

Trending on Pinterest: an examination of pins about skin tanning

Smita C. Banerjee,¹ Vivian M. Rodríguez,² Kathryn Greene,³ Jennifer L. Hay¹

Abstract

Rates of melanoma and nonmelanoma skin cancers are on the rise in the USA with data revealing disproportionate increase in female young adults. The popularity of intentional skin tanning among U.S. adolescents is attributed to several factors, including prioritization of physical appearance, media images of tanned celebrities, ease of availability of artificial tanning facilities, and more recently, the prevalence and celebration of tanned skin on social media. Pinterest, as the third most popular social media platform, was searched for “pins” about skin tanning. The resultant “pins” were examined to understand the extent and characteristics of skin tanning portrayed on Pinterest. We analyzed pins on Pinterest about skin tanning ($n = 501$) through a quantitative content analysis. Overall, results indicated an overwhelmingly protanning characteristic of pins about skin tanning on Pinterest, with over 85% of pins promoting tanning behavior. The pins were generally characterized by the portrayal of a female subject (61%) and provided positive reinforcement for tanning (49%). Use of tanning for enhancing appearance was the main positive outcome expectancy portrayed in the pins (35%), and nudity or exposure of skin on arms (32%) and legs (31%) was evident in about a third of pins. With overwhelmingly positive pins promoting tanning, use of female subjects, exhibiting nudity, and appearance enhancement, there seems to be a consistent targeting of female users to accept tanning as a socially acceptable and popular behavior. The findings indicate a need for developing sun protection messages and the leveraging of social media for dissemination of skin cancer prevention and detection messages.

Keywords

Content analysis, Melanoma, Pinterest, Skin cancer, Social media

Rates of melanoma and nonmelanoma skin cancers are on the rise in the USA [1, 2] with data revealing an upward trend in the incidence of melanoma, with an average 1.4% increase each year, from 2004 to 2013 [3]. The American Cancer Society [1] estimates 87,110 new cases of melanoma in 2017, and 9,730 deaths from it. Similarly, rates of nonmelanoma skin cancers such as basal cell carcinoma and squamous cell carcinoma are on the rise, with an estimated 5.4 million cases in 2012 [4]. Recent epidemiologic studies also reveal an age-related trend in the incidence of melanoma. Melanoma is one of the most common cancers in people younger than 30 (especially younger women) [1] and the rates of incidence are increasing at an alarming level. From 1973

Implications

Practice: The popularity of Pinterest among young adults provides an opportunity for leveraging it for developing and disseminating skin cancer prevention messages.

Policy: Policy makers at the local, state, and national level need to be informed about the tanning messages disseminated on social media to develop effective public health messages to reduce skin cancer risk.

Research: Research should examine the content of discussions and conversations that ensue on Pinterest (and other social media platforms) regarding tanning behavior.

to 2011, the incidence of melanoma in adolescents and young adults increased by 253%, with White female young adults at a particularly high risk [5].

Most (>90%) melanoma skin cancers are caused by skin cell damage from ultraviolet radiation (UVR) received through indoor tanning and/or outdoor exposure [6], with this damage due to tanning, uniquely, over and above sunburns [7], especially tanning at younger ages [8]. Data from the 2010, 2013, and 2015 National Health Interview Survey (NHIS), a nationally representative sample of the U.S. civilian noninstitutionalized population aged ≥ 18 years, indicate that adult indoor tanning decreased from 5.5% in 2010 to 3.5% in 2015; it is still pretty significant among non-Hispanic White women aged 18–21 years (20.4%) [9]. Similarly, the rates of intentional outdoor tanning are highest in adults aged 18–29 years (14.1%) [10]. The popularity of skin tanning among U.S. adolescents is attributed to several factors, such as prioritization of physical appearance [11–14], social norm perceptions regarding preference for a tanned skin [14–16], media images of tanned celebrities [17, 18], aggressive advertising campaigns by the tanning industry, and ease of availability of artificial tanning facilities [19–22], and more recently, the prevalence and celebration of tanned skin on social

¹Department of Psychiatry and Behavioral Sciences, Memorial Sloan Kettering Cancer Center, New York, NY, USA

²Center for Mind+Body Health, Charlottesville, VA, USA

³School of Communication and Information, Rutgers University, New Brunswick, NJ, USA

Correspondence to: Smita C. Banerjee, banerjes@mskcc.org

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media [23–26]. The use of social media to promote tanning has garnered research interest by scholars [27–30], with a call for more research to understand how various social media platforms promote, instruct, and celebrate tanning [24]. While Ricklefs and colleagues [24] focused on promotional indoor tanning advertising on Twitter and Facebook, Hossler and Conroy [23] described the content on tanning bed use from 72 YouTube videos. Some recent studies have also examined social media platforms for promoting skin cancer prevention messages [29]. Examining the unique capabilities of social media platforms for both tanning promotion and tanning prevention messages, enhanced with the use of imagery is something that needs to be harnessed to better understand how to utilize these platforms for skin cancer prevention efforts. The present study attempts to answer this call for explicating tanning promotion messages by focusing on one particular social media platform that has not yet been studied for tanning promotion, Pinterest.

PINTEREST: AN INTRODUCTION

Pinterest is a virtual pin board where users organize and share interesting things found on the web. It is the third most popular social network site (SNS) among online Americans after Facebook and Instagram [30]. There are currently 200 million registered users on Pinterest, with 175 million active users [31], with 60% female users, and 67% users under 40 years old. The basic building block for Pinterest is a pin that typically consists of an image or video added to Pinterest, a user-generated brief description, and a link back to the source of the image [32]. A pin can be added from a website using the Pin It button, or users can upload images from their computer or phone. The primary feature of Pinterest is the re-pin feature, which allows users to share existing content with their followers by adding an image to their own board. Re-pins maintain the source-link of the image no matter how many times it becomes re-pinned. Besides pinning and re-pinning, Pinterest offers a unique suite of features and functions, such as creating, liking, following, commenting, inviting, sharing, checking, searching, and exploring different categories [32–34].

In an examination of Pinterest in terms of its content, user comments, and user behavior, “re-pinning” was the most frequently observed user behavior [32,35], and most user comments pertained to sharing opinion and judgment, engaging in dialogue, sharing a personal history with the image, and providing additional narrative details. Re-pinning can not only provide a measure of influence that the pin has [29], it can also satisfy people’s need to be popular and accepted, particularly when their pin is re-pinned by a large number of people [36]. Pinterest allows users to follow like-minded others and form communities based on mutual interests,

and re-pinning allows for proliferation and visibility of an idea [36]. As such, Pinterest has been redefined as a sharing and curating platform, which is beneficial for information use, reuse, and creation on the social web [32].

SOCIAL CURATION ON PINTEREST

Social curation refers to collaborative sharing of web content organized around one or more particular themes or topics [34]. Pinterest offers a social curation platform where users can create, curate, and share information on the web [32]. Users can “pin” pictures/videos they consider interesting and classify them into user-named categories such as fashion, animals, food, and so on. Users can follow other users or boards and “like,” “re-pin,” or “comment” on pins. In addition, users can explore different categories and search the pins they want to find. In a study on pinning activity and user gratification and motivation for pinning, Wang, Yang, Zheng, and Sundar [36] described how the pictorial nature of Pinterest emphasizes the visual over the verbal, conveying reality in a manner that is easily comprehensible to the user instead of requiring cognitive effort to understand the meaning of the pinned message.

When people pin a message, they are trying to not only showcase their interests but to also connect with others who share similar interests [37]. Besides the popular pins about fashion, food, and house decoration, there has been a recent interest in health-related pins. In fact, the 3 of the 10 most popular Pinterest topics released in December 2016 were health related [38]. Scholars have begun to examine portrayal of various health behaviors on Pinterest, with topics ranging from waterpipe smoking [39], vaccines [40], depression [41], chronic obstructive pulmonary disease [42], thin-ideal or skinny people images [43–45], and skin cancer [29]. The present study extends this literature by describing types and characteristics of pins about skin tanning found on Pinterest.

SKIN TANNING ON PINTEREST

Pins about skin tanning may convey not only pro-tanning messages, but they may also convey anti-tanning messages. To date, no study has examined the portrayal of skin tanning on Pinterest. We use the vicarious learning paradigm of the social cognitive theory (SCT) [46, 47] to understand how pins about skin tanning may encourage certain behaviors. Vicarious learning or modeling refers to learning by observation and purports that not all behavioral, cognitive, and affective learning happens from direct experience. Human beings have a keen ability to learn vicariously by observing other people’s actions and any consequences for them [46, 47]. Both celebrity and noncelebrity models (i.e., other human beings) can convey norms, values, and motivate specific behaviors. These models can also show

how people should feel or act in certain situations [47]. Because of the pictorial nature of Pinterest, the images related to or about skin tanning not only provide vicarious models of learning, but can also encourage behavior by portraying positive consequences and rewards [28].

Among people who already tan, these pins can provide an affirmation of their values and behavior. Those with a more positive appraisal and affective response surrounding tanning may be more likely to engage with pins around tanning, and these pins may in turn reinforce positive thought and affect about tanning. Even among nontanners searching for fashion or style, pins about tanning may come up, showcasing current trends around tanning. Borrowing from the literature on tanning portrayal in magazines, research informs us that celebrity models in magazines are portrayed with significantly fewer sun protective hats and clothing cover [48], possibly signaling a norm around (un)safe sun behaviors. Similarly, the frequent portrayal of skin tanning practices (such as laying out in the sun or indoor tanning, engaging in tanning with friends) in visual pins on Pinterest may contribute to general acceptance of norms about skin tanning offline and send the “bandwagon” message, that is, everyone around the user is engaging in the similar behavior [36]. As well, exposure to individuals achieving desired outcomes on Pinterest can create outcome expectancies that are aligned with the outcomes the model in the pins has achieved, and that can function as positive incentives [46]. Thus, viewing messages linking skin tanning with attaining the societal standard of beauty might motivate tanning behavior in Pinterest users.

Social media facilitates propagating messages. Therefore, we measured the reach of skin tanning-related pins. Furthermore, exposure to pins that are frequently re-pinned and liked can highlight more positive and less negative expectancies of tanning (expectancies are defined as beliefs about the expected consequences of engaging in a behavior) [49], motivating Pinterest users to engage in the tanning behavior. There may also be other characteristic differences in frequently re-pinned and liked pins as compared with less frequently re-pinned and liked pins (such as, differences in the way tanning is portrayed, kind of message, etc.). In that sense, it is important to examine the extent to which skin tanning is portrayed on Pinterest. Thus, our work is guided by the vicarious learning paradigm of the SCT as well as aspects related to reach of the pins, characteristics of the pins, and examination of differences between frequently re-pinned and liked pins and less frequently re-pinned and liked pins, leading to the four research questions:

RQ1: What is the reach (i.e., frequency of re-pins and likes) and purpose (i.e., goal) of skin tanning-related pins on Pinterest?

RQ2: How is skin tanning covered on Pinterest in terms of tanning behavior portrayal (method of tanning, individual versus group behavior, kind of message)?

RQ3: To what extent do Pinterest pins use vicarious learning (demonstrating a certain behavior and consequences of engaging in that behavior) to encourage skin tanning behavior?

RQ4: Are there characteristic differences in pins (purpose, tanning behavior portrayal, and modeling) that are more frequently re-pinned and liked as compared with pins that are less frequently re-pinned and liked?

METHODS

A content analysis was conducted of pins on skin tanning on Pinterest to answer the research questions posed.

Sample and selection of pins

To collect pins on skin tanning, we searched Pinterest.com using five search key words—skin tanning, tanning, indoor tanning, sunbathing, and sun tanning—in November 2016. A total of 895 pins were downloaded, of which 5 pins were duplicates. The duplicates were removed, resulting in 890 unique pins that were assigned a unique identification number.

Coding procedures and inter-rater reliability

The coding procedure included seven steps. At Step 1, four research assistants were trained to apply the coding scheme reliably, and then divided in two coding teams (Team A, Team B). The total number of pins ($N = 890$) were divided in two sets ($n = 445$ unique pins in each set). At Step 2, to establish the first inter-rater reliability, the two coders in each team started with coding the same designated subset of pins ($n = 22$; 5% of 445). At Step 3, percentage agreements were calculated to check for inter-rater reliability with discrepancies resolved by the first author and reconciled codes entered as data [30]. We continued with coding only when the coders achieved a minimum of 80% agreement. At Step 4, both coders in each team independently coded 211 or 212 pins. After the first set of independent coding, the second inter-rater reliability was assessed in Step 5 and discrepancies were resolved by the first author and reconciled codes entered as data in Step 6. At Step 7, both coders in each team independently coded 212 or 211 pins. Figure 1 provides a visual description of the procedure. In summary, 802 pins were coded once independently, and 88 pins were double coded by two coders independently. The percentage agreement for all the coding categories was high, and ranged between 85% and 100%. Specific percentage agreements for IRR1 and IRR2 for each coded category are available from the first author.

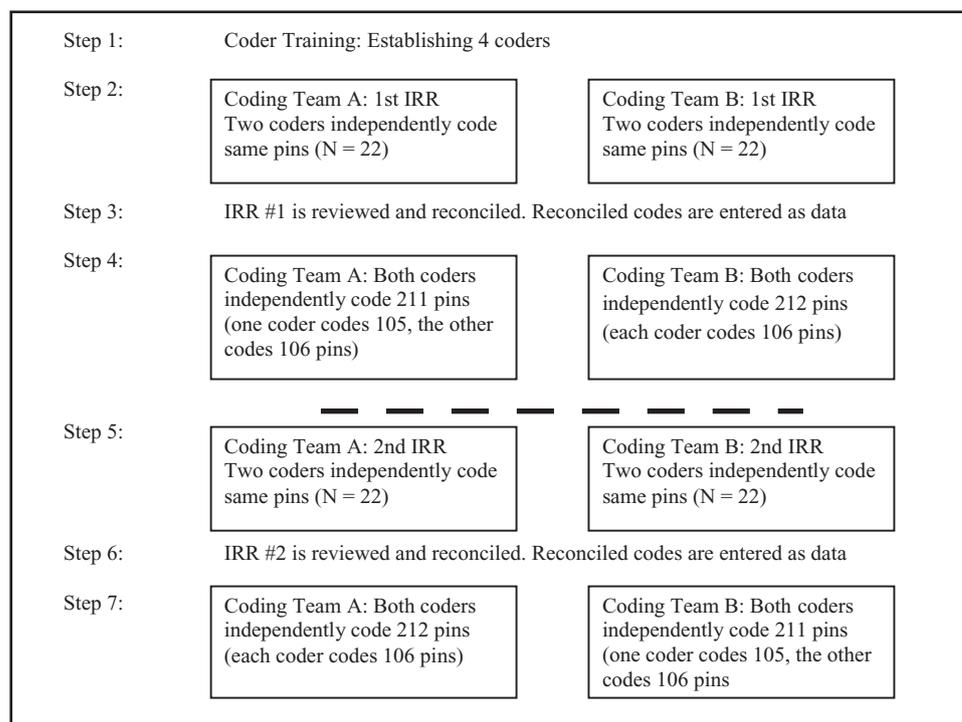


Fig 1 | Inter-rater reliability (IRR) and coding procedures (N = 890 pins).

Unit of analysis and measurement

The unit of analysis was an individual pin about tanning. Before initiating coding, it was necessary to screen the pins and only select the ones that were relevant. All the downloaded pins were first coded for their relevance to skin tanning into three categories: high relevance, low relevance, and no relevance. A pin was coded as having *high relevance* when its primary focus was on skin tanning (e.g., a pin showing before and after images of women's legs on a bed with the words "best sunless tanner ever"; or a pin showing an image of a female in a bathing suit sitting on a beach and applying oil on her legs with the words, "homemade dark tanning oil..."; $n = 362$; 40.7%), *low relevance* when its primary focus was on something else like fashion or clothing and mentioned tanning only in passing (e.g., a pin with an image of a swimsuit with the words, "Show off your tan in this supersoft, drapery romper with a crochet top that reveals just a hint of sun kissed skin"; or a pin with image of celebrity Vanessa Hudgens in a halter top and the words, "She's the queeeeeen:) Love her tanned skin, hair, makeup & fit she issss!"; $n = 139$; 15.6%), and *no relevance* when the pin was not about skin tanning at all but is about leather tanning, tan colored clothes, make-up or nail paint, wall paint, and so on (e.g., a pin with the image of a make-up palette with the words, "They are almost here!"; or a pin with a pair of tan-colored pumps with the words, "GUCCI fashion show chunky heel sandals found on polyvore"; $n = 389$; 43.7%). The pins with no relevance were not coded further, resulting in 501 usable pins.

The overall descriptive information of each pin was recorded, including number of re-pins and number

of likes. We used a deductive approach to coding to analyze the pins about tanning. The structure of analysis was operationalized based on prior literature on Pinterest, SCT, and outcome expectancies of tanning [29, 30, 50] and consisted of the following categories: *reach* (operationalized as number of re-pins and number of likes; RQ1) and *purpose* (operationalized as goal of the pin; RQ1), *tanning behavior portrayal* (operationalized as method of tanning, individual versus group behavior, and kind of message; RQ2), and *vicarious learning/modeling* (operationalized as demonstration of tanning behavior and consequences of engaging in that behavior, and included presence/absence of noncelebrity human models—not necessarily celebrity or paid models—but an attractive person, modeling desired behavior, modeling gender, nudity, and positive and negative outcome expectancies; RQ3). Table 1 presents the coding scheme and includes a list of coding categories and definitions. The coding scheme applied to both images and words in the pin.

Data analysis

Descriptive statistics (frequencies and percentages) were calculated to assess distribution of codes in the pins, particularly to answer RQs 1–3. To answer RQ4, we dichotomized the data by applying a median split to differentiate between low and high re-pinned pins (median = 38) and low and high liked pins (median = 6). A series of pairwise chi-square tests with Fisher's exact test were conducted to examine differences in pins (in terms of purpose, tanning behavior portrayal, and modeling). In addition, to reconfirm the findings for RQ4, we split the sample

Table 1 | A description of coding categories, definitions, and values

Coding category	Definition	Value
1. Relevance	Being closely connected with or appropriate to skin tanning	<p>1 = High relevance: primary focus on skin tanning</p> <p>2 = Low relevance: primary focus on something else like fashion or clothing and mentions tanning (or implicit reference to tanning) only in passing</p> <p>3 = No relevance: when the pin is about not about skin tanning at all (e.g., it's about leather tanning or tan colored paint, etc.)</p>
2. Goal	Objective that the pin is trying to achieve	<p>1 = Protanning: when the pin is explicitly or implicitly in favor of tanning</p> <p>2 = Antitanning: when the pin is explicitly or implicitly against tanning</p> <p>3 = Promotional protanning: when the goal of the pin is to promote products, services, or charity events related to skin tanning (e.g., ad for a tanning salon, industry)</p> <p>4 = Promotional antitanning: when the goal of the pin is to promote products, services, or charity events related to skin cancer (e.g., skin cancer awareness charity promoting a ban of tanning salons)</p> <p>5 = Other: if the goal of the pin doesn't fit-in with any of the aforementioned goals, code it as other and write-out the goal</p>
3. Kind of tanning	The type of tanning mentioned or alluded to in the pin	<p>1 = Sun tanning: if the pin is about sun tanning</p> <p>2 = Sunless tanning: if the pin is about use of sunless lotions/oils etc. for altering skin color</p> <p>3 = Indoor tanning: if the pin is about use of indoor tanning beds/lamps/booths</p> <p>4 = Sun protection: if the pin is about protecting oneself from the sun</p> <p>5 = Indoor tanning cessation: if the pin is about quitting indoor tanning</p> <p>6 = Not specified: if the pin does not specify kind of tanning</p>
4. Kind of message	The type of message portrayal in the pin	<p>1 = Words only: if the pin includes only words</p> <p>2 = Images and words: if the pin includes images as well</p> <p>3 = Video: if the pin includes a link to a video</p>
5. Social tanning	Is the tanning behavior shown as an individual behavior or one with friends/others	<p>1 = Social behavior: tanning with others</p> <p>2 = Individual behavior: tanning by oneself</p> <p>3 = No tanning behavior shown/unable to assess</p>
6. Noncelebrity human models	If the pin includes human models (not celebrity or paid models only) to show tanning behaviors	<p>1 = Yes: pin shows noncelebrity human models</p> <p>2 = No: pin does not show noncelebrity human models</p>
7. Modeling desired behavior	If the pin shows the desired behavior it is advocating (explicit or implicit)	<p>1 = Yes—how to tan: pin shows how to tan, e.g., laying in the sun, standing in the tanning booth</p> <p>2 = Yes—how to avoid: pin shows how to avoid tanning, e.g., putting on sunscreen, wearing wide brimmed hat</p> <p>3 = No: pin does not show desired behavior</p>
8. Modeling gender	The gender of the model in the pin	<p>1 = Female: pin has a female model</p> <p>2 = Male: pin has a male model</p> <p>3 = Both: pin has male and female models</p> <p>4 = No model: pin does not have a model</p>
9. Nudity	To assess if the pin includes models that are showing skin on the specific parts noted below	See below...
9a. Legs	Nude legs	1 = yes, 0 = no
9b. Mid-riff	Nude mid-riff	1 = yes, 0 = no
9c. Chest area	Nude chest area	1 = yes, 0 = no
9d. Arms	Nude arms	1 = yes, 0 = no

(Continued)

Table 1 | Continued

Coding category	Definition	Value
9e. Back	Nude back	1 = yes, 0 = no
9f. Any other	Nudity in any other part of the body	1 = yes, 0 = no
10. Reinforcement	If the pin provides explicit positive or negative reinforcement	1 = Positive—for tanning: pin provides positive reinforcement for tanning behavior 2 = Positive—for avoiding tanning: pin provides positive reinforcement for avoiding tanning 3 = No reinforcement: pin does not provide reinforcement
11. Outcome expectancy	Beliefs about the expected consequences of engaging in a behavior	See below...
11a. Appearance reasons to tan	When the pin discusses enhancement to one's appearances, such as tanning will make one look thinner, sexier, etc. (either explicit or implicit)	1 = yes, 0 = no
11b. Appearance harms	When the pin discusses harms to the skin and appearance due to tanning	1 = yes, 0 = no
11c. Health improvement	When the pin discusses tanning improving one's physical health or safety, or to avoid sunburn etc.	1 = yes, 0 = no
11d. Health threat	When the pin discusses damaging effects of tanning on one's health	1 = yes, 0 = no
11e. Convenience of tanning	When the pin discusses ease of getting a tan, etc.	1 = yes, 0 = no
11f. Psychological/physical discomfort	When the pin discusses tanning being a waste of money, unnecessary, inconvenient, etc.	1 = yes, 0 = no
11g. Mood enhancement	When the pin discusses improving mood, enjoyment, nostalgia, or relaxation as a result of getting the tan	1 = yes, 0 = no
11h. Social approval	When the pin discusses tanning approval by friends and romantic partners	1 = yes, 0 = no
11i. Social disapproval	When the pin discusses tanning being disapproved by friends and/or romantic partner.	1 = yes, 0 = no
11j. Parental approval	When the pin discusses tanning approval by parents.	1 = yes, 0 = no
11k. Parental disapproval	When the pin discusses tanning being disapproved by parents	1 = yes, 0 = no

in three groups (low, medium, and high) based on tertiles, and conducted the analyses comparing the low versus high groups. The pattern of results was similar to the median split analyses (and available from the first author). For brevity, we report the median split analyses only. Given that multiple tests were conducted for nudity (five tests) and outcome expectancies (six tests), we adjusted for multiple testing and only report $p \leq .01$ or $p \leq .001$.

RESULTS

Reach and purpose of skin tanning-related pins

RQ1 asked about the reach and purpose of skin tanning related pins. Reach was assessed by the distribution of re-pins and likes. Of the 890 downloaded

pins, 501 pins were coded for this study, whereas 389 pins were not relevant and were not coded further. The coded pins had an average of 1,228.98 re-pins ($SD = 11,272.44$, median = 38, range = 1–243,700) and 259.09 likes ($SD = 2,978.33$, median = 6, range = 0–65,800), indicating a highly varied distribution. In terms of goal or purpose of the pins, 204 (40.7%) were protanning (in favor of tanning generally, but not promoting any specific product, service, or event), 30 (6%) were antitanning (against tanning, but not promoting any specific product, service, or event), 222 (44.3%) were promotional protanning (promoting products, services, or charity events related to skin tanning), 12 (2.4%) were promotional antitanning (promoting products, services, or charity events related to skin cancer), and 33 (6.6%) were unclear.

Tanning behavior portrayal in pins

RQ2 asked about the way tanning behavior is portrayed on Pinterest. Tanning behavior portrayal was operationalized as the method of achieving a tan, individual versus social tanning, and the kind of message used for portrayal (i.e., words only, images, and words, or video). Our data showed that the following methods of tanning were portrayed in the pins: sunless tanning ($n = 196$; 39.1%), sun tanning ($n = 133$; 26.5%), sun protection ($n = 23$; 4.6%), indoor tanning ($n = 7$; 1.4%), indoor tanning cessation ($n = 4$; 0.8%), and unspecified ($n = 138$; 27.5%). In terms of tanning as an individual versus social behavior (tanning with friends), actual behavior was portrayed in 238 (47.5%) of the pins, with tanning most frequently portrayed as an individual behavior ($n = 224$; 44.7%) and less frequently as a social behavior ($n = 14$; 2.8%). Finally, in terms of how the message in the pin was portrayed, images and words were used most often ($n = 477$; 95.2%), followed by words only ($n = 22$; 4.4%), and video ($n = 2$; 0.4%).

Modeling behavior in pins

RQ3 asked about modeling/vicarious learning that encourages tanning behavior on Pinterest. To operationalize modeling, defined as implicit or explicit presentation of the desired behavior the pin is advocating, we coded for the following variables: use of noncelebrity human models, modeling desired behavior, gender of the model, nudity, reinforcement, and outcome expectancies (see Table 1). Descriptive results for the modeling-specific variables are presented in Table 2. The results indicated that noncelebrity human models were present in 62.3% of the pins, and a majority of those models were females (97.7%). Description regarding “how to tan” was provided in 23% of the pins, and 48.5% pins provided a positive reinforcement for tanning (desirable response such as words like “sexy looks,” “great body,” and “perfect tan,” presented as a consequence of tanning). Nudity or exposure of skin on particular body parts was most evident on arms (32.1%), followed by legs (31.1%), chest area (22.4%), mid-riff (21%), and back (8%). In terms of outcome expectancy, the most frequently portrayed positive outcome expectancy was endorsement of appearance reasons to tan (35.3%), followed by health improvements (12.9%), convenience of tanning (11.4%), and mood enhancement (4.2%). The most frequently portrayed negative outcome expectancy was health threat (6.6%), followed by appearance harms (4.4%), and psychological/physical discomfort (1%).

Differences in pins based on frequency of re-pins and likes

RQ4 assessed characteristic differences in pins (purpose, tanning behavior portrayal, and modeling) that are more frequently re-pinned and liked as compared with pins that are less frequently re-pinned and liked. Results showed no significant differences

in the purpose of skin tanning related pins (Table 3). In terms of tanning behavior portrayal, there was lower re-pinning and lower liking of sunless tanning pins compared with sun tanning pins. As well, there was lower re-pinning and lower liking of pins that did not portray tanning behavior compared with pins that portrayed how to tan. Finally, in terms of modeling description, the more frequently re-pinned and liked pins were more likely to have noncelebrity human models than not, and to portray nudity (in legs) compared with pins that did not portray nudity (in legs). Finally, there was lower re-pinning of pins that portrayed appearance harms than the pins that did not portray appearance harms.

DISCUSSION

As the third most popular social media site, Pinterest can be harnessed by individuals and corporations for promoting tanning by informing its users about new products in the market to aid the tanning process, celebrating tanning behavior, and tanned looks, as well as for preventing tanning by informing its users about the risk factors associated with skin cancer and promoting skin cancer prevention. This study analyzed pins on Pinterest about skin tanning through a content analysis. More than half the pins coded displayed tanning behavior in some form (sunless, sun tanning, or indoor tanning) and 23% of the pins described “how to tan.” From the vicarious learning paradigm of the SCT [46, 47], these findings suggest that the portrayal of tanning behavior on Pinterest may achieve one of two goals: (a) motivate some Pinterest users to learn from and engage in such behavior themselves, and (b) provide positive reinforcement to Pinterest users who engage in tanning behavior themselves. The exact course of behavior adoption or behavior maintenance can be examined in future research.

Overall, the results also indicated an overwhelmingly protanning characteristic of pins about skin tanning on Pinterest, with over 85% of pins promoting tanning behavior. This finding is aligned with the emerging data on popularity of tanning-related topics on social media platforms. The coded pins had an average of 1,228.98 re-pins ($SD = 11,272.44$, range = 1–243,700) and 259.09 likes ($SD = 2,978.33$, range = 0–65,800), indicating a highly varied distribution. Compared with the study about skin cancer-related pins [29], where the pins had an average of 48.36 re-pins ($SD = 127.75$) and 6.86 likes ($SD = 17.59$) the current study data indicates greater prevalence of tanning pins as compared with skin cancer related pins.

In one study, Google search trends of tanning-related key words showed seasonal trends with higher rates of searching in the USA annually in February–May and the peak in March [50]. In another study conducted over a 2-week period, more than 150,000 posts on Twitter, reaching more than 100 million

Table 2 | Descriptive analysis of skin tanning modeling behavior on Pinterest (N = 501)

Coding category	Number of pins (n)	%
1. Noncelebrity human models		
1a. Yes—human models	312	62.3
1b. No—human models	189	37.7
2. Modeling desired behavior		
2a. How to tan	115	23.0
2b. How to avoid	4	0.8
2c. No tanning-related behavior	382	76.2
3. Modeling gender		
3a. Female model(s)	305	60.9
3b. Male model(s)	3	0.6
3c. Both female and male model(s)	4	0.8
3d. No models	189	37.7
4. Nudity ^a		
4a. Legs	156	31.1
4b. Mid-riff	105	21.0
4c. Chest area	112	22.4
4d. Arms	161	32.1
4e. Back	40	8.0
4f. Any other	5	1.0
5. Reinforcement		
5a. Positive—for tanning	243	48.5
5b. Positive—for avoiding tanning	30	6.0
5c. No reinforcement	228	45.5
6. Outcome expectancy ^a		
6a. Appearance reasons to tan	176	35.3
6b. Appearance harms	22	4.4
6c. Health improvement	64	12.9
6d. Health threat	33	6.6
6e. Convenience of tanning	57	11.4
6f. Psychological/physical discomfort	5	1.0
6g. Mood enhancement	21	4.2
6h. Social approval	7	1.4
6i. Social disapproval	0	0
6j. Parental approval	0	0
6k. Parental disapproval	1	0.2

^aNudity and Outcome expectancy were multiple response variables.

users, mentioned indoor tanning, with less than 5% of the tweets mentioning risks [51]. These findings suggest that tanning-related messages on social media are frequent, and highlight intentional indoor and/or outdoor tanning rather than skin cancer prevention. Social media has not yet been fully harnessed for skin cancer prevention research [52].

The pins analyzed in the current study were generally characterized by the portrayal of a noncelebrity female model and provided positive reinforcement. Use of tanning for enhancing appearance was the main positive outcome expectancy portrayed in the pins and nudity or exposure of skin on arms and legs was evident in a large number of pins. This finding is interesting, given that the current data on melanoma indicates that the most frequent site of melanoma in

women is the legs, while in the men, it is their trunk [53]. These facts regarding the more frequent site of melanoma and highlighting associations with poor skin cancer prevention behaviors (such as laying down in sun or indoor tanning) in different genders can really be utilized for highlighting the need for using sun protection and avoiding indoor tanning. As well, educating the public about self-skin examinations as melanoma can also be diagnosed in unexposed areas of the body is important for skin cancer prevention efforts.

In terms of vicarious learning/modeling, the study demonstrates the value of using imagery for portraying a behavior and consequences of engaging in the behavior. With overwhelmingly positive pins promoting tanning, use of noncelebrity female models,

Table 3 | Results of chi-square tests comparing more frequently versus less frequently re-pinned and more frequently versus less frequently liked pins

	Low versus high re-pinned pins			Low versus high liked pins*		
	Low re-pinned <i>n</i> (%) ^a	High re-pinned <i>n</i> (%) ^a	χ^2	Low liked <i>n</i> (%) ^a	High liked <i>n</i> (%) ^a	χ^2
1. Goal			6.25			2.64
Protanning	209 (87.8%)	219 (94.4%)		219 (89%)	209 (93.3%)	
Antitanning	29 (12.2%)	13 (5.6%)		27 (11%)	15 (6.7%)	
2. Kind of tanning			13.96**			17.72**
Sun tanning	51 (30.7%)	84 (50.9%)		53 (30.1%)	82 (52.9%)	
Sunless tanning	115 (69.3%)	81 (49.1%)		123 (69.9%)	73 (47.1%)	
3. Kind of message			3.95			2.86
Words only	6 (2.4%)	15 (6%)		7 (2.7%)	14 (5.8%)	
Images and words	243 (97.6%)	236 (94.0%)		250 (97.3%)	229 (94.2%)	
4. Social tanning			0.14			0.94
Individual behavior	85 (93.4%)	139 (94.6%)		83 (92.2%)	141 (95.3%)	
Social behavior	6 (6.6%)	8 (5.4%)		7 (7.8%)	7 (4.7%)	
5. Noncelebrity human models			7.12*			14.10**
Yes	138 (55.4%)	167 (67.1%)		137 (53.3%)	168 (69.7%)	
No	111 (44.6%)	82 (32.9%)		120 (46.7%)	73 (30.3%)	
6. Modeling desired behavior			8.63*			10.36**
How to tan	43 (17.6%)	72 (28.7%)		44 (17.3%)	71 (29.5%)	
No tanning behavior	202 (82.4%)	179 (71.3%)		211 (82.7%)	170 (70.5%)	
7. Nudity ^b						
Legs	55 (36.7%)	101 (54.3%)	10.38**	57 (38.0%)	99 (53.2%)	7.74*
Midriff	39 (26.2%)	66 (35.5%)	3.33	40 (26.8%)	65 (34.9%)	2.52
Chest area	41 (27.7%)	71 (38.2%)	4.05	42 (28.4%)	70 (37.6%)	3.17
Arms	64 (43%)	97 (52.4%)	2.97	64 (43%)	97 (52.4%)	2.97
Back	11 (7.4%)	29 (15.6%)	5.30	13 (8.7%)	27 (14.5%)	2.64
8. Reinforcement			6.96			3.23
Positive—for tanning	112 (44.6%)	133 (53%)		118 (45.6%)	127 (52.3%)	
Positive—for avoiding tanning	21 (8.4%)	9 (3.6%)		19 (7.3%)	11 (4.5%)	
No reinforcement	118 (47%)	109 (43.4%)		122 (47.1%)	105 (43.2%)	
9. Outcome expectancy ^c						
Appearance reasons to tan	89 (35.6%)	88 (35.1%)	0.02	91 (35.3%)	86 (35.4%)	0.00
Appearance harms	17 (6.8%)	5 (2%)	6.90*	17 (6.6%)	5 (2.1%)	6.12
Health improvement	37 (14.9%)	29 (11.6%)	1.16	41 (16%)	25 (10.3%)	3.43
Health threat	18 (7.3%)	15 (6%)	0.32	18 (7%)	15 (6.2%)	0.14
Convenience of tanning	34 (13.7%)	24 (9.6%)	2.01	36 (14%)	22 (9.1%)	2.93
Mood enhancement	7 (2.8%)	14 (5.6%)	2.41	8 (3.1%)	13 (5.4%)	1.58

df was 1 for all tests, except for reinforcement (*df* = 2).

^aPercentages provided are for low re-pinned versus high re-pinned and for low liked versus high liked. Percentages are not of total pins coded.

^bNudity was a multiple response variable, and for each subtype of nudity (e.g., arms, legs, back), we measured it as present or absent. Frequencies for present categories are noted here.

^cOutcome expectancy had 11 subscales of measurement. To have adequate number of counts per category, we ran the analysis on the subscales that had a frequency of 10 or more. Each category was measured as present or absent. Frequencies for present categories are noted here.

p* < .01, *p* < .001.

exhibiting nudity, and appearance enhancement, there seems to be a consistent targeting of female users to accept tanning as a socially acceptable and popular behavior. The majority of messages that included outcome expectancy promoted attractiveness as motivation to engage in the tanning behavior. Findings suggest that these messages perpetuate the idea that skin tanning enhances appearance.

This finding is consistent with previous research demonstrating that appearance is often a motivation behind skin tanning [54–58].

Prior research has revealed that higher users of social networking sites get exposed to appearance norms in the media and thus engage in behaviors such as refraining from sun protection while indoors or indoor tanning that lead to darkening skin tone

to adhere to media norms [27]. Another study also suggested that most of the videos on YouTube portrayed tanning positively and most videos included the appearance consequences of tanning [23]. Thus, multiple studies conducted on different social media platforms indicate a higher prevalence of attraction motivation and skin darkening norms on the specific social networking sites.

When users see a large number of likes and re-pins on pins that promote skin tanning, they are encouraged to follow the behaviors of both celebrity and noncelebrity human models in the pins with the motivation to look like them [36]. By examining comments and discussions about tanning pins, we can get a more in-depth view of how users who disseminate these images engage in communication around skin tanning risks. As the majority of Pinterest users are young adult women, it appears that this group is frequently engaging with skin tanning and appearance enhancement ideas on this platform. The endorsement of skin tanning messages by like-minded peers serves as a social reward, and this visible display of engagement furthers the acceptance of tanned skin and appearance and adoption of the idealized behaviors [46]. Recent population-based data inform us that intentional indoor and outdoor tanning remains significant among non-Hispanic young adult White women [11], and policy-based approaches such as age-based restrictions aimed at youth access will have limited effect on this population [54]. Therefore, it seems that social media could present prevention opportunities targeting this group, and need to be explored further.

This study clearly demonstrates that social media is a viable platform for information presentation, information searching, and connecting with like-minded individuals. Although we focused on skin tanning, some recent research has also harnessed the potential of Pinterest for skin cancer prevention messages [29]. Analyses revealed that only 16% of the pins discussed the cause of skin cancer, and 6% of the pins included explicit information on primary skin cancer prevention methods and 15% of the pins include information on secondary skin cancer prevention methods. Although the current pattern of coverage of skin cancer on Pinterest indicates a lack of cause framing (i.e., lack of focus on the causes of skin cancer) and a lack of primary skin cancer prevention messages, use of social media for skin prevention can really be marshaled for UV protection and avoidance, and for portraying harmful and unintended consequences of tanning behavior [29]. Prior research suggests that prevention messages are more effective when they contain images, and thus, a platform like Pinterest could be harnessed more for skin cancer prevention [59]. This can be done through more creative use of images in creating infographics that integrate visuals and text in a

way that makes them both vivid and information rich. In addition, better use of hash tags in skin cancer prevention pins may increase presence of these pins for people searching for fashion and/or clothing, make-up, tanning, looks, and so forth, and will increase visibility and potential reach of these pins. The work on positive body image and exercise motivation on Pinterest [45] can be further leveraged for disseminating messages on safe sun behaviors. Social media provides a useful platform for cancer prevention research and has the potential to reach a large number of people.

Limitations

This study is not without limitations. First, we examined pins downloaded from Pinterest in November 2016. It may be possible that the characteristics of pins curated, re-pinned, and liked between summer and winter months are different in terms of content, form, and other characteristics. A future study could compare the pins between summer and winter months to account for seasonal differences in tanning behavior and association with pins on Pinterest. Second, Pinterest is only one of the social media platforms. A more comprehensive study of skin tanning portrayal across the social media platforms such as Instagram and Twitter will provide a more compelling evidence of how social media is being harnessed for certain kinds of messages. Each site has unique features that will affect how a behavior is portrayed and how users engage with the message. Third, given the gendered nature of Pinterest use [60, 61], a study could analyze how male and female users pin differently about tanning. Similarly, analyses of pins differing by the creator (commercial enterprise or an individual user) can provide insight into the promotional intent of the pins. Relatedly, a future observational study could be conducted to understand the characteristics of users who pin favorably about tanning, re-pin, or who like and comments on these pins to better understand the reach of these pins (beyond just number of people who are reposting, liking, or commenting). Finally, we only analyzed the frequency of likes and re-pins but did not focus on the comments that users post about the pin. A future study could analyze the content of discussions and conversations that ensue on social media regarding tanning pins. These discussions could either critique or reinforce the tanning behavior portrayal and may also initiate discussions about skin cancer.

CONCLUSIONS

Melanoma is one of the most common cancers in young adults, especially younger women [1], and most (>90%) melanoma skin cancers are caused by the damage from UVR received through indoor tanning and outdoor exposure [6, 7]. Therefore, young

adults need exposure to a greater number of messages about UV protection and skin cancer prevention [29]. Social media provides a viable platform for dissemination of such messages and should be leveraged to examine the most efficacious method of motivating people to engage in safe sun and skin cancer prevention and detection behaviors.

Compliance with Ethical Standards

Primary Data: The findings reported in this paper have not been previously published, and the manuscript has not been simultaneously submitted elsewhere. The authors have full control of all primary data, and we agree to allow the journal to review the data, if requested.

Conflict of Interest: The authors report no conflicts of interest.

Ethical Approval: This study does not involve human participants and informed consent was therefore not required. This article does not contain any studies with animals performed by any of the authors.

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