mere public compliance effect: "in the more public situation the group may be regarded as more convincing, so that actual private change as well as public compliance could be greater in the public than in the private conditions" (p. 146).

Research in this area has tended to focus on the effects of public and private scenarios in relation to conformity to group influence rather than on the effects of message factors that are intended to prime normative influence. This is the first study, to my knowledge, which empirically tests the effects of manipulating the public or private context of two health behaviors on the impact of descriptive and injunctive norms on intention. Furthermore, it focuses on a non-college aged, population of parents of a young child. The objective of this study is to provide new information about the effects of a cue - observability of a behavior - on the normative route to intention. It is my hope that the findings of this study will generate continued investigation into a range of observability cues in health communication messages and their effects. By demonstrating the effects of a subtle manipulation of the public or private context of a health behavior on the normative route to intention, I hope to build an

empirical foundation upon which to expand research into the effects of this factor within a wider range of health communication messages.

It is proposed, based on research reviewed here (see above), that the association between norms and intentions will vary as a function of observability. That is to say that the presence of referent others (i.e. others parents) will prime descriptive and injunctive norms associated with sun protection among parents of young children. Consequently, among parents who are told that their behavior can be observed by another parent, there should be a greater influence of perceived norms on intention. This process of persuasive change is known as priming, and is based on priming theory, which proposes that persuasive effects can also occur by changing the association between a predictor and its outcome, even when the mean for the predictor remains the same (e.g. Domke, Shah, & Wackman, 1998; Iyengar & Kinder, 1987; Mendelsohn, 1996). Priming's theoretical basis is based on activation and accessibility. Priming increases the association between the primed belief and the subsequent attitude. Priming should increase the relative importance of the primed belief in the overall positive or negative evaluation of the behavior and intention to perform that behavior (Fishbein & Cappella, 2006).

Hypothesis 1a   Intention to perform health behaviors for one's child should be more associated with descriptive norms among parents who are told that their behavior is observable by other parents (vs. not observable).

Hypothesis 1b   Intention to perform health behaviors for one's child should be more associated with injunctive norms among parents who are told that their behavior is observable by other parents (vs. not observable).

Method

A national, non-representative, sample of four hundred and ninety-eight individuals was recruited by Survey Sampling International to participate in an on-line survey during December of 2009 and January of 2010. As the goal of this study is to test theory rather than to generalize findings to a wider population of parents, an unweighted convenience sample of parents was used rather than a representative sample. Criteria for inclusion included that subjects were aged 18 and older, and were the parent of at least one child aged five through age nine. In addition, at least 30 percent of the total sample was male. Of the subjects recruited for the study, 467 were retained for analysis. The parents ranged in age from 18 to 50 and above (most parents were aged 30–39). The majority of participants were white (84.4 percent). The sample was 61 percent female. Eighty-two percent of the sample were currently married or living with a partner. The unweighted demographic characteristics of the sample are presented in Table 1.

Design

Nutrition and sun protection studies are presented and analyzed as separate studies, although they were undertaken at the same time, and respondents were randomly assigned to one or the other study. Respondents were randomly assigned to an observable or non-observable behavioral scenario in a between-subjects experimental design[1]. The focus outcome measure for the experiments was intention to feed one's child healthy foods in the behavioral scenario depicted (i.e. play date at the parent's house) and intention to protect one's child from (the effects of excessive) exposure to the sun in the sun protection condition.

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[1]Analyses presented here examine hypotheses related to the observability manipulation. There was an additional manipulation of message conditions, which are discussed in a separate paper. As subjects were randomly assigned to message conditions, the effects of this factor were averaged across the conditions and did not affect results reported here.

Procedure

After responding to questions about demographic characteristics and personality traits, subjects were asked about their behavioral intentions in a relevant scenario (matched for behavior type – sun protection scenario or nutrition scenario). The intentions measure incorporated the randomized observability manipulation. Respondents were asked whether or not they would engage in the target behavior either when they were observed by other parents, or when they were not told they were being observed (in the case of sun protection), or when being observed was not mentioned (in the case of obesity.) Once they had responded to questions measuring intention related to the behavioral scenario (i.e. the outcome measure), all subjects were given a manipulation check for the observability manipulation. Then, all subjects responded to questions about injunctive and descriptive norms related to providing healthy foods to or engaging in sun-protection behaviors for their child.

Measures: Sun protection

<u>Dependent Variable: Intention to practice sun protection behaviors for one's child:</u>
Participants assigned to a sun protection behavioral scenario were asked to imagine that they were in a "*local park or playground with your child (think of your youngest child aged between 5 and 9) on a typical summer (weekend) day at midday*". Participants assigned to the observable behavioral scenario were then told that "*You are accompanied by friends - who are also parents of young children like yourself*". In contrast, participants who were assigned to the non-observable scenario were told that "*You are not accompanied by other family members or friends*". For this behavioral scenario, in the non-observable condition, parents were informed that they could not be observed by referent others.

All participants in the sun protection groups (observable and not-observable) were then asked to note on a 10-point Likert scale how likely it would be that they would have performed five sun protection behaviors when 1=Extremely unlikely and 10=Extremely likely: (1) Keep my child out of the sun during the midday hours as much as possible (i.e. seek out shade), (2) Apply sunscreen to my child with an SPF of 15 or more (and reapply as necessary), (3) Make sure that my child is wearing a shirt that covers his/her chest and arms, (4) Make sure that my child is wearing a hat, and (5) Make sure that my child is wearing sunglasses. Respondents were assigned a mean score for all items measuring intention. Responses to these five items were averaged to form a continuous measure for intention to protect one's child from the sun (Cronbach's alpha = .79). The intention measure for sun protection was an index which ranged from 1 to 10. Descriptive statistics for the intention measure and for all Integrative Model measures are listed in Table 2.

<u>Descriptive and Injunctive Norms:</u> There are a number of ways in which descriptive norms have been operationalized and conceptualized in the literature. For example, a typical approach has been to measure behavioral base rates (e.g., what percent of parents with children the age of your child would perform this behavior). According to Lapinski and Rimal (2005), individual descriptive norms pertain to people's perception of the behavior in question (e.g., most of my friends exercise at least three times a week). Similarly, Fishbein and Ajzen (2010) conceptualize descriptive norms as norms based on perceptions of what other people are doing. Fishbein and Ajzen (2010) also stress the importance of the identification of a relevant social agent and ensuring compatibility between norms and the predicted behavior (for example, time period and context). Consistent with this conception of descriptive norms, the measure used here was intended to gauge whether important others (other parents of young children) perform the behavior in question. Care was also taken to choose a relevant group for identification (other parents of a young child) and a time period and setting that matched the behavioral intention measure. In addition, to ensure consistency

of response options across other Integrated Model factors, the question was phrased in order to allow parents to note their agreement or disagreement with the following statement: '*Most parents of a child aged 5 through 9 like myself (who are important to me) will do the following this summer at the local park or playground on a typical summer's weekend day at noon*'. Responses to 7-point scales ranging from 1=Disagree and 7=agree were averaged across all five behaviors to form a measure of descriptive norms (Cronbach's alpha = .89). The descriptive norms measure was a continuous variable which ranged from −3 to +3 (see Table 2 for descriptive statistics). The measure was centered prior to its inclusion in analysis. A dichotomous version of this variable was also created, with a median split of 0.9. One hundred and twelve parents were categorized as having low levels of self-reported descriptive norms and 113 as having a high level of descriptive norms.

Parents' injunctive norms regarding protecting their child from the effects of exposure to the sun were measured by asking subjects to indicate the strength of their agreement with the statement '*Parents of a child aged five through 9 like myself (who are important to me) think I should do the following this summer at the local park or playground on a typical summer's weekend day at noon*'. Responses to 7-point scales ranging from 1=Disagree and 7=agree were averaged across all five behaviors to form a measure of injunctive norms (Cronbach's alpha = .86). The injunctive norms measure was a continuous variable which ranged from −3 to +3. A dichotomous version of this variable was also created, with a median split of 1.01. One hundred and sixteen parents were categorized as having low levels of self-reported injunctive norms and 109 as having a high level of injunctive norms.

Measures: Nutrition

Dependent Variable: Intention to serve one's child healthy foods: To assess intention to perform nutrition behaviors subjects were randomized to either the observable or the non-observable version of the following scenario, as follows:

> "Imagine you are home with your child (think of your youngest child aged between 5 and 9) at 5 pm on a typical Sunday evening. Your child has a friend over for an afternoon play date, and you are about to prepare dinner for the children to eat. "

For subjects assigned to the observable condition the next sentence was:

> "As you begin preparing the meal, your child's friend's parent arrives and you invite him/her to join you in the kitchen and stay until the children have had dinner"

For subjects assigned to the non-observable condition the text continues directly to the question below:

> "How likely are you to include the following foods in the meal you serve your child and his/her friend?"

The decision to use different means of manipulating non-observable vs. observable in the two behavioral scenarios (nutrition and sun protection) was based on the presumption that parents in the playground scenario would be likely to assume that they *are* observable unless specifically informed that they were alone, given that the setting itself is public. However, in the play date scenario in which they were in a private setting (their own home), parents would be more likely to assume that they were *not* in the company of other parents (unless they were told that another parent was present). In addition, the mention of another parent not being present might have also led to the inadvertent priming of observability among parents in the non-observable nutrition groups, potentially undermining the manipulation.

Parents were presented with twelve different food items and are asked to note the likelihood of including each in the meal on a scale ranging from 1 = '*Extremely unlikely*' to 10 = '*Extremely likely*'. The food items were (1) Meat – grilled or baked (2) Fish (3) Meat – fried or pre-cooked (4) Side dish (5) Pizza (6) Water (7) Milk (8) Drinks other than water or milk (9) Fruit/s (10) Vegetable/s (11) Dessert (baked), and (12) Dessert (frozen). As the nutrition items included both healthy options and unhealthy options (and some that were neutral, such as side dishes), factor analysis using maximum likelihood with oblique rotations was used to determine how the items grouped into sub-components. Three components were shown to account for a (combined) 46 percent of the total variance in intention. As the focus of the study was to predict intention to feed children healthy foods, the sub-component which included only healthy foods was used in the study – this component, which accounted for 11.6 percent of the total variance, included grilled meat, fish, fruit, and vegetables. Responses to these four items were averaged to form a continuous measure for intention (Cronbach's alpha = .56). The intention measure for nutrition ranged from 2 to 9 (see Table 2 for descriptive statistics).

Parents' descriptive norms regarding serving their child healthy food were measured by asking subjects to indicate the strength of their agreement with the statement '*Most parents of a child aged 5 through 9 like myself (who are important to me) will give their child the following foods and drinks on a typical Sunday evening at home when the child has a friend over for a play date*'. *do the following this summer at the local park or playground on a typical summer's weekend day at noon*'. Responses to 7-point scales ranging from 1=Disagree and 7=agree were averaged across all four healthy food items (fish, grilled meat, fruit and vegetables) to form a measure of descriptive norms. The descriptive norms measure was a continuous variable which ranged from –3 to +3 (Cronbach's alpha = .69). A dichotomous version of this variable was also created, with a median split of 1.01. One hundred and nineteen parents were categorized as having low levels of self-reported descriptive norms and 123 as having a high level of descriptive norms.

Parents' injunctive norms regarding feeding their child healthy foods were measured by asking subjects to indicate the strength of their agreement with the statement '*Parents of a child aged five through 9 like myself (who are important to me) think I should give my child the following foods and drinks for dinner on a typical Sunday evening at home when the child has a friend over for a play date*'. Responses to 7-point scales ranging from 1=Disagree and 7=agree were averaged across all four healthy food items (fish, grilled meat, fruit and vegetables) to form a measure of injunctive norms. The injunctive norms measure ranged from –3 to +3 (Cronbach's alpha = .73). A dichotomous version of this variable was also created, with a median split of 1.01. One hundred and twenty-nine parents were categorized as having low levels of self-reported injunctive norms and 113 as having a high level of injunctive norms. Table 2 provides descriptive statistics for these measures.

Results

Manipulation check—Two manipulation checks were conducted during the course of the on-line survey, one for the observability manipulation and one for the message type manipulation. The manipulation check for the observability of the behavioral scenario is relevant for the current study. Subjects in the nutrition sample were asked whether, in the (play date) scenario they had read, they were (a) alone (b) with their child only (c) accompanied by another parent or parents. Subjects in the sun protection sample were asked the same question regarding the playground scenario they had received.

Among parents in the nutrition sample, 64 percent of subjects recalled the observability manipulation correctly (66 percent of those in the non-observable condition and 63 percent of those in the observable condition). Among parents in the sun protection sample, 72

percent of subjects recalled the observability manipulation correctly (82.1 percent of those in the non-observable condition and 63 percent of those in the observable condition). Across both samples, 325 parents (69.7 percent of the total sample) correctly recalled the observability manipulation.

Results

The results are organized in two sections. Hypotheses 1a and 1b were tested separately among two groups – parents who were surveyed about sun protection for their child (n = 225), and parents who were surveyed about nutrition behaviors for their child (n = 242). The correlation between descriptive and injunctive norms was strong and significant for both the sun protection group, $r(225)$ = .71, p < .001), and the nutrition group, $r(242)$ = .57, p < .001). Consequently, to avoid collinarity complications in the analysis of these variables, their effects were estimated independently. For sun protection and for nutrition, preliminary analyses were conducted to test for significant demographic or Integrated Model predictors of behavioral intention. The final models test the joint effects of norms and observability on intention, and include as covariates those variables which were found to be significant predictors in preliminary analyses.

Sun protection – Preliminary Analyses

A linear regression analysis using the sample of parents who participated in the on-line survey relating to sun protection (n = 225) revealed that parents' sun protection behavior was a highly significant predictor of intention to practice sun protection behaviors for their child in the future (B=1.02, SE=.10, p < .001), accounting for 34.7% of the variance in behavioral intention. Other demographic characteristics (age of parent, the number of children at home, parents' marital status, gender of parent, employment status, parents' education, race (White/other), tendency of the child's skin to burn when exposed to the sun, and gender of child) were not significant predictors of intention (p > .05).

In a second linear regression, intention to protect one's child from the sun was regressed on parents' sun protection behaviors, observability of behavior, as well as Integrated Model factors – attitudes toward sun protection, norms, and control beliefs relating to this behavior, and the interaction between the Integrated Model factors and observability. As the effects of descriptive and injunctive norms were to be tested separately (see H1a and H1b), this step was conducted in separate models, each of which included either descriptive norms (preliminary analysis for H1a) or injunctive norms (H1b).

In a model which included descriptive norms, linear regression analysis revealed that control beliefs were not a significant predictor of intention (B=.16, SE=.10, p>.05). Similarly, in a model which included injunctive norms, linear regression analysis revealed that control beliefs were also not a significant predictor of intention (B=.12, SE=.08, p>.05). Therefore, control beliefs and their interaction with observability were dropped from analysis from this point. All other variables were significant predictors and were retained in the final models to avoid specification error.

Results: Test of interaction between norms and observability – sun protection

Sun Protection: Primary Analyses—Table 3 shows the results of the final OLS regression model predicting intention to practice sun protection behaviors in the playground scenario (R^2= .60). The results show a significant positive effect of parents' own sun protection (B=.61, SE=.08, p <.001), and attitudes toward sun protection for one's child (B=.88, SE=.12, p <.001). Observability of behavior had no conditional effect on intention (B=−.22, SE=.16, p >.05) and there was no significant joint effect of attitudes and observability

(B=−.23, SE=.18, p >.05). The statistically significant interaction term for descriptive norms and observability indicates that the effect of descriptive norms was significantly different across the observability conditions. In the observable condition, the estimated effect of descriptive norms on intention was positive and significant (B=.40, SE=.09, CI(95): .23 – .56). In contrast, among parents in the non-observable group, the estimated effect of descriptive norms on intention was non-significant (B=.12, SE=.10, CI(95): −.07 – .30). The statistically significant product term indicates that the difference between these two slopes was statistically significant (B=.28, SE=.13, p = .03). The association (as reflected by the respective regression coefficients) between descriptive norms and behavioral intention was stronger among parents in the observable condition compared with parents in the non-observable condition. Thus, H1a was supported among the sample of parents in the sun protection group.

Table 4 shows the results of the final OLS regression model predicting intention to practice sun protection behaviors in the playground scenario (R^2= .65). The model tests the effects of observability and injunctive norms and the interaction between these variables (H1b). Parents' own sun protection (B=.53, SE=.08, p <.001), injunctive norms (B=.42, SE=.10, p <.001) and attitudes toward sun protection for one's child (B=.72, SE=.12, p <.05) were significant predictors of intention (but, given the inclusion of interaction terms, the coefficient for injunctive norms is a conditional effect, not a main effect). Observability of behavior had no conditional effect on intention (B= −.19, SE=.15, p>.05) and there was no significant joint effect of attitudes and observability (B= −.24, SE=.18, p>.05). The estimated effects of injunctive norms were not different across the observability conditions in the sun protection group. In the observable condition, the estimated effect of injunctive norms on intention was positive (B=.62, SE=.10, CI(95): .43 – .80). Among parents in the non-observable group, the estimated effect of injunctive norms on intention was also positive and significant (B=.42, SE=.10, CI(95): .22 –.63). However, the absence of an interaction effect indicated that these two slopes did not differ significantly from one another, though it was in the predicted direction (B=.19, SE=.14, p = .16). Thus, H1b was not supported among the sample of parents in the sun protection group.

Nutrition – Preliminary Analyses—A linear regression analysis using the sample of parents who participated in the on-line survey relating to nutrition (n = 242) revealed that parents' own nutrition behavior was a highly significant predictor of intention to serve one's child healthy foods (B=.22, SE=.07, p < .001). Parents' race (White vs. Other) was also a significant predictor of intention. Non-White parents reported significantly lower behavioral intention compared with White parents (B= −.40, SE=.23, p< .01). These two characteristics accounted for 11.9% of the variance in behavioral intention. Other demographic characteristics (age of parent, the number of children at home, parents' marital status, gender of parent, employment status, parents' education, child's body mass index, and gender of child) were not significant predictors of intention (p > .05).

In a second linear regression, intention to serve one's child healthy foods was regressed on parents' nutritional behavior, parents' race (White vs. Other), observability of behavior, as well as Integrated Model factors – attitudes toward health nutrition, norms, and control beliefs relating to this behavior, and the interaction between the Integrated Model factors and observability. As the effects of descriptive and injunctive norms were to be tested separately (see H1a and H1b), this step was conducted in separate models, each of which included either descriptive norms (preliminary analysis for H1a) or injunctive norms (H1b).

In a model which included descriptive norms, linear regression analysis revealed that attitudes were significantly associated with behavioral intention (B=.27, SE=.09, p < .05), but that control beliefs were not a significant predictor of intention (B=.18, SE=.10, p > .05).

In contrast, in a model which included injunctive norms linear regression analysis revealed that attitudes (B=.32, SE=.09, $p < .01$) as well as control beliefs (B=.29, SE=.11, $p < .05$) were both significant predictors of intention. Therefore, in the final model testing H1a, control beliefs and their interaction with observability were dropped from the model but were retained in the model testing H1b. All other significant predictors were retained in the final models to avoid specification error.

Results: Test of interaction between norms and observability – Nutrition

Table 5 shows the results of the final OLS regression model predicting intention to serve one's child healthy food in the play date scenario ($R^2 = .41$). The results show a significant positive effect of parents' own nutrition behavior (B=.22, SE=.07, $p <.01$), descriptive norms (B=.47, SE=.11, $p <.001$), and attitudes toward healthy nutrition for one's child (B=.37, SE=. 10, $p <.001$). Observability of behavior (B= −.12, SE=.15, $p >.05$) and parents' race (B= −. 40, SE=.23, $p >.05$) had no significant overall effect on intention, and there was no significant joint effect of attitudes and observability (B=.01, SE=.14, $p >.05$). The estimated effects of descriptive norms were not different across the observability conditions in the nutrition group. In the observable condition, the estimated effect of descriptive norms on intention was positive (B=.60, SE=.10, CI(95): .41 – .79). Among parents in the non-observable group, the main effect of descriptive norms on intention was also positive and significant (B=.46, SE=.12, CI(95): .25 –.67). The differences between these two coefficients, though in the predicted direction, were not statistically significant as indicated by the non-significant interaction term (B=.13, SE=.15, p=.38). Thus, H1a was not supported among the sample of parents in the nutrition group.

Table 6 shows the results of the final OLS regression model predicting intention to serve one's child healthy food in the play date scenario (R^2= .34). The model tests the estimated effects of observability and injunctive norms and the interaction between these variables (H1b). Parents' own nutrition behavior (B=.21, SE=.07, $p <.01$), parents' race (B= −.70, SE=.24, $p <.01$), control beliefs (B=.31, SE=.15, $p <.05$), and attitudes toward healthy nutrition for one's child (B=.33, SE=.13, $p <.05$) were significant predictors of intention. Observability of behavior (B= −.23, SE=.17, $p >.05$) and injunctive norms (B=.07, SE=.11, p>.05) had no (conditional) effect on intention. There was no significant joint effect of attitudes and observability (B=.01, SE=.18, $p >.05$) or of control beliefs and observability (B=−.07, SE=.21, $p >.05$). The main effect of injunctive norms varied across observability conditions in the nutrition group. In the observable condition, the main effect of injunctive norms on intention was positive and significant (B=.37, SE=.10, CI(95): .18 – .57). In contrast, among parents in the non-observable group, the main effect of injunctive norms on intention was non-significant (B=.07, SE=.11, CI(95): −.14 – .28). The difference between these two coefficients was statistically significant as reflected by the coefficient for the product term (B=.30, SE=.14, $p < .05$). The association between injunctive norms and behavioral intention was stronger among parents in the observable condition compared with parents in the non-observable condition. This effect is similar to that observed in the sun protection group for H1a. Thus, H1b was supported among the sample of parents in the nutrition group.

Finally, it should also be noted that there were no overall differences in means for descriptive norms or for injunctive norms among parents in observable and non-observable conditions (see Table 7 for overall means for these variables). Consequently, in spite of the fact that norms were measured after subjects had received the behavioral scenario (i.e. intention measure), observability did not have an overall effect on norms. Therefore, the results of the current study are comparable to a design in which norms had been measured prior to measurement of the intention measure

Discussion

The findings of this study contribute to research into factors which influence the impact of norms on intention to perform health behaviors, specifically the influence of descriptive and injunctive norms. Lapinski and Rimal (2005) have argued that behavioral privacy – the extent to which a behavior is enacted in a public or private setting, should be a likely moderator of normative influences (Bagozzi et al., 2000; Cialdini et al., 1990). They suggest that injunctive norms are less likely to influence behavior that is performed in a private setting than behavior in a public setting. However, this distinction is made with regard to different behaviors, for example college students' condom use versus their alcohol consumption. While the population is the same, the behaviors are very different. According to the reasoned action approach (Fishbein et al. 2002) behaviors are categorized according to target, action, context and time. Any change to one or more of these factors is likely to influence the underlying components (attitudes, norms, self-efficacy or other distal variables) influencing intention. This study furthers the literature by comparing the same behavior and only varying one factor – the extent to which it could be observed by another parent.

The findings of this study illustrate how a (fairly subtle) manipulation of the identical behavioral scenario – the presence or absence of another parent who can observe the subjects' behavior – moderated the effects of both descriptive and injunctive norms on intention to perform sun protection and nutrition behaviors. One possible explanation for the finding that observability influenced the descriptive norms-intention association for sun protection, but not the injunctive norms-intention association could be related to differences in the scenarios provided to parents for these two behaviors. In the sun protection scenario, parents were asked to picture themselves in an outdoor setting (in a park or playground), whereas parents in the nutrition group were asked to picture themselves in their own kitchen. The difference in physical location may have influenced the type of norm that was primed. In an outdoor setting where one can more readily observe others' behavior descriptive norms could be expected to exert a stronger influence on intention than injunctive norms. As noted, the effect of observability on injunctive norms, while not statistically significant, was in the predicted direction. In contrast, in one's own kitchen, the presence of another parent in close proximity who can observe one's behavior could be expected to prime injunctive norms. This finding also supports the theoretical viewpoint that these two types of social norms are distinct and their influence should be considered separately rather than in a combined norms measure.

The effect of norms on intention varied across the observability conditions in the hypothesized direction. As predicted, the mechanism of effect was typical of a priming effect (see Fishbein & Cappella, 2006). Under conditions of observability, priming increased the associations between perceived norms (descriptive and injunctive) and behavioral intention. Priming normative influence through observability increased the relative importance of perceived norms in the overall formation of behavioral intention for the two behavioral scenarios tested. As a result, parents with low levels of self-reported injunctive and descriptive norms reported reduced intention when they were told that another parent was present, compared with parents with high self reported injunctive and descriptive norms who were told that they were alone with their child (in the identical scenario).

It should be noted, however, that the results for the sun protection study are stronger, overall, than those for the healthy food study. The behavioral scenario that was used in the nutrition study suffered from a number of limitations that may have detracted from the validity of the findings for this group. First, the food options given to parents were somewhat vague. In addition, parents' responses may have been influenced by external

factors such as the cost of the item, time involved in preparation, their child's allergies, or a particular lifestyle choice that influences eating habits at home. While the influence of such external factors would likely be accounted for in analysis, the measure could have been more specific and included a broader range of foods. Second, the manipulation is confounded in the observable condition for the nutrition behavior because parents are asked about choosing foods not only for their own child, but also for the child of the other parent who is at their home. Therefore, the effect of observability on intention may not be due to the interaction between the presence of another parent in the scenario and injunctive norms, but to a parents' desire to treat the other parent's child in a way that is consistent with good manners and hospitality. Had the other child not been described as present in this scenario, the effect of observability may not have interacted with injunctive norms to influence intention to serve one's own child healthy food

The findings presented here suggest that perceived social norms play an important role in forming intention to perform sun protection and nutrition behaviors among parents of young children. The presence of another parent who can observe the behavior performed for one's child appears to prime the individual parents' perceptions of normative practice and expectations. Among parents who feel that their social environment is likely to perform these sun protection behaviors or who feel that their close friends and family expect them to do so, the presence of another parent may serve as a reinforcing agent or cue to intention.

This could have useful implications for public health practitioners and health communication researchers who are targeting a population for which there is evidence to suggest that the prevailing social norms favor the behavior in question. For this population, a message which incorporates a textual or visual element of observability might help increase or reinforce intention, which may then lead to an increase in the performance of the healthy behavior. However, the findings also point to a disconcerting implication with regard to populations within which the prevailing descriptive and injunctive norms are dismissive or even discouraging, with regard to sun protection and nutrition behaviors. Messages aimed at this population should avoid incorporating cues to observability by other parents in messages, as this could reduce intention or reinforce low intention among this population.

Limitations and Conclusions

This study presents new information about the ways in which social norms can interact with the observability of a behavior in a message designed to promote sun protection in their joint effects on intention. However, it also has a number of limitations. The study looks at sun protection and nutrition behaviors only, so that the findings presented here may not be generalizable to other health behaviors. Additionally, the measures here are based upon self-report and may not accurately represent parents' true intention to practice sun protection behaviors. Another limitation common to experimental study designs such as the design of the current study is that the effects are likely to be short lived. However, as the goal of this study is to provide new information about the effects of incorporating an observability cue in messages relating to healthy behaviors aimed at parents of young children rather than bring about a change in behavior among this population, this does not represent a serious limitation.

It is important to acknowledge that, in contrast to studies which look at a measure of behavior in field settings, this study employs a hypothetical scenario as its outcome, which could justifiably be seen as detracting from its external validity. However, Fishbein and Ajzen (Fishbein & Ajzen, 1975; Fishbein et al. 2002; Fishbein & Ajzen, 2010) have argued that there is good evidence that, when properly measured, intentions are good predictors of behavior. In particular, intention measures (such as the outcome measures used in this study) that are specific in as far as time period, physical setting, and action, and are matched for

specificity to their underlying predictors (norms, attitudes and control beliefs) are predictive of behavior.

Furthermore, the focus of the current study was to examine the effects of a manipulation of the public or private context of a behavior on the norm-intention relation rather than to draw inferences concerning the prediction of health behaviors among a greater population of parents. In addition, practical considerations precluded testing the hypotheses described here in a real-life context while maintaining adequate control of possible confounding factors. However, we acknowledge that our choice of a controlled experimental design with its hypothetical behavioral scenario, contributes to the internal validity of our findings, but detracts to some degree from its external validity. Future research should address these concerns through the use of more concrete behavioral outcomes.

Future research could also test the hypotheses explored herewith a different population, for example, parents of older children or populations at higher risk for skin cancer or obesity. It could also be worthwhile examine the effects of messages in other formats and with a range of manipulations of observability, both textual and/or visual, to determine whether similar interactions are observed among parents from populations which vary according to the descriptive and injunctive norms surrounding the behavior of interest.

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Table 1

Demographic characteristics of sample (N = 467)

Demographic Characteristics	*n*	Percent
Gender		
Male	182	39
Female	285	61
Education		
Some high school but did not graduate	14	3.0
High school diploma/GED	95	20.3
Some college/2-year degree	193	41.3
4-year college graduate	112	24.0
More than 4-year college degree	53	11.3
Employment status		
Employed	281	60.2
Not employed	186	39.8
Marital status		
Married or cohabiting	385	82.4
Single	82	17.6
Race/ethnicity[2]		
White	394	84.4
Hispanic/Latino	66	14.1
African-American/Black	42	9
Asian American	18	3.9
Other	27	5.8
Age		
18–29	71	15.2
30–39	164	35.1
40–49	156	33.4
50 or older	76	16.3
Children (living at home)		
One	117	25.1
Two	186	39.8
Three	100	21.4
Four	51	10.9
Five or more	13	2.8
Child's gender (child aged 5–9)		
Male	246	52.7
Female	221	47.3
Child's age		
Five	105	22.5
Six	107	22.9
Seven	82	17.6

Demographic Characteristics	*n*	Percent
Eight	85	18.2
Nine	88	18.8
Child's birth order (child aged 5–9)		
Oldest or only child	167	35.8
A younger child with at least one older sibling	287	61.5
A twin or multiple	13	2.8
Child's health		
Fair	20	4.3
Good	155	33.2
Very good	292	62.5

[2]Participants could choose more than one race/ethnicity.

Table 2

Principal variables

Descriptive norms

Sun protection (n = 225)	Range = –3 to 3		Sun protection (n = 225)	n	%
M (SD)	0.81 (1.46)		Low	112	49.8
Median	1.00		High	113	50.2
Cronbach's Alpha.	0.89				
Nutrition (n = 242)	Range = –3 to 3		*Nutrition (n = 242)*	n	%
M (SD)	1.18 (1.14)		Low	119	49.2
Median	1.25		High	123	50.8
Cronbach's Alpha.	0.69				

Injunctive norms

Sun protection (n = 225)	Range = –3 to 3		Sun protection (n = 225)	n	%
M (SD)	1.04 (1.35)		Low	116	51.6
Median	1.00		High	109	48.4
Cronbach's Alpha.	0.86				
Nutrition (n = 242)	Range = –3 to 3		*Nutrition (n = 242)*	n	%
M (SD)	1.73 (1.19)		Low	129	53.3
Median	2.00		High	113	46.7
Cronbach's Alpha.	0.73				

Observability conditions | n | % |
Sun protection (n = 225):		
Observable	113	24.2
Not observable	112	24.0
Nutrition (n = 242):		
Observable	124	25.6
Not observable	118	25.2

Dependent variable (Behavioral intention)

Sun protection (n = 225)			Nutrition (n = 242)

Descriptive norms		**Descriptive norms**	
M (SD)	6.96 (1.91)	*M (SD)*	6.46 (1.54)
Median	7.0	Median	6.50
Cronbach's Alpha.	0.79	Cronbach's Alpha.	0.56
Range (Min – Max)	2.6–10.0	Range (Min – Max)	1.75–9.0

Table 3

Results of OLS regression predicting intention to protect one's child from exposure to the sun

Variable	B	SE
Parents' sun protection behavior	.61***	.08
Descriptive norms (sun protection)	.12	.10
Attitudes (sun protection)	.88***	.12
Observable behavioral scenario (Yes=1, No=0)	−.22	.16
Attitudes* Observable	−.23	.18
Descriptive norms * Observable	.28*	.13

Note. n = 225. R^2 =. 60.

*
p < .05.

**
p < .01.

***
p < .001.

Table 4

Results of OLS regression predicting intention to protect one's child from exposure to the sun

Variable	*B*	*SE*
Parents' sun protection behavior	.53***	.08
Injunctive norms (sun protection)	.42***	.10
Attitudes (sun protection)	.72***	.12
Observable behavioral scenario (Yes=1, No=0)	−.19	.15
Attitudes * Observable	−.24	.18
Injunctive norms * Observable	.19	.14

Note. $n = 225$. $R^2 = .65$.

*
 $p < .05$.

**
 $p < .01$.

***
 $p < .001$.

Table 5

Results of OLS regression predicting intention to serve one's child healthy food among parents

Variable	B	SE
Parents' own nutrition behavior	.22[**]	.07
Parent's race (White/Other)	−.40	.23
Descriptive norms (nutrition)	.47[***]	.11
Attitudes (nutrition)	.37[***]	.10
Observable behavioral scenario (Yes=1, No=0)	−.12	.15
Attitudes [*] Observable	.01	.14
Descriptive norms [*] Observable	.13	.15

Note. $n = 242$. $R^2 = .41$.

[*]
$p < .05$.

[**]
$p < .01$.

[***]
$p < .001$.

Table 6

Results of OLS regression predicting intention to serve one's child healthy food among parents

Variable	B	SE
Parents' own nutrition behavior	.21[**]	.07
Parent's race (White/Other)	−.70[**]	.24
Injunctive norms (nutrition)	.07	.11
Control beliefs (nutrition)	.31[*]	.15
Attitudes (nutrition)	.33[*]	.13
Observable behavioral scenario (Yes=1, No=0)	−.23	.17
Control beliefs [*] Observable	−.07	.21
Attitudes [*] Observable	.01	.18
Injunctive norms [*] Observable	.30[*]	.14

Note. $n = 242$. $R^2 = .34$.

[*]
$p < .05$.

[**]
$p < .01$.

[***]
$p < .001$.

Table 7

Means (observed) for Injunctive and Descriptive Norms for Observable/Not observable groups

	Observable *M (SD)*	Non-Observable *M (SD)*	*p*
Descriptive norms- sun protection (*n* = 225)	.76 (1.59)	.86 (1.32)	>.05
Injunctive norms - sun protection (*n* = 225)	.99 (1.48)	1.09 (1.21)	>.05
Descriptive norms – nutrition (*n* = 242)	1.48 (1.15)	1.50 (1.17)	>.05
Injunctive norms – nutrition (*n* = 242)	1.70 (1.21)	1.76 (1.17)	>.05

Note. N=467.