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How Do Perceived Descriptive Norms Influence Indoor Tanning Intentions? An Application of the Theory of Normative Social Behavior

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Abstract

Indoor tanning bed use is highly influenced by perceived norms about a tanned appearance. The theory of normative social behavior (TNSB) details the many ways in which norms can impact intentions and behavior, but has never been assessed in the context of indoor tanning. Considering this, we conducted a survey among female university students ($N = 274$) to determine the extent to which the TNSB predicted intentions to use indoor tanning beds. Overall, the path model predicted about 46% of the variance in intentions, and the majority of significant indirect effects were witnessed through the outcome expectation variables included in the TNSB, suggesting that these may be the most salient mechanisms – as predicted by the TNSB – through which norms can impact tanning intentions. In light of these results, theoretical and practical implications are discussed, and specific recommendations are given to extend the predictive utility of the TNSB in the context of indoor tanning.

Keywords

theory of normative social behavior; indoor tanning; norms

The theory of normative social behavior (TNSB; Rimal & Real, 2005) was developed to describe how perceived descriptive norms can influence behavior, as mediated and moderated by different types of cognitive mechanisms. Although initially tested in the context of drinking behavior, this framework can be utilized to study other types of behavior that are driven principally by norms. The current study seeks to extend research on the TNSB by examining the predictive ability of the model in a novel context, indoor tanning bed use. Indoor tanning behavior is highly motivated by normative perceptions, and as such represents a logical context in which to test the theoretical propositions of the TNSB.

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The use of tanning beds by adolescents and young adults has risen at alarming rates. Twenty nine percent of white female high school students and 13% of all students report using a tanning bed in the past year (Eaton, et al., 2012). Female indoor tanning prevalence rises dramatically during adolescence, increasing from 7% of 14 year olds to 15% of all 15 year olds, and then rising to 35% of 17 year olds (Geller et al., 2002). Troublingly, the popularity of indoor tanning has risen amid mounting evidence of the health consequences. Indoor tanning use can cause melanoma, the most deadly form of skin cancer, as well as basal and squamous cell carcinoma (Boniol, Autier, Boyle, & Gandani, 2012; Colantino, Bracken, & Beecker, 2014). Exposure to indoor tanning during adolescence and early adulthood unequivocally contributes to carcinogenesis, and some estimates suggest that frequenting indoor tanning salons before the age of 35 increases melanoma risk by 75% (Cust et al., 2011; Lazovich et al. 2010; Quinn et al., 2015; Zhang, Qureshi, Geller, Frazier, & Hunter, 2012).

The TNSB offers an ideal framework to predict indoor tanning intentions, as indoor tanning has long been recognized as a behavior that is strongly influenced by normative perceptions. To illustrate, indoor tanning intentions and behavior are motivated by socio-normative beliefs about friends' tanning behavior (Cafri et al., 2006; Hillhouse, Adler, Drinnon, & Turrisi, 1997; Hillhouse, Turrisi, Holwiski, & McVeigh, 1999; Hillhouse, Turrisi, & Shields, 2007), perceived social pressure to conform to a tanned cosmetic ideal (Broadstock, Borland, & Gason, 1992; Greene, Campo, & Banerjee, 2010), culturally-based perceptions equating a tanned appearance with attractiveness (Cafri et al., 2006; Greene & Brinn, 2003; Hillhouse et al., 1997; Hillhouse et al., 1999), and a normative desire to be tan like famous media personalities (Cafri et al., 2006). The current study will systematically assess the relationship between perceived indoor tanning norms and outcomes by testing the TNSB among college-aged, female indoor tanners. This study can add to the literature on the TNSB and indoor tanning more generally in at least three ways: (1) by assessing the theory in a novel context to determine the extent to which its propositions apply to behaviors other than college student drinking; (2) by using structural equation modeling (SEM) techniques to simultaneously assess all mediating and moderating relationships proposed by the theory in one model, which has yet to be done; and (3) by contributing to the literature on indoor tanning through the determination of mediational and moderational variables that may impact the relationship between perceived tanning norms and indoor tanning intentions.

Literature Review

The TNSB posits that the relationship between descriptive norms and behavior is influenced by three broad classifications of variables: injunctive norms, outcome expectations and group identity beliefs (Rimal & Real, 2005). While the overwhelming majority of interventional research to reduce indoor tanning has focused on appearance-based factors, a growing body of literature suggest that it is beneficial to account for additional motivations for indoor tanning, including normative influence (Cafri et al., 2006; Carcioppolo, Chudnovskaya, Gonzalez, & Stephan, 2014; Hillhouse et al., 1997; Hillhouse, Turrisi & Kastner, 2000; Turrisi, Hillhouse, & Gerbert, & Grimes, 1999). The following sections will describe each component of the TNSB and how they relate to indoor tanning, and in doing

so, propose hypotheses to specify how these constructs may influence indoor tanning intentions.

Descriptive Norms

Descriptive norms represent perceptions of behavioral prevalence (Cialdini, Reno, & Kallgren, 1990). Information about descriptive norms may be gathered by observing media depictions of a particular issue, observing peers, or by talking about the behavior with peers (Lapinski & Rimal, 2005). Perceived descriptive norms play an influential role in people's decisions to go indoor tanning. Davis and colleagues (2004) found that adolescent participants believe that many students their age use tanning beds. Others have found that adolescents' indoor tanning intentions and behavior increase as peer and friends' tanning increases (Bagdasarov, Banjeree, Greene, & Campo, 2008; Banjeree, Greene, Bagdasarov, & Campo, 2009; Keck & Bunton, 2007; Stapleton, Turrise, & Hillhouse, 2008). Additionally, people tan to comply with perceived societal norms for attractiveness. Adolescents frequently cite the desire to appear attractive as a motivation for tanning (Cafri et al., 2006; Hillhouse et al., 2000), suggesting a perceived social pressure to conform to ideal standards of beauty. In fact, the desire to appear attractive is a better predictor of indoor tanning attitudes than health motivation (Hillhouse et al., 2000). Consistent with the TNSB, as perceptions of indoor tanning prevalence increase, intentions of using indoor tanning beds should increase.

H1: Descriptive norms about indoor tanning will be positively related to indoor tanning intentions.

Injunctive Norms

Injunctive norms represent perceived social approval, or what ought to be done in a given situation, and may involve social sanctions for noncompliance with the norm (Cialdini et al., 1990). Perceptually, injunctive norms reflect the pressure that individuals feel to conform. The TNSB posits that injunctive norms have either a moderating or mediating effect on the relationship between descriptive norms and behavioral intentions (Rimal, 2008; Rimal & Real, 2005). Regarding moderation, if perceived social pressure to conform exists, the positive relationship between descriptive norms and behavior is magnified. Regarding mediation, Rimal (2008) proffers that perceptions of widespread prevalence of a behavior will lead individuals to perceive stronger pressure to comply, thus increasing behavioral intention. Results from college drinking studies support both relationships, finding a small but significant moderating effect for injunctive norms and support for mediational effects on alcohol consumption (Lapinski and Rimal, 2005; Rimal, 2008; Rimal & Real, 2005).

Considering indoor tanning, research including norms in the prediction of indoor tanning intention has largely taken a reasoned-action approach (Fishbein & Ajzen, 2011), by measuring subjective norms. While many consider subjective norms to be conceptually equivalent to injunctive norms (Lapinski & Rimal, 2005; Rimal, 2008), recent work suggests that they are distinct but similar concepts (Park, Klein, Smith, & Martell, 2009; Park & Smith, 2007). If these are conceptually distinct constructs, then this study can offer a unique contribution to the indoor tanning literature by exploring whether and how injunctive norms impact indoor tanning intentions.

In light of the predictions of the TNSB, injunctive norms may have a multiplicative effect of descriptive norms on outcomes: perhaps tanning intentions are highest when one perceives that referent others use tanning beds and that tanning is a socially acceptable behavior. It is also possible that injunctive norms play a mediational role, where perceptions of descriptive norms influence the extent to which people perceive indoor tanning as an acceptable behavior, which in turn influences tanning intentions. Considering these possibilities, the following hypotheses are advanced:

H2a: Injunctive norms will moderate the association between descriptive norms and indoor tanning intentions.

H2b: Injunctive norms will mediate the association between descriptive norms and indoor tanning intentions.

Outcome Expectations

Similarly, outcome expectations may exhibit a moderating and/or a mediating effect on the relationship between descriptive norms and intentions (Rimal, 2008). Outcome expectations refer to beliefs that one's actions will lead to desirable outcomes (Bandura, 1986). The TNSB posits that the relationship between descriptive norms and behavioral intention may be moderated and mediated by three specific outcome expectations: benefits to self, benefits to others, and anticipatory socialization (Rimal & Real, 2005). Benefits to self are conceptualized as positive consequences of engaging in a behavior (Rimal & Real, 2005). In the context of indoor tanning these may include any rewarding or beneficial aspects of tanning, such as looking more attractive or being in a better mood after tanning (Noar, Myrick, Morales-Pico, & Thomas, 2014). Benefits to others is conceptualized in the TNSB as benefits that others attain by enacting a behavior (Rimal & Real, 2005). Whereas individuals may think of self-related benefits as positive outcome expectations of engaging in a behavior, benefits to others can be thought of as opportunities missed, or a potential loss if the behavior is not enacted (Rimal & Real, 2005). In essence, even if one does not perceive many self-directed benefits of using indoor tanning beds, motivations to tan may still exist if others are perceived as benefitting from having a tanned appearance.

It stands to reason that the mediational and moderational roles predicted by the TNSB would extend to the context of indoor tanning. Regarding moderation, when perceived benefits of tanning to self and others is high, the relationship between descriptive norms and outcomes likely grows stronger. Rimal (2008) also postulates that outcome expectations can mediate the relationship between descriptive norms and behavioral intentions, providing evidence from alcohol and drug studies demonstrating a mediation effect. It makes intuitive sense that perceived benefits could also mediate the relationship between descriptive norms and tanning intentions; as perceptions of descriptive norms increase, it is likely that one would perceive increased benefits to self and others for adopting the normative behavior, which in turn would increase tanning intentions.

Anticipatory socialization is the belief that enacting a behavior can facilitate and enhance social interactions (Borsari & Carey, 1999). Indoor tanning is often perceived as a social behavior (Hillhouse et al., 2007), which can increase perceptions of anticipatory socialization. In fact, teenagers and young adults report that they are motivated to indoor tan

to increase social interaction with friends (Poorsattar & Hornung, 2007). A moderating effect would be present if the relationship between descriptive norms and intent to indoor tan is strongest in those who perceived high levels of anticipatory socialization. When people perceive high anticipatory socialization associated with using tanning beds, their perceptions of others' tanning behavior may be more likely to inform their own decisions regarding indoor tanning. Alternatively, high prevalence levels of peer indoor tanning could lead to increased expectations of peer socialization associated with indoor tanning, which could then lead to higher intentions to indoor tan. Considering the moderating and mediating influence of outcome expectations witnessed in previous TNSB studies, and the relevance of these outcome expectations in the context of indoor tanning, the following hypotheses are proposed:

H3a: Outcome expectation constructs (benefits to self, benefits to others, anticipatory socialization) will moderate the association between descriptive norms and indoor tanning intentions.

H3b: Outcome expectations constructs (benefits to self, benefits to others, anticipatory socialization) will mediate the association between descriptive norms and indoor tanning intentions.

Group Identity

According to the TNSB, group identity constructs should moderate the relationship between descriptive norms and behavioral intention. Group identity pertains to feelings of affinity with one's social group and the desire to be connected to that group (Rimal & Real, 2005). In the absence of group affinity there is no reason to expect group identity to affect behavioral choices (Rimal, 2008). Group identity has been operationalized in two ways: aspiration, or the extent to which a person seeks to emulate referent others, and similarity, the extent to which an individual perceives a lack of psychological distance from others (Rimal & Real, 2005). Group identity is grounded in the social identity perspective (Tajfel, 1981), which contends that individuals develop some parts of their self-concept from communicating with salient social groups and subsequent self-categorization into those groups (Lapinski & Rimal, 2005). Stapleton and colleagues (2008) found that adolescents who identified with the "popular crowd" were significantly more likely to have positive attitudes towards tanning and reported the highest tanning intentions and behaviors. Thus, in line with the TNSB, we predict that tanning intentions will be highest when participants strive to emulate the behavior of salient or similar others, and there is a strong perception of behavioral prevalence. Thus, the following hypothesis is advanced:

H4: Group identity constructs (aspiration, perceived similarity) will moderate the association between descriptive norms and indoor tanning intentions

Method

Participants and Procedure

The sample consisted of 274 female undergraduate students from a large, Midwestern university who had used indoor tanning facilities at least one time in the past 12 months. This sample is appropriate for a study on indoor tanning behavior, as skin cancer incidence

due to indoor tanning is a growing concern in the U.S., particularly among young people (ages 15–24) and in the Midwest (Palmer, Mayer, Woodruff, Eckhardt, & Sallis, 2002). Only females were chosen to participate in this study, as previous research has demonstrated that younger females (ages 15–29) are markedly more likely to use indoor tanning beds and also more likely to develop skin cancer, particularly malignant melanoma, than men (Herzog, 2005; Swerdlow & Weinstock, 1998). Participants' average age was 20.69 ($SD = 1.56$) and the majority of the sample was Caucasian (87.6%) and used indoor tanning beds on average 22.19 times ($SD = 40.65$) in the past year. A cross-sectional survey was developed to measure relevant demographics, tanning behavior, TNSB constructs, and indoor tanning intentions. All participants completed the survey online and received extra credit for their participation.

Measures

Unless otherwise noted, all variables were measured on 5-point Likert-type scales ranging from “strongly disagree” to “strongly agree.” *Skin type* was assessed as a covariate on the outcome variable, intentions to use indoor tanning beds. Skin type was measured using Fitzpatrick's (1975) skin type measure containing four options: “1) always burn, unable to tan, 2) often burn, but can tan if I work at it, 3) occasionally burn, but then tan easily, 4) never burn, tan easily.” *Descriptive Norms* measured participants' perceptions of a typical female student's tanning habits, containing modified items from Rimal and Real's (2005) measures of descriptive drinking norms, and items developed by Hillhouse and colleagues (2007). Three items were used to measure descriptive norms. Examples of items include: “most female college students use indoor tanning beds” and “most popular female college students use indoor tanning beds.” Reliability for this variable was acceptable ($\alpha = .77$). *Injunctive Norms* measured participants' perceptions of relevant others' approval regarding indoor tanning. Four items were used to measure injunctive norms that were modified from Rimal and Real's (2005) measure of injunctive norms and alcohol consumption. Examples of items include: “society in general considers indoor tanning an acceptable behavior” and “most [university name] students in general consider indoor tanning acceptable.” Reliability for this construct was acceptable ($\alpha = .82$). *Benefits to Self* represents participants' perceptions of the personal benefits of indoor tanning. The four items used to measure this construct were modified from Rimal and Real (2005). The items are: using indoor tanning beds is rewarding/pleasurable/enjoyable/fun.” Reliability for this construct was acceptable ($\alpha = .94$). *Benefits to Others* measures participants' perceptions of the benefits of indoor tanning to other people. The four items used to measure this construct were modified from Rimal and Real (2005). The items include: “for most people, using indoor tanning beds is rewarding/pleasurable/enjoyable/fun.” Reliability for this construct was acceptable ($\alpha = .90$). *Anticipatory Socialization* assesses the degree to which people think indoor tanning is an integral part of the social experience. Four items were used to measure this construct. Examples of items include: “I often go tanning with my friends” and “when my friends decide to go tanning, I go along.” Reliability for this construct was acceptable ($\alpha = .93$). *Aspiration* measures the extent to which one emulates the behavior of others. This was measured using the media subscale from Cafri and colleagues (2006) PARTS scale. Six items were used to measure aspiration. Examples include: “I wish I had a tan like the people I see in magazines” and “I would like my skin tone to be darker, like a celebrity.” Reliability

for this construct was acceptable ($\alpha = .97$). *Perceived Similarity* assesses how similar participants felt to other [university name] students. The four items used to measure perceived similarity were taken from Rimal and Real (2005). Examples of items include: “how similar do you think most [university name] students are to you in the way they think” and “how similar do you think most [university name] students are to you in their behaviors.” Reliability for this construct was acceptable ($\alpha = .79$). Finally, four items were used to measure *intentions* to use indoor tanning beds. The items selected are from a previous study on indoor tanning intentions (Hillhouse & Turrissi, 2002). Examples of items include: “I intend to use indoor tanning facilities within the next year” and “I intend to maintain a tan all year-round through indoor tanning.” Reliability for this construct was acceptable ($\alpha = .92$).

Results

Overview of Analyses

See Table 1 for all descriptive statistics for this study. The proposed model was evaluated through SEM with maximum likelihood estimation. Preliminary examination revealed that all assumptions of SEM (e.g., linearity, multivariate normality, homoscedacity) were met. Model fit was assessed using Hu & Bentler's (1999) recommendations specifying cut off values close to .95 for CFI/TLI, .09 for SRMR, and .06 for RMSEA.

The model hypothesized that the relationship between the exogenous variable (i.e., descriptive norms) and the endogenous variable (i.e., indoor tanning intention) is mediated by injunctive norms and outcome expectations (i.e., benefits to self, benefits to others, anticipatory socialization), and moderated by injunctive norms, outcome expectations, and group identity (i.e., perceived similarity, aspiration). The two-step procedure (Anderson & Gerbing, 1988; Kline, 2005) was followed: the measurement model was first assessed through confirmatory factor analysis (CFA), and then the structural model was analyzed to examine the relationships among the latent variables. Analyses were conducted in Mplus 7.0.

Measurement Model

The measurement model demonstrated reasonable model fit: $\chi^2 (467) = 1,145.06$, $p < .001$, χ^2/df ratio = 2.45; CFI = .93, TLI = .92, RMSEA = .07 (90% CI: .068, .078), SRMR = .06. Although these fit statistics do not meet the criteria for excellent fit proposed by Hu and Bentler (1999), these researchers note that model fit should not be constrained by strict cutoffs, as “each index does not work equally well with various conditions,” (p.27) and recommend accepting values that are close to these proposed cut-off values, as they likely represent an acceptable balance of Type I and Type II error rates concerning model fit.

Structural Model

After the measurement model was specified, the structural model including all hypothesized relationships was estimated. All predictor variables were mean-centered according to Aiken and West's (1991) recommendations. The hypothesized model fit the data reasonably well, $\chi^2 (80) = 203.50$, $p < .001$, χ^2/df ratio = 2.54; CFI = .93, TLI = .90, RMSEA = .08 (90%

CI: .063, .088), SRMR = .07. Figure 1 shows the relationships between the latent constructs. Overall, the model explained 46.0% of the variance in indoor tanning intentions. The standardized regression coefficient (beta) is reported for all hypothesis tests.

Hypotheses Testing

H1, that descriptive norms would predict indoor tanning intentions, was supported ($\beta = .15$, $p = .01$). H2 posited that injunctive norms will moderate (H2a) and mediate (H2b) the association between descriptive norms and indoor tanning intentions. The interaction effect of descriptive norms and injunctive norms was not significant ($\beta = .02$, $p = .78$), yielding no support for H2a. To test the indirect effect hypothesized in H2b, bootstrapping procedures using 1,000 resamples with replacement were utilized to estimate bias-corrected 95% confidence intervals (MacKinnon, Lockwood, & Williams, 2004). The results show that the indirect effect of descriptive norms on intentions through injunctive norms was not statistically significant ($\beta = -.01$; 95% CI: $-.042$, $.032$). Therefore, H2b was not supported.

H3 postulated that outcome expectations (i.e., benefits to self, benefits to others, anticipatory socialization) both moderate and mediate the relationship between descriptive norms and indoor tanning intentions. Only benefits to others ($\beta = -.24$, $p < .05$) was a significant moderator, whereas the moderating effects of benefits to self ($\beta = .08$, $p = .24$) and anticipatory socialization ($\beta = .01$, $p = .92$) were not significant. The relationship between descriptive norms and intentions was strongest when perceived benefits to others were low (see Figure 2). Therefore, H3a was partially supported. Regarding the mediating effect, the indirect effects through benefits to self ($\beta = .12$; 95% CI: $.053$, $.19$) and anticipatory socialization ($\beta = .10$; 95% CI: $.04$, $.14$) were significant, but the indirect effect through benefits to others was not ($\beta = -.04$; 95% CI: $-.09$, $.02$). Thus, H3b was partially supported.

The moderational effect proposed in H4, that the relationship between descriptive norms and intentions would be moderated by group identity constructs (perceived similarity and aspiration), was partially supported. While no support was found for perceived similarity as a moderator ($\beta = -.08$, $p = .14$), there was a marginally significant interaction effect between descriptive norms and aspiration on intentions ($\beta = .10$, $p = .07$). This interaction was probed using Hayes' MODPROBE custom dialog for SPSS, allowing researchers to test the significance of the interaction at three levels of the moderating variable: $-1SD$, the mean, and $+1SD$ (Hayes & Matthes, 2009). All other study variables and interaction terms were entered as covariates in this analysis. Results revealed that the relationship between descriptive norms and indoor tanning intentions was highest at $+1SD$ of aspiration ($b = .39$; $SE = .19$; $p = .04$). Generally, when aspirations to tan like celebrities were high, there was a stronger relationship between perceived descriptive norms and indoor tanning intentions (see Figure 3).

Discussion

The current study was conducted to assess the predictive capacity of the TNSB in a novel framework, indoor tanning bed intentions among female tanners. In total, the model explained about 46% of the variance in indoor tanning intentions, highlighting the versatility and predictive power of the TNSB framework. However, the effects on intentions tended to

be modest and the majority of variance in intentions was accounted for by the direct effect of three variables: anticipatory socialization, benefits to self, and perceptions of the descriptive norm. Considering extant literature on indoor tanning this is not surprising, as research suggests that attractiveness motivations and normative perceptions are the two largest predictors of indoor tanning (Hillhouse, Turrisi, Stapleton, & Robinson, 2008).

There were also several significant indirect effects, providing partial support for using the TNSB in the context of indoor tanning. First, perceived benefits to self and anticipatory socialization both mediated the relationship between descriptive norms and indoor tanning intentions. Higher perceptions of descriptive tanning norms were associated with increased perceptions of benefits and anticipatory socialization, resulting in increased tanning intentions. However, neither of these variables functioned as moderators of the effect of descriptive norms on intentions, which conflicts with previous tests of the TNSB. Perhaps one reason to describe why the current results conflict with previous findings may be due to the type of analysis used in the current study. This study is unique in research using the TNSB in that SEM was used to test all mediating and moderating relationships at once, determining how model predictions function when controlling for all other variables and relationships proposed by the model. Previous tests of the TNSB were generally conducted using stepwise regression analyses, using multiple models to evaluate one interaction between descriptive norms and a proposed intermediary variable at a time to avoid potential multicollinearity when assessing interactions with descriptive norms. This study adds to our theoretical understanding of norms by testing all TNSB propositions simultaneously.

There was a significant moderating effect witnessed concerning benefits to others, but in the opposite of the expected direction. Curiously, the highest intentions to use indoor tanning beds were witnessed when descriptive norms were high and perceived benefits to others was low. A similar pattern of results was witnessed in Rimal and Real's (2005) test of the TNSB, where they found that when controlling for benefits to self, the relationship between benefits to others and drinking intentions was negative. The authors proposed that those "who intend to consume alcohol believe that the benefit they derive from this activity is not shared by others, and that they have a special access to benefits unknown to others" (Rimal & Real, 2005; p. 406). This relationship may be explained through both optimistic bias and cognitive dissonance theory (CDT). For instance, Rimal and Real (2005) suggest that optimistic bias – the propensity to view oneself as less vulnerable to risks than others (Weinstein, 1989) – may explain how perceived benefits to self can increase drinking intentions whereas perceived benefits to others decreases intentions. People are more likely to believe that harmful outcomes associated with binge drinking can affect others but are less likely to affect oneself (Rimal & Real, 2005). Like binge drinking behavior, indoor tanning represents a clear health threat. Perhaps people believe that the harmful outcomes of indoor tanning (skin cancer, skin aging, and wrinkling) are likely to happen to others but are not applicable to themselves. Similarly, these results may be explained through CDT, or perceived inconsistency between attitudes and actions (Festinger, 1957). People who use tanning beds seem to be generally aware of the relationship between tanning and skin cancer (Carciooppolo et al., 2014), which may lead them to perceive scant benefits to others' use of tanning beds. In this regard, tanners may hold dissonant cognitions; they perceive strong attractiveness and normative self-related benefits to using tanning beds, but also realize

potential the negative health consequences of tanning for others. In summary, CDT and optimistic bias help to explain the complex nature of enacting behaviors that yield both social benefits and health consequences.

These results also have implications for the TNSB more broadly outside of the context of indoor tanning, providing evidence for including a measure of benefits to others in the model. In previous TNSB research, benefits to others is sometimes included (Rimal & Real, 2005) and sometimes dropped from the model (Rimal, 2008; Rimal & Real, 2007). Considering the results of this analysis as well as those from Rimal & Real (2005) who found a negative relationship between benefits to others and drinking behavior, it appears as if benefits to others may be an important construct to consider when assessing normative behaviors that are threatening to one's health.

Contrary to predictions of the TNSB, there were no mediating or moderating effects of injunctive norms. Indeed, there was not even a significant relationship witnessed between injunctive norms and intentions. Although there was a significant bivariate correlation between injunctive norms and indoor tanning intentions, when all other predictors were included in the model that relationship became non-significant. This suggests that indoor tanning behavior may be guided more by descriptive normative perceptions than injunctive normative perceptions. This is an important finding for indoor tanning research, which has fairly extensively explore the relationship between subjective norms and indoor tanning outcomes, whereas descriptive norms have been studied less often. As such, the present results suggest that future research attend to the relationship between descriptive norms and outcomes.

Another possible explanation of the lack of either a direct or indirect effect of injunctive norms on outcomes can be attributed to the influence of behavioral privacy. Behavioral privacy concerns whether a behavior is performed in a public or private setting, which may function as a moderator of normative influence (Cialdini et al., 1990; Lapinski & Rimal, 2005). Indoor tanning is largely performed in a private setting (although the outcomes of indoor tanning may be known to observant others), enacted individually or with a small group of friends. This stands in stark contrast to other normative behaviors, such as drinking alcohol, where a large group of friends and acquaintances can observe someone publicly enacting the normative behavior. Lapinski and Rimal (2005) state that if the act or outcomes of enacting a behavior are not publicly known, then injunctive norms will likely not influence behavior. Further, Lapinski and colleagues (2013) contend that an interaction between norms and behavioral privacy may only be present when the behavior in question is socially undesirable. Indoor tanning is largely a private behavior, and one that can be perceived as a source of shame (Hunt, Auguston, Rutten, Moser, & Yaroach, 2012). This finding has implications for the TNSB generally, as it provides additional support for considering behavioral privacy when using the TNSB to study normative behaviors that are normally conducted privately, such as indoor tanning.

Among group identity constructs, only aspiration served to moderate the relationship between descriptive norms and indoor tanning intentions. In brief, tanning intentions were highest when both descriptive norms and aspirations to be tan like celebrities were both

high. This result adds to theoretical research on indoor tanning, demonstrating a multiplicative relationship between appearance-based motivations and normative motivations, the two greatest contributors to indoor tanning (Hillhouse et al., 2008). Theoretically, it appears appropriate that support would be found for aspiration as a moderator but not perceived similarity. Similarity was measured using the original TNSB measure, which was developed to assess the extent to which people believed they were similar to other college students (Rimal & Real, 2005). This measure appears appropriate for college drinking studies, but may not extend to indoor tanning, as fewer students use indoor tanning beds compared to alcohol. Thus collegiate indoor tanners may feel less similar to other college students in comparison to the levels of similarity that collegiate drinkers may feel with other students. Perhaps future work in this area should explore the extent to which people feel similar to other indoor tanning bed users.

Implications for Health Interventions

To date, the most effective interventions targeting indoor tanners have focused explicitly on attractiveness motivations, using UV photography to show how UV exposure is damaging and wrinkling skin, which conflicts with motivations to use tanning to look more attractive (Gibbons, Gerrard, Lane, Mahler, & Kulik, 2005). However this study demonstrates the mechanisms through which descriptive norms can impact tanning intentions. Future research in this area should explore the utility of using a normative appeal to reduce indoor tanning. Research on social norms marketing and binge drinking highlights that people often overestimate the prevailing drinking descriptive norm (DeJong et al., 2003). It may be likely that indoor tanners also overestimate the frequency in which others use indoor tanning beds. If this is the case, perhaps future research should focus on conducting social norms marketing campaigns to that correct perceptions of the descriptive norm, which may reduce tanning intentions and behavior.

Relatedly, Hillhouse and colleagues (2007) conducted a cluster analysis providing evidence for qualitatively different types of indoor tanners, some of whom are more influenced by normative motivations than others. In particular, this research suggests that mixed tanners (those who tan regularly in certain seasons and tan for special events during the off-season) report the highest perceptions of descriptive norms, whereas regular tanners (those who tend to use indoor tanning beds all year) report the highest perceptions of injunctive norms (Hillhouse et al., 2007). Intervention and campaign researchers could use this information to inform message development strategies for these types of tanners. For instance, if mixed tanners have the highest perceptions of descriptive norms about tanning, perhaps that group can benefit most from an intervention strategy that targets normative perceptions.

Limitations & Future Research

One potential limitation of the current study was that only indoor tanners were enrolled. Previous studies using the TNSB did not include only students who drank alcohol in their samples. Perhaps the predictive power of the model could be expanded in the context of tanning if this sample included non-indoor tanners as well. Another possible limitation of the present study is that it was only conducted among females in the Midwest U.S., thus may not generalize to all indoor tanners.

Future research using the TNSB, and norms generally, should focus on identifying whether injunctive norms function as mediators or moderators of descriptive norms on outcomes. Rimal (2008) suggests that this could be either a mediating or moderating relationship. While it may be difficult to assess causality in this situation, doing so could help solidify predictions of the TNSB. Future research should be done to extend the TNSB framework to determine specific mediating and moderating constructs in the context of indoor tanning. As an example, one appearance-based factor that is strongly related to indoor tanning is perceptions of skin aging (Cafri, et al., 2006). Generally, as people believe that tanning can prematurely age and wrinkle their skin, they are less likely to use indoor tanning beds. Perhaps this construct can be added as an outcome expectation moderator to the TNSB framework to expand its predictive utility. Future work should also explore using normative measures that are more salient to indoor tanners. For instance, the current study operationalized descriptive and injunctive norms as perceptions of distal referents' behavior and approval, however much communication research suggests that the motivation to comply with normative perceptions increases in response to more proximal referents.

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References

- Aiken, L.S., West, S.G. Multiple regression: Testing and interpreting interactions. Newbury Park, CA: Sage; 1991.
- Anderson JC, Gerbing DW. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*. 1988; 103:411–423.
- Bagdasarov Z, Banerjee S, Greene K, Campo S. Indoor tanning and problem behavior. *Journal of American College Health*. 2008; 56:555–561. [PubMed: 18400668]
- Bandura, A. Social foundations of thought and action. Englewood Cliffs, NJ: Prentice Hall; 1986.
- Banerjee SC, Greene K, Bagdasarov Z, Campo S. 'My friends love to tan': Examining sensation seeking and the mediating role of association with friends who use tanning beds on tanning bed use intentions. *Health Education Research*. 2009; 24:989–998. [PubMed: 19574406]
- Boniol M, Autier P, Boyle P, Gandini S. Cutaneous melanoma attributable to sunbed use: Systematic review and meta-analysis. *BMJ*. 2012; 345:e4757. [PubMed: 22833605]
- Borsari BE, Carey KB. Understanding fraternity drinking: Five recurring themes in the literature, 1980–1998. *Journal of American College Health*. 1999; 48:3037.
- Broadstock M, Borland R, Gason R. Effects of suntan on judgements of healthiness and attractiveness by adolescents. *Journal of Applied Social Psychology*. 1992; 22:157–172.
- Cafri G, Thompson JK, Roehrig M, van den Berg P, Jacobsen PB, Stark S. An investigation of appearance motives for tanning: The development and evaluation of the Physical Appearance Reasons For Tanning Scale (PARTS) and its relation to sunbathing and indoor tanning intentions. *Body Image*. 2006; 3:199–209. [PubMed: 18089223]
- Carcioppolo N, Chudnovskaya EV, Martinez Gonzalez A, Stephan T. In-group rationalizations of risk and indoor tanning: A textual analysis of an online forum. *Public Understanding of Science*. 2014 (early view).

- Cialdini RB, Reno RR, Kallgren CA. A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*. 1990; 58:1015–1026.
- Colantonio S, Bracken MB, Beecker J. The association of indoor tanning and melanoma in adults: Systematic review and meta-analysis. *Journal of the American Academy of Dermatology*. 2014; 70:847–857. [PubMed: 24629998]
- Cust AE, Armstrong BK, Goumas C, Jenkins MA, Schmid H, Hopper JL, Mann GJ. Sunbed use during adolescence and early adulthood is associated with increased risk of early-onset melanoma. *International Journal of Cancer*. 2011; 28:2425–2435.
- Davis, A., Peterson, JA., Short, MJ., Skinner, M. Youth attitudes on the use of tanning beds: A report on the results of focus groups with high school students in the KFL&A Health Unit area. 2004. Retrieved from: http://www.kflapublichealth.ca/Files/Reports/Youth_attitudes_on_the_use_of_tanning_beds-2004.pdf
- DeJong W, Schneider SK, Towvim LG, Murphy MJ, Doerr EE, Simonsen NR, Scribner RA. A multisite randomized trial of social norms marketing campaigns to reduce college student drinking: a replication failure. *Substance Abuse*. 2003; 30:127–140.
- Eaton DK, Kann L, Kinchen S, Shanklin S, Flint KH, Hawkins J, Wechsler H. Youth risk behavior surveillance - United States, 2011 Morbidity and mortality weekly report. *Surveillance summaries* (Washington, DC). 2012; 61(4):1–162.
- Festinger, L. A theory of cognitive dissonance. Stanford, CA: Stanford University Press; 1957.
- Fishbein, M., Ajzen, I. Predicting and changing behavior: The reasoned action approach. Taylor & Francis; 2011.
- Fitzpatrick TB. Soleil et peau. *Journal of Medical Esthetics*. 1975; 2:33–34.
- Geller AC, Colditz G, Oliveira S, Emmons K, Jorgensen C, Aweh GN, Frzaier AL. Use of sunscreen, sunburning rates, and tanning bed use among more than 10,000 US children and adolescents. *Pediatrics*. 2002; 109:1009–1014. [PubMed: 12042536]
- Gibbons FX, Gerrard M, Lane DJ, Mahler HIM, Kulik JA. Using UV photography to reduce use of tanning booths: A test of cognitive mediation. *Health Psychology*. 2005; 24:358–363. [PubMed: 16045371]
- Greene K, Brinn LS. Messages influencing college women's tanning bed use: Statistical versus narrative evidence format and a self-assessment to increase perceived susceptibility. *Journal of Health Communication*. 2003; 8:443–461. [PubMed: 14530147]
- Greene K, Campo S, Banerjee S. Comparing normative, anecdotal, and statistical risk evidence to discourage tanning bed use. *Communication Quarterly*. 2010; 58:111–132.
- Hayes A, Matthes J. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods*. 2009; 41:924–936. [PubMed: 19587209]
- Herzog CE. Overview of sarcomas in the adolescent and young adult population. *Journal of Pediatric Hematology/Oncology*. 2005; 27:215–218. [PubMed: 15838394]
- Hillhouse J, Adler C, Drinnon J, Turrisi R. Application of Azjen's theory of planned behavior to predict sunbathing, tanning salon use, and sunscreen use intentions and behaviors. *Journal of Behavioral Medicine*. 1997; 20:365–378. [PubMed: 9298435]
- Hillhouse J, Turrisi R. Examination of the efficacy of an appearance-focused intervention to reduce UV exposure. *Journal of Behavioral Medicine*. 2002; 25:395–409. [PubMed: 12136499]
- Hillhouse J, Turrisi R, Holwiski F, McVeigh S. An examination of psychological variables relevant to artificial tanning tendencies. *Journal of Health Psychology*. 1999; 4:507–516. [PubMed: 22021643]
- Hillhouse JJ, Turrisi R, Kastner M. Modeling tanning salon behavioral tendencies using appearance motivation, self-monitoring and the theory of planned behavior. *Health Education Research*. 2000; 15:405–414. [PubMed: 11066458]
- Hillhouse J, Turrisi R, Shields AL. Patterns of indoor tanning use: Implications for clinical interventions. *Archives of Dermatology*. 2007; 143:1530–1535. [PubMed: 18087003]
- Hillhouse J, Turrisi R, Stapleton J, Robinson J. A randomized controlled trial of an appearance-focused intervention to prevent skin cancer. *Cancer*. 2008; 113:3257–3266. [PubMed: 18937268]

- Hu L, Bentler PM. Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*. 1999; 3:424–453.
- Hunt, Y., Augustson, E., Rutten, L., Moser, R., Yaroch, A. History and culture of tanning in the United States. In: Heckman, CJ., Manne, SL., editors. *Shedding Light on Indoor Tanning*. New York: Springer; 2012.
- Keck, SA., Bunton, P. From the Proceedings of the 3rd Annual GRASP Symposium. Wichita State University; 2007. Does the awareness of the health risks from tanning differ in an 18–30 year-old age group compared to a 31–55 year-old age group?. 2007
- Kline, RB. Principles and practice of structural equation modeling. 2nd. New York: Guilford Press; 2005.
- Lapinski MK, Rimal RN. An explication of social norms. *Communication Theory*. 2005; 15:127–147.
- Lapinski MK, Maloney EK, Braz M, Shulman HC. Testing the effects of social norms and behavioral privacy on hand washing: A field experiment. *Human Communication Research*. 2013; 39:21–46.
- Lazovich D, Vogel RI, Berwick M, Weinstock MA, Anderson KE, Warshaw EM. Indoor tanning and risk of melanoma: a case-control study in a highly exposed population. *Cancer Epidemiology, Biomarkers & Prevention*. 2010; 19:1557–1568.
- MacKinnon DP, Lockwood CM, Williams J. Confidence limits for the indirect effects: Distribution of the product and resampling methods. *Multivariate Behavioral Research*. 2004; 39:99–128. [PubMed: 20157642]
- Noar SM, Myrick J, Morales-Pico B, Thomas NE. Development and validation of the comprehensive indoor tanning expectations scale. *JAMA Dermatology*. 2014; 150:512–521. [PubMed: 24500373]
- Palmer R, Mayer J, Woodruff S, Eckhardt L, Sallis J. Indoor tanning facility density in eighty U.S. cities. *Journal of Community Health*. 2002; 27:191–202. [PubMed: 12027269]
- Park HS, Klein KA, Smith S, Martell D. Separating subjective norms, university descriptive and injunctive norms, and U.S. descriptive and injunctive norms for drinking behavior intentions. *Health Communication*. 2009; 24:746–751. [PubMed: 20183383]
- Park HS, Smith SW. Distinctiveness and influence of subjective norms, personal descriptive and injunctive norms, and societal descriptive and injunctive norms on behavioral intent: A case of two behaviors critical to organ donation. *Human Communication Research*. 2007; 33:194–218.
- Poorsattar SP, Hornung RL. UV light abuse and high-risk tanning behavior among undergraduate college students. *Journal of the American Academy of Dermatology*. 2007; 56:375–379. [PubMed: 17257709]
- Quinn M, Alamian A, Hillhouse J, Scott C, Turrisi, Baker K. Prevalence and correlates of indoor tanning and sunless tanning product use among female teens in the United States. *Preventive Medicine Reports*. 2015; 2:40–43. [PubMed: 25621199]
- Real K, Rimal RN. Friends talk to friends about drinking: Exploring the role of peer communication in the theory of normative social behavior. *Health Communication*. 2007; 22:169–180. [PubMed: 17668996]
- Rimal R. Modeling the relationship between descriptive norms and behaviors: A test and extension of the theory of normative social behavior (TNSB). *Health Communication*. 2008; 23:103–116. [PubMed: 18443998]
- Rimal RN, Real K. How behaviors are influenced by perceived norms. *Communication Research*. 2005; 32:389–414.
- Stapleton J, Turrisi R, Hillhouse J. Peer crowd identification and indoor artificial UV tanning behavioral tendencies. *Journal of Health Psychology*. 2008; 13:940–945. [PubMed: 18809645]
- Swerdlow AJ, Weinstock MA. Do tanning lamps cause melanoma? An epidemiologic assessment. *Journal of the American Academy of Dermatology*. 1998; 38:89–98. [PubMed: 9448211]
- Tajfel, H. Social stereotypes and social groups. In: Turner, JC., Giles, H., editors. *Intergroup behavior*. Oxford, UK: Blackwell; 1981. p. 144–167.
- Turrisi R, Hillhouse J, Gebert C, Grimes J. Examination of cognitive variables relevant to sunscreen use. *Journal of Behavioral Medicine*. 1999; 22:493–509. [PubMed: 10586383]
- Weinstein N. Optimistic biases about personal risks. *Science*. 1989; 246:1232–1233. [PubMed: 2686031]

Zhang M, Qureshi AA, Geller AC, Frazier L, Hunter DJ, Han J. Use of tanning beds and incidence of skin cancer. *Journal of Clinical Oncology*. 2012; 30:1588–1593. [PubMed: 22370316]

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Figure 1.

Structural Equation Model Depicting the Relationship between TNSB Constructs and Intentions to Use Indoor Tanning Beds.

Note. Coefficients are standardized and only displayed for significant results. Insignificant paths are represented by a dashed line. Direct paths for similarity and aspiration were included in the structural model but are not shown here to simplify the illustration, both were non-significant. † $p < .10$, * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 2. Probe of the moderating effect of aspiration on the relationship between descriptive norms and indoor tanning intentions. Moderating effect is probed at $+1/-1$ *SD* from the sample mean, controlling for all other study variables.

Figure 3. Probe of the moderating effect of aspiration on the relationship between descriptive norms and indoor tanning intentions. Moderating effect is probed at ± 1 SD from the sample mean, controlling for all other study variables.

Table 1

Descriptive Statistics and Pearson's Correlations for All Study Variables

Variable	α	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Descriptive Norm	.77	3.59	0.85	--							
2. Injunctive Norm	.82	3.38	0.75	.42**	--						
3. Benefit to Oneself	.94	3.05	1.18	.41**	.44**	--					
4. Benefit to Others	.90	3.58	0.77	.43**	.43**	.56**	--				
5. Anticipatory Socialization	.93	2.35	1.24	.47**	.30**	.56**	.27**	--			
6. Similarity	.79	3.05	0.71	.33**	.22**	.31**	.21**	.42**	--		
7. Aspiration	.97	2.81	1.30	.39**	.21**	.39**	.18**	.34**	.21**	--	
8. Tanning Intentions	.92	2.55	1.36	.51**	.43**	.61**	.32**	.65**	.37**	.38**	--

Note. Responses to all measures on 5-point scales.* $p < .05$.** $p < .01$.