

Original Investigation

Development and Validation of the Comprehensive Indoor Tanning Expectations Scale

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IMPORTANCE Strong links between indoor tanning behavior and skin cancer have been demonstrated across several studies. Understanding the complex belief systems that underlie indoor tanning in young women is a crucial first step in developing interventions to deter this behavior.

OBJECTIVES To develop and validate a comprehensive, multidimensional, theory-based outcome expectations measure to advance an understanding of the sets of beliefs that underlie indoor tanning behavior among young women.


DESIGN, SETTING, AND PARTICIPANTS Cross-sectional study comprising a web-based survey of 11 sororities at a large university in the southeastern United States. Study participants ($n = 706$) were aged 18 to 25 years; 45.3% had tanned indoors in their lifetime and 30.3% in the past year.

MAIN OUTCOMES AND MEASURES Intention to tan indoors, frequency of indoor tanning behavior in the past year, and indoor tanner type (nontanner, former tanner, or current tanner).

RESULTS A comprehensive scale assessing indoor tanning outcome expectations was developed. In total, 6 positive outcome expectations factors and 5 negative outcome expectations factors were identified. These subscales were reliable (coefficient α range, 0.86-0.95) and were significantly (mostly at $P < .001$) correlated with a set of established measures, including appearance motivation, indoor tanning attitudes and norms, and intention to tan indoors. Examination of subscales across the 3 indoor tanning groups also revealed significant ($P < .001$) differences on all 11 subscales. Current tanners had the most positive and least negative perceptions about indoor tanning, while nontanners had the most negative and least positive perceptions. Former tanners tended to fall in between these 2 groups. The 2 subscales with the largest differences across the groups were mood enhancement (positive outcome expectation) and psychological/physical discomfort (negative outcome expectation). Multiple linear regression analyses demonstrated several outcome expectations subscales to be significantly associated with intention to tan indoors and frequency of indoor tanning behavior.

CONCLUSIONS AND RELEVANCE Results suggest that the Comprehensive Indoor Tanning Expectations (CITE) Scale provides a reliable and valid assessment of the complex sets of beliefs that underlie indoor tanning, including positive (motivational) and negative (deterrent) beliefs. This new scale may further advance research on indoor tanning beliefs and can guide health communications to prevent and deter indoor tanning behavior.

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Systematic reviews and meta-analyses have reported a relationship between indoor tanning and incidence of cutaneous melanoma,^{1,2} basal cell carcinoma,³ and squamous cell carcinoma.³ The evidence suggests that UV exposure via indoor tanning at younger ages (ie, <35 years) may particularly enhance risk for melanoma^{1,2,4} and other skin cancers.^{3,5} Skin cancer risk also seems to increase as a function of indoor tanning frequency.^{1,3-6} Recognizing the growing evidence, the International Agency for Research on Cancer⁷ in 2009 classified indoor tanning devices as carcinogenic to humans.

Multiple studies reveal that young women of white race/ethnicity are particularly likely to tan indoors,⁸⁻¹¹ and melanoma rates are increasing among this group.^{12,13} Yet, what motivates young women to frequent indoor tanning facilities has been understudied. Studies¹⁴⁻¹⁹ examining tanning motivations have found various beliefs (eg, those focused on enhanced appearance, relaxation, and social influences) to be associated with indoor tanning behavior. However, studies have been limited by the use of general attitude measures,^{14,16,20,21} single-item measures,^{16-18,22-24} or measures that assessed a narrow set of tanning beliefs.^{15-17,19,24} A comprehensive, multidimensional, theory-based measure is needed to garner a more sophisticated understanding of the complex sets of beliefs that underlie the decision to tan (or not tan) indoors.

The objective of the present study was to develop and validate such a measure. According to social cognitive theory,^{25,26} beliefs about the expected consequences of engaging in a behavior, referred to as outcome expectations, are a primary motivator of human behavior. Outcome expectations are positive and negative in nature and serve as incentives and disincentives for behavior, respectively. Applied to indoor tanning, physical outcome expectations refer to effects on the body, such as appearance and health influences. Social expectations refer to approval, disapproval, compliments, concerns, and other social reinforcements and punishments. Self-evaluative expectations refer to how engaging in a behavior makes one feel confident, happy, bad, or guilty. We considered these and other possible domains of outcome expectations (described in the Measures subsection below) in the development of this new measure.

Methods

Participants

The institutional review board of The University of North Carolina approved all procedures used in this research. After answering an age eligibility question, sorority members accessing a URL provided informed consent online. We conducted an online survey of sorority members at a large public university in the southeastern United States to gauge indoor tanning beliefs and behaviors. To reach this population, we worked with the campus Panhellenic Council, a sorority governing body. The council coordinated with members of each campus sorority house to help facilitate the survey.

We promoted the survey with the help of representatives from the Panhellenic Council, who educated sorority members about the project. We described the project in meetings

with the leadership of the Panhellenic Council, who are sorority members. These members in turn promoted the project at meetings in the individual sorority houses. We distributed to all sororities posters and bowls of magnets with the URL of the online survey. These items were placed in high-traffic areas in the sorority houses. We also worked with the Panhellenic Council to send out e-mail messages inviting all sorority members to take the survey. An initial message was sent when the survey launched, followed by 3 reminder messages during the 3-week survey period.

We conducted the study a few weeks after sorority recruitment, a time when existing members and new members may experience greater motivations to tan. We also timed the launch to coincide with sorority “health week,” a weeklong event focused on women’s health. To participate in the study, sorority members had to be aged at least 18 years (because of a University of North Carolina institutional review board stipulation). The survey launched on September 26, 2012, and was open for 3 weeks. At the end of the 3-week period, 706 participants had completed the survey. Five participants had been excluded because they did not meet the minimum age requirement (ie, 18 years). This represented a 40.1% (706 of 1759) response rate.

Measures

Comprehensive Indoor Tanning Expectations Scale

We applied a sequential approach to development of the Comprehensive Indoor Tanning Expectations (CITE) Scale.^{27,28} To examine the positive and negative consequences that young women attribute to indoor tanning, we extensively reviewed the research on motivations for indoor tanning, including qualitative studies,^{29,30} quantitative studies,^{17,18,22,31} and review studies.^{19,32} We grouped types of motivations into topic areas (appearance, health, social, self-evaluation, and other) by valence (positive or negative) with reference to the 3 types of outcome expectations (physical, social, and self-evaluative). We then wrote multiple items to cover the content domain of each of these areas. Using an iterative process, our research team wrote and reviewed candidate items over the course of several meetings. Items lacking clarity were discarded or rewritten. We also consulted with a survey expert from a social science research institute at our institution, who critically reviewed the measure and provided constructive feedback. When this process was complete, the initial measure consisted of a total of 70 items. The stem presented before the measure stated “If I went indoor tanning...,” and participants answered on the following 5-point response scale: (1) definitely wouldn’t, (2) probably wouldn’t, (3) not sure, (4) probably would, or (5) definitely would. Before the study was launched, we pretested the measure with 10 individuals who were representative of the target audience, asking for feedback on item comprehension and clarity. Feedback given by test participants was used to improve the measure.

Several other measures were assessed on the survey, including items to characterize the sample and examine the validity of the CITE Scale. They included the following:

Demographics

We asked a series of demographic questions. These included sex, race/ethnicity, education, and age.

Skin Type, Sun Protection, and Family History

We asked a series of items related to skin type, burn tendency and tannability, and general sun protection behaviors, making use of standardized items.^{6,33-35} We also asked questions about family history of skin cancer.¹⁷

Indoor Tanning Attitudes

Indoor tanning attitudes were assessed using a 10-item scale.²⁰ Participants were asked to rate their attitudes about indoor tanning on various 7-point (range, -3 to 3) semantic differential pairs, including dull/interesting, boring/stimulating, unpleasant/pleasant, not relaxing/relaxing, and not sexy/sexy. Coefficient α of the scale was 0.92.

Appearance Motivation

Appearance motivation was assessed with a 4-item scale.¹⁵ Participants rated their agreement or disagreement on a 5-point scale to items such as "How I look is important to me" and "It is important that others view my physical attractiveness positively." Coefficient α of the scale was 0.76.

Appearance Reasons to Tan (General and Media)

Appearance reasons to tan were assessed using scales by Cafri et al.³⁶ For general appearance reasons to tan, participants rated their agreement or disagreement with 6 items on a 5-point scale, including items such as "Having a tan gives a person more sex appeal" and "People who are tan look more attractive." For media appearance reasons to tan, participants rated their agreement or disagreement with 4 items on a 5-point scale, including items such as "I wish I was as tan as celebrities in the media" and "I want to be as tan as TV stars." Coefficient α of the general scale was 0.84, while α of the media scale was 0.96.

Indoor Tanning Descriptive Norms

Descriptive norms for indoor tanning were assessed with 1 item.¹⁷ Participants were asked to give their best guess on a scale from 0% to 100% as to what percentage of their sorority sisters they thought had gone indoor tanning in the past 12 months.

Indoor Tanning Injunctive Norms

Indoor tanning injunctive norms were assessed by asking participants (on a 5-point scale) how strongly they believed several referents thought they should or should not go indoor tanning.²⁰ Referents assessed included mother, father, other female relatives, boyfriend, friends, and sorority sisters. Coefficient α of this scale was 0.76.

Indoor Tanning Temptations

Indoor tanning temptations were assessed by 14 items that were developed for the present study. Temptation is a concept that mirrors self-efficacy and has been applied in areas such as smoking cessation.³⁷ Participants were asked "How tempted would you be to tan indoors when..." and were presented with a series of situations such as when their current tan is wearing off, it is the winter season, friends are going tanning, or they are feeling anxious or stressed. Participants answered on a 5-point scale that ranged from not at all tempted to ex-

remely tempted. Factor analysis (using the same procedures described in the Statistical Analysis subsection below) revealed this scale to load on a single factor explaining 73.1% of the variance, with all factor loadings exceeding 0.70. Coefficient α of the scale was 0.97.

Indoor Tanning Intentions

Indoor tanning intentions were assessed by asking participants if they planned on tanning indoors sometime in the future.¹⁷ Responses on a 5-point scale ranged from definitely won't to definitely will.

Indoor Tanner Types and Tanning Frequency

An initial yes or no question asked participants if they had ever used a tanning bed or booth with tanning lamps. Those who said no were classified as nontanners. Those who said yes were asked to report how many times they had tanned indoors in the past 12 months. Those who reported zero times were classified as former tanners, while those who reported 1 or more times were classified as current tanners. The value that current tanners reported was used as an indicator of frequency of indoor tanning behavior in the past 12 months.³⁸

Procedure

Sorority members who were interested in the study used the URL to access the online survey. The first page of the survey described the study as being about appearance, health, and tanning. After answering the age eligibility question and providing informed consent online, the participants proceeded through the online survey, which took approximately 20 minutes.

Incentives to participate in the study were given at the level of the sorority house (rather than at the level of the individual participant). Sorority houses that met certain thresholds of participation earned Visa check cards and Panhellenic Points (points allotted to sororities by the Panhellenic Council for participating in charitable and other events). Houses with at least a 50% participation rate received a \$100 check card and Panhellenic Points, with graduated incentives at 70% (\$150) and 90% (\$200) participation.

Statistical Analysis

We used maximum likelihood factor analysis with promax rotation to examine the dimensionality of the outcome expectations scales. Promax rotation was used because we expected the outcome expectations dimensions to correlate with one another. To determine the number of factors to retain, we examined the number of eigenvalues greater than 1 and the screeplot.³⁹ We used an iterative process that took into account our a priori areas (based on extant literature [eg, work by Hillhouse and Turrisi¹⁹] and social cognitive theory) in which we expected items to group, as well as empirical indicators (ie, eigenvalues and screeplot). We computed factor analyses, dropped items that crossloaded (>0.30) on multiple factors, recomputed analyses, and reinspected our output. Factor loadings were considered acceptable if they were greater than 0.40 on a factor and less than 0.30 on all other factors. We repeated this process until a final solution that was both con-

ceptually and empirically interpretable emerged. All analyses were conducted separately for positive and negative outcome expectations. Using the above procedures, preliminary factor analyses conducted separately on tanners and nontanners revealed virtually identical solutions. Therefore, the final analyses were conducted on the entire sample ($n = 706$).

Construct validity of CITE subscales was assessed by examining correlations with established indoor tanning measures. Analyses of variance were conducted to examine differences on the subscales across the 3 tanner types. Multiple linear regression analyses examined how CITE positive and negative subscales predicted indoor tanning intention and behavior. The intention analyses were conducted on the full sample using intention to tan indoors as the dependent variable (mean [SD], 2.38 [1.40]), while the behavior analyses were conducted on current tanners using frequency of tanning in the past year as the dependent variable (range, 1-150; mean [SD], 17.44 [23.00]). For both sets of analyses, we entered background variables in step 1; in step 2, we entered positive expectations (analysis 1), negative expectations (analysis 2), or both (analysis 3).

Results

In total, 54.7% of the sample ($n = 386$) were nontanners, 15.0% ($n = 106$) were former tanners, and 30.3% ($n = 214$) were current tanners. Characteristics of these groups are summarized in **Table 1**. Participant age ranged from 18 to 25 years, with mean (SD) ages of 19.30 (1.08) years for nontanners, 20.00 (1.20) years for former tanners, and 19.40 (1.10) years for current tanners.

Scale Development

Results of the final solution for positive outcome expectations are summarized in **Table 2**. The final solution had 6 factors and explained 72.9% of the variance. The 6 factors were appearance benefits, convenience, mood enhancement, health improvement, social approval, and parental approval. To score the measure, all items in each subscale were summed and divided by the number of items. Coefficient α values and means (SDs) of these subscales were computed and are listed in **Table 3**. All coefficient α values were acceptable, ranging from a low of 0.86 (health improvement) to a high of 0.95 (mood enhancement). A coefficient α could not be computed on the parental approval factor because it consisted of only 2 items; a bivariate correlation indicated that the items were significantly correlated ($r = 0.76, P < .001$). The mean levels of the subscales indicated that the least highly endorsed positive outcome expectation was health improvement (mean, 1.48), while the most highly endorsed positive outcome expectation was convenience (mean, 3.47).

Results of the final solution for negative outcome expectations are also summarized in **Table 2**. The final solution had 5 factors explaining 74.6% of the variance. These 5 factors were health threat, psychological/physical discomfort, appearance harms, social disapproval, and parental disapproval. All coefficient α values were acceptable, ranging from a low of 0.87 (psychological/physical discomfort) to a high of 0.93 (health

threat). Again, a bivariate correlation indicated that the 2 parent items were significantly correlated ($r = 0.84, P < .001$). The mean levels of these subscales indicated that the least highly endorsed negative outcome expectation was social disapproval (mean, 3.14), while the most highly endorsed negative outcome expectation was health threat (mean, 4.37).

Correlations among CITE subscales demonstrated that the subscales were significantly correlated with one another, with correlations among positive-positive and negative-negative subscales being positive in nature and with correlations among positive-negative subscales being negative in nature. Correlations ranged in value from -0.11 to 0.71 (eTable in the Supplement).

Construct Validity Analyses

Correlations between CITE subscales and validity-oriented variables are summarized in **Table 3**. As expected, the positive outcome expectations subscales were all positively and significantly correlated with this set of validity-oriented variables (mostly at $P < .001$). Also as expected, the negative outcome expectations subscales tended to be negatively associated with these variables (many at $P < .001$).

The means (SDs) of positive and negative CITE subscales across the 3 tanner types are listed in **Table 4**. Analyses of variance found significant differences on all 11 subscales (at $P < .001$). On all 11 subscales, Tukey tests revealed significant differences between nontanners and current tanners and between former tanners and current tanners. Nontanners and former tanners were significantly different on 7 of 11 subscales. Effect sizes indicated that the positive expectations subscale that most distinguished among tanning groups was mood enhancement, while the negative expectation that distinguished most was psychological/physical discomfort. The means on all subscales by tanning group are plotted in the eFigure in the Supplement.

Association With Indoor Tanning Intention and Behavior

Results of the multiple linear regression analyses (**Table 5**) indicated that step 2 of these regression analyses accounted for significant amounts of variance in intention to tan indoors (R^2 range, 0.47-0.62) and in frequency of indoor tanning behavior (R^2 range, 0.22-0.31). In all analyses, CITE subscales predicted unique variance ($P < .001$) over and above background variables. With all 11 subscales entered, CITE subscales that remained significant in the prediction of intention to tan indoors were convenience, mood enhancement, health improvement, parental approval, and psychological/physical discomfort. In the behavior analyses, the subscales that remained significant were parental approval, psychological/physical discomfort, and social disapproval.

Discussion

The present study developed the CITE Scale, an outcome expectations measure that consists of 6 positive and 5 negative subscales. Some of the subscales are consistent with previous studies^{17,22,23} such as those on appearance, mood, and

Table 1. Demographic and Skin Characteristics of the 3 Groups

Variable	No. (%)		
	Nontanners (n = 386)	Former Tanners (n = 106)	Current Tanners (n = 214)
Race/ethnicity^a			
White	370 (95.9)	103 (97.2)	206 (96.3)
Black/African American	5 (1.3)	0	1 (0.5)
Hispanic/Latino	10 (2.6)	6 (5.7)	7 (3.3)
Other	18 (4.7)	0	0
Year in school			
Freshman	113 (29.3)	12 (11.3)	50 (23.4)
Sophomore	125 (31.9)	33 (31.1)	64 (29.9)
Junior	91 (23.6)	25 (23.6)	60 (28.0)
Senior	56 (14.5)	35 (33.0)	40 (18.7)
Graduate student	1 (0.3)	1 (0.9)	0
Housing			
Sorority house	100 (25.9)	31 (29.2)	49 (22.9)
On-campus dorm	186 (48.2)	40 (37.7)	75 (35.0)
Off campus	87 (22.5)	35 (33.0)	85 (39.7)
Parents' house	1 (0.3)	0	0
Other	12 (3.1)	0	5 (2.3)
Skin color, natural			
Very fair	69 (17.9)	8 (7.5)	7 (3.3)
Fair	186 (48.2)	57 (53.8)	106 (49.5)
Olive	87 (22.5)	30 (28.3)	74 (34.6)
Light brown	38 (9.8)	10 (9.4)	26 (12.1)
Dark brown	6 (1.6)	1 (0.9)	1 (0.5)
Tendency to burn, 1-h sun exposure in summer with no protection			
Severe sunburn with blistering	15 (3.9)	4 (3.8)	0
Painful sunburn with peeling	115 (29.8)	27 (25.5)	30 (14.0)
Mildly burnt then tan	194 (50.3)	57 (53.8)	136 (63.6)
Brown without sunburn	62 (16.1)	17 (16.0)	47 (22.0)
Do not know	0	1 (0.9)	1 (0.5)
Tannability, repeated sun exposure in summer with no protection			
No tan or only freckled	41 (10.6)	2 (1.9)	7 (3.3)
Mildly tanned	104 (26.9)	25 (23.6)	26 (12.1)
Moderately tanned	149 (38.6)	51 (48.1)	107 (50.0)
Deeply tanned	89 (23.1)	26 (24.5)	72 (33.6)
Do not know	3 (0.8)	2 (1.9)	2 (0.9)
Summer sun protection behavior, sunscreen, hat, etc			
Never or hardly ever	13 (3.4)	2 (1.9)	13 (6.1)
Less than half the time	36 (9.3)	13 (12.3)	38 (17.8)
About half the time	60 (15.5)	21 (19.8)	55 (25.7)
Not always but more than half the time	116 (30.1)	25 (23.6)	58 (27.1)
Always or almost always	161 (41.7)	45 (42.5)	50 (23.4)
Know anyone with skin cancer			
None	58 (15.0)	17 (16.0)	38 (17.8)
1	115 (29.8)	23 (21.7)	49 (22.9)
≥2	213 (55.2)	66 (62.3)	127 (59.3)
No. of moles removed or biopsied			
None	304 (78.8)	78 (73.6)	173 (80.8)
1	48 (12.4)	16 (15.1)	20 (9.3)
≥2	34 (8.8)	12 (11.3)	21 (9.8)

(continued)

Table 1. Demographic and Skin Characteristics of the 3 Groups (continued)

Variable	No. (%)		
	Nontanners (n = 386)	Former Tanners (n = 106)	Current Tanners (n = 214)
Ever had skin cancer			
No	383 (99.2)	104 (98.1)	207 (96.7)
Yes	3 (0.8)	2 (1.9)	7 (3.3)

^a Race/ethnicity categories sum to more than 100% because participants could check more than 1 category.

Table 2. Factor Loadings of Positive and Negative Indoor Tanning Outcome Expectations—Final Results^a

Positive Outcome Expectation	Result	Negative Outcome Expectation	Result
It would make me look thinner	0.94 Appearance benefits	It would be dangerous	0.93 Health threat
It would make me look more toned	0.92 Appearance benefits	It would increase my chances of getting melanoma	0.85 Health threat
It would hide my skin imperfections	0.69 Appearance benefits	It would be bad for my skin	0.84 Health threat
It would make me more fashionable	0.66 Appearance benefits	It would be unhealthy	0.83 Health threat
It would make me look healthy	0.64 Appearance benefits	It would lead to skin cancer	0.70 Health threat
It would make me look great	0.62 Appearance benefits	It would feel uncomfortably hot and sweaty in the tanning booth	0.91 Psychological/physical discomfort
It would make me look like a celebrity	0.59 Appearance benefits	It would feel claustrophobic in the tanning booth	0.88 Psychological/physical discomfort
It would make me more attractive	0.55 Appearance benefits	It would be a waste of money	0.69 Psychological/physical discomfort
It would get me ready for a special event (eg, a dance)	0.77 Convenience	It would make me feel bad about myself	0.63 Psychological/physical discomfort
It would be a fast way to get a tan	0.76 Convenience	It would be an unnecessary luxury	0.52 Psychological/physical discomfort
It would be a convenient way to get a tan	0.72 Convenience	It would be expensive	0.48 Psychological/physical discomfort
It would prepare me for a vacation or spring break	0.66 Convenience	It would lead to saggy skin later in life	0.87 Appearance harms
It would make my tan lines disappear	0.66 Convenience	It would lead to wrinkles in later life	0.84 Appearance harms
It would give me a nice base tan	0.62 Convenience	It would make my skin leathery	0.78 Appearance harms
It would be enjoyable	0.92 Mood enhancement	It would lead to premature (early) skin aging	0.75 Appearance harms
It would reduce stress or tension	0.91 Mood enhancement	It would make my skin smell bad	0.57 Appearance harms
It would be relaxing	0.88 Mood enhancement	It would upset some of my friends	0.89 Social disapproval
It would improve my mood	0.81 Mood enhancement	It would upset people around me	0.88 Social disapproval
It would help lift my spirits	0.69 Mood enhancement	It would lead people to worry about my health	0.75 Social disapproval
It would be healthy for me	0.84 Health improvement	It would upset my mom	1.02 Parental disapproval
It would be a safe way to get a tan	0.79 Health improvement	It would upset my dad	0.80 Parental disapproval
It would be good for my skin	0.78 Health improvement		
It would be safer than tanning in the sun	0.66 Health improvement		
It would lead to compliments from people I date	0.92 Social approval		
It would make me more desirable to people I date	0.73 Social approval		
It would lead to compliments from my friends	0.53 Social approval		
It would be something my mom supports	1.02 Parental approval		
It would be something my dad supports	0.74 Parental approval		

^a All factor loadings greater than 0.40 on a factor and less than 0.30 on all other factors are shown.

social motivations. Other subscales proved more novel, such as convenience (indoor tanning as a quick and easy way to tan) and psychological/physical discomfort (feeling physically and psychologically uneasy about tanning). These results extend previous research¹⁵⁻¹⁷ by conceptualizing and measuring indoor tanning beliefs as multidimensional and multivalenced, lending a more sophisticated understanding of this behavior.

CITE subscales were significantly correlated with a set of measures from the established indoor tanning literature (eg,

the chapter by Hillhouse and Turrisi¹⁹), building support for the validity of this new scale. On average, the size of the correlations was at least as large for the positive compared with the negative outcome expectations. This suggests that changing indoor tanning behavior will require more than communicating its risks; rather, the perceived benefits of this behavior must also be addressed.

In addition, we examined how belief systems varied across nontanners, former tanners, and current tanners. In

Table 3. Positive and Negative Outcome Expectations Means (SDs), Coefficient α Values, and Correlations With Construct Validity Variables^a

Indoor Tanning Outcome Expectation	Mean (SD)	Coefficient α	Appearance Motivation	Appearance Reasons to Tan-General	Appearance Reasons to Tan-Media	Indoor Tanning Attitudes	Indoor Tanning Descriptive Norms	Indoor Tanning Injunctive Norms	Indoor Tanning Temptations	Indoor Tanning Intentions
Positive										
Appearance benefits	2.68 (0.99)	0.92	0.38 ^b	0.55 ^b	0.54 ^b	0.60 ^b	0.18 ^b	0.37 ^b	0.66 ^b	0.54 ^b
Convenience	3.47 (1.00)	0.88	0.25 ^b	0.47 ^b	0.38 ^b	0.66 ^b	0.21 ^b	0.43 ^b	0.67 ^b	0.61 ^b
Mood enhancement	2.64 (1.24)	0.95	0.26 ^b	0.44 ^b	0.41 ^b	0.79 ^b	0.28 ^b	0.46 ^b	0.75 ^b	0.71 ^b
Health improvement	1.48 (0.67)	0.86	0.13 ^c	0.17 ^b	0.17 ^b	0.44 ^b	0.10 ^d	0.30 ^b	0.40 ^b	0.43 ^b
Social approval	2.92 (1.08)	0.88	0.33 ^b	0.49 ^b	0.43 ^b	0.58 ^b	0.21 ^b	0.42 ^b	0.63 ^b	0.51 ^b
Parental approval	1.61 (0.94)	$r = 0.76$	0.06	0.13 ^c	0.19 ^b	0.52 ^b	0.17 ^b	0.53 ^b	0.42 ^b	0.51 ^b
Negative										
Health threat	4.37 (0.73)	0.93	-0.04	-0.09 ^d	-0.10 ^c	-0.33 ^b	-0.06	-0.27 ^b	-0.24 ^b	-0.32 ^b
Psychological/physical discomfort	4.05 (0.74)	0.87	-0.17 ^b	-0.32 ^b	-0.30 ^b	-0.70 ^b	-0.26 ^b	-0.51 ^b	-0.60 ^b	-0.67 ^b
Appearance harms	3.55 (0.98)	0.89	-0.05	-0.14 ^b	-0.12 ^c	-0.38 ^b	-0.03	-0.35 ^b	-0.29 ^b	-0.38 ^b
Social approval	3.14 (1.10)	0.88	-0.04	-0.10 ^c	-0.09 ^d	-0.36 ^b	-0.20 ^b	-0.43 ^b	-0.26 ^b	-0.33 ^b
Parental disapproval	3.91 (1.23)	$r = 0.84$	-0.02	-0.08 ^d	-0.10 ^c	-0.40 ^b	-0.14 ^b	-0.58 ^b	-0.29 ^b	-0.40 ^b

^a Comprehensive Indoor Tanning Expectations (CITE) subscales were scored by summing all items in each subscale and then dividing by the number of items. Higher values indicate greater belief in each positive or negative dimension.

^b $P < .001$.

^c $P < .01$.

^d $P < .05$.

Table 4. Analyses of Variances Comparing Tanner Types on CITE Subscales^a

Outcome Expectation	Mean (SD)			P Value	Partial η^2
	Nontanners (n = 386)	Former Tanners (n = 106)	Current Tanners (n = 214)		
Positive					
Appearance benefits	2.40 (0.94) _a	2.53 (0.95) _{a,b}	3.25 (0.85) _c	<.001	.15
Convenience	3.07 (1.05) _a	3.40 (0.97) _b	4.21 (0.53) _c	<.001	.25
Mood enhancement	2.06 (0.97) _a	2.49 (1.13) _b	3.76 (0.92) _c	<.001	.37
Health improvement	1.34 (0.53) _a	1.31 (0.55) _{a,b}	1.80 (0.80) _c	<.001	.10
Social approval	2.61 (1.06) _a	2.88 (1.00) _b	3.50 (0.89) _c	<.001	.14
Parental approval	1.30 (0.64) _a	1.65 (0.96) _b	2.16 (1.13) _c	<.001	.16
Negative					
Health threat	4.48 (0.72) _a	4.49 (0.68) _{a,b}	4.13 (0.77) _c	<.001	.05
Psychological/physical discomfort	3.99 (0.80) _a	3.63 (0.93) _b	2.72 (0.83) _c	<.001	.33
Appearance harms	4.17 (0.68) _a	4.24 (0.72) _{a,b}	3.75 (0.80) _c	<.001	.07
Social disapproval	3.41 (1.09) _a	3.10 (1.06) _b	2.68 (1.00) _c	<.001	.09
Parental disapproval	4.27 (1.07) _a	3.86 (1.27) _b	3.33 (1.25) _c	<.001	.12

^a Comprehensive Indoor Tanning Expectations (CITE) subscales were scored by summing all items in each subscale and then dividing by the number of items. Higher values indicate greater belief in each positive or negative dimension. The means that do not share a common subscript are significantly different at $P < .05$ or better based on Tukey tests for honestly significant difference.

most cases, significant differences were observed across these groups. On some variables (eg, appearance benefits, health improvement, health threat, and appearance harms), nontanners did not differ from former tanners. This suggests that former tanners no longer perceive appearance and health benefits to indoor tanning, but they recognize appearance and health harms of tanning. This implies that these beliefs can change, and these factors may be routes to persuading current tanners to become former tanners. How-

ever, it is also important to note that mood enhancement and psychological/physical discomfort (in some ways, the mirror opposite of mood enhancement) emerged as the 2 factors that most distinguished among the 3 groups. Previous research has also found perceptions of mood enhancement to be a factor in motivating indoor tanning,^{16,23,24} and this issue must be addressed in efforts to deter the behavior. The emerging literature on tanning dependence sheds some light on this issue.^{40,41}

Table 5. Multiple Linear Regression Analyses Examining Association of CITE Subscales With Indoor Tanning Intention and Behavior^a

Predictor Variable	Coefficient β		
	Positive Only	Negative Only	Positive and Negative
Step 1^b			
Year in school	-0.02/-0.04	-0.02/-0.04	-0.02/-0.04
Skin color	0.02/0.01	0.03/0.01	0.03/0.01
Tendency to burn	0.01/-0.01	0.02/0.01	0.01/-0.01
Tannability	0.08/-0.08	0.07/-0.07	0.07/-0.08
Sun protection	-0.25 ^d /-0.06	-0.25 ^d /-0.09	-0.25 ^d /-0.06
Ever had skin cancer	0.08 ^f /0.15 ^f	0.08 ^f /0.15 ^f	0.08 ^f /0.15 ^f
Know someone with skin cancer	0.03/-0.14	0.03/-0.11	0.03/-0.13
Step 2^c			
Year in school	-0.04/-0.05	-0.05/-0.09	-0.05/-0.08
Skin color	0.04/-0.02	0.06/-0.07	0.05/-0.05
Tendency to burn	-0.01/0.02	-0.03/0.03	-0.02/0.03
Tannability	0.02/-0.07	-0.01/-0.05	0.01/-0.06
Sun protection	-0.07 ^e /0.02	-0.14 ^d /0.02	-0.06 ^f /0.07
Ever had skin cancer	0.01/0.09	0.04/0.08	0.01/0.09
Know someone with skin cancer	-0.01/-0.12	0.02/-0.09	-0.01/-0.10
Positive			
Appearance benefits	0.04/0.05	...	0.01/0.03
Convenience	0.14 ^d /0.12	...	0.10 ^f /0.10
Mood enhancement	0.44 ^d /0.18 ^f	...	0.32 ^d /0.07
Health improvement	0.11 ^d /0.09	...	0.09 ^e /0.04
Social approval	0.01/0.02	...	0.04/0.01
Parental approval	0.19 ^d /0.24 ^d	...	0.15 ^d /0.29 ^e
Negative			
Health threat	...	-0.01/-0.12	-0.02/-0.17
Psychological/physical discomfort	...	-0.61 ^d /-0.40 ^d	-0.29 ^d /-0.24 ^e
Appearance harms	...	-0.01/-0.07	0.01/-0.11
Social disapproval	...	0.03/-0.27 ^d	0.01/-0.16 ^f
Parental disapproval	...	-0.07/-0.07	-0.04/-0.13

Abbreviation: CITE, Comprehensive Indoor Tanning Expectations.

^a First entry is for intention (full sample), and second entry is for behavior (current tanners only). "Ever had skin cancer" and "Know someone who has had skin cancer" were dummy coded as 0 (no) or 1 (yes).

^b Step 1 $r = 0.31^b/0.21$, $R^2 = 0.09/0.05$, and $\Delta R^2 = 0.09^b/0.05$ for positive only; $r = 0.31^b/0.19$, $R^2 = 0.09/0.04$, and $\Delta R^2 = 0.09^b/0.04$ for negative only; and $r = 0.31^b/0.20$, $R^2 = 0.09/0.04$, and $\Delta R^2 = 0.09^b/0.04$ for positive and negative.

^c Step 2 $r = 0.76^b/0.46^b$, $R^2 = 0.58/0.22$, and $\Delta R^2 = 0.49^b/0.17^b$ for positive only; $r = 0.69^b/0.51^b$, $R^2 = 0.47/0.26$, and $\Delta R^2 = 0.38^b/0.22^b$ for negative only; and $r = 0.79^b/0.56^b$, $R^2 = 0.62/0.31$, and $\Delta R^2 = 0.53^b/0.27^b$ for positive and negative.

^d $P < .001$.

^e $P < .01$.

^f $P < .05$.

We further examined how CITE subscales predicted indoor tanning intention (among the full sample) and frequency of indoor tanning behavior (among current tanners). Our results for intention suggest variables that can inform future prevention efforts, including convenience, mood enhancement, health improvement, parental approval, and psychological/physical discomfort. These variables could each be addressed in interventions, such as encouraging substitution of sunless tanning⁴²⁻⁴⁴ to address the convenience expectation or promoting mood-enhancing activities, such as meditation or yoga. For behavior, the parental approval variable was again significant, suggesting that interventions with parents may need to be an integral part of a comprehensive approach to indoor tanning prevention.⁴⁵⁻⁴⁷

Limitations

The present study was limited in several ways. This study took place at a single university, and results may not generalize to other young women. However, our sample meets the requirements for a development sample as indicated by scale developers.²⁸ Also, although we incentivized survey participation, our response rate was only 40.1%. However, we

achieved good representation across years in school (24.9% freshmen, 31.5% sophomores, 24.9% juniors, and 18.7% seniors), and the proportion of women living in sorority houses in our sample (25.5%) was identical to that in this population (23.9%). We also found the expected rates of indoor tanning behavior in our sample.^{10,11} This study was based on self-report, and it relied on participants' ability to honestly and accurately report their beliefs and behaviors. Social desirability may have influenced some women to not participate in the survey or to not answer honestly. Finally, this was a cross-sectional study; therefore, we must use caution in interpreting these data in a causal manner.

Implications for Dermatologists

Dermatologists are likely to find the results of the present study to be useful in effectively counseling patients. Our results suggest that appearance is only one of the motivations for indoor tanning. Other factors (eg, perceptions of convenience, mood enhancement, and health improvement) are additional motivations that should be addressed by dermatologists. Our results also suggest that perceptions of parental approval have a strong role in indoor tanning; therefore, dermatologists might

also take advantage of opportunities to discuss indoor tanning with parents of adolescents and young adults.

Conclusions

The present study has successfully developed a new scale that can provide a sophisticated and nuanced understanding of the beliefs that underlie indoor tanning. In the future, the CITE Scale could be applied in several ways. Most notably, investigations are needed to confirm its reliability and to extend evidence for its validity in other samples and through longitudinal studies. Also, the CITE Scale may be adapted for use with adolescent and male populations, and it could be used in com-

plex models of indoor tanning behavior (eg, structural equation models). Given the recent focus on tanning dependence and the physiological dimension to indoor tanning,^{40,41} future research might examine what role subscales, such as mood enhancement, can have in such investigations. The CITE Scale also has implications for interventions that aim to deter young women from tanning indoors. Studies can apply this scale so as to better understand what beliefs to target in communications to deter indoor tanning,⁴⁸ as well as to assess whether interventions were successful in changing those beliefs. Because of numerous calls for a range of health communication interventions to deter young people from indoor tanning^{45,47,49} and because the literature to date remains limited,⁵⁰ this is a key priority for future research.

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