



Trust for online social media direct-to-consumer prescription medication advertisements



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ABSTRACT

Objectives: We are not aware of research on the association of social factors with trust for online social media direct-to-consumer prescription medication advertisements (DTCA). We study the association of race/ethnicity and social factors with online social media DTCA trust.

Methods: Participants ($n=665$) were asked no/yes questions about their exposure to online social media DTCA advertisements from any of the following online social media platforms of Facebook, Google+, Instagram, LinkedIn, Pinterest, Snapchat, Twitter, Tumblr, and YouTube. Multivariate linear regression analyses were performed for trust and included predictors of race/ethnicity and social factors.

Results: Asian/Asian American race/ethnicity ($B=6.71$, $SE=1.63$, $p < 0.001$), prescription medication use ($B=3.87$, $SE=1.49$, $p=0.01$), and bonding social capital ($B=0.31$, $SE=0.05$, $p < 0.001$) were each positively associated with increased trust in online social media DTCA. Age and tie strength were each not associated with trust in online social media DTCA.

Conclusions: We recommend that pharmaceutical marketers revise their current marketing policy and allocate in their budgets funding for online social media DTCA that are tailored to Asians/Asian Americans and include topics relating to bonding social capital. Pharmaceutical marketers may also want to employ easily accessible approaches for sharing online social media DTCA so that those with strong bonding social capital can connect with each other.

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Introduction

In 2015, pharmaceutical companies spent \$6.1 billion on direct-to-consumer prescription medication advertisements (DTCA) [1]. DTCA are seen or heard by 86% of people in the United States [2]. A review article on DTCA expenditures in the United States reported that Internet DTCA increased by 109% from 2005 to 2009 [3]. Social media advertising is a subtype of Internet advertising and consumers report exposure to online social media DTCA advertising [4].

Cultural values may influence the way a particular racial/ethnic group reacts to DTCA. Asians are generally more collectivistic while Whites are more individualistic [5,6] and these cultural values will influence the types of advertising that will appeal to Asians and Whites [7]. For example, consumers from China value more than those from the United States the social effects of advertising [8].

In developed countries, minority racial/ethnic groups are quicker to adapt to Internet social media than majority racial/ethnic group consumers [9]. Also, social media is important for brand building [9].

The purpose and research objective of this paper is twofold. First, although there is research showing Asian/Asian American race/ethnicity preferences for trust in DTCA [4], there is no literature showing race/ethnicity preferences for trust in online social media DTCA. Online social media is an increasingly popular area for advertising [10]. A better understanding of the interests of different racial/ethnic groups would further allow pharmaceutical companies to target racial/ethnic groups with online social media DTCA. One aim is to study if race/ethnicity is associated with trust for online social media DTCA. Second, social variables may influence trust in online social media DTCA. A second aim is to study if social variables are associated with trust for online social media DTCA. We consider those social variables that differ between racial/ethnic groups. In the literature review section below, we review selected articles retrieved from scholarly databases to formulate our hypotheses.

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Literature review

Trust

DTCA may be perceived differently by different racial/ethnic groups. African Americans are more likely than Hispanic Americans and White Americans to speak with their physicians about DTCA [11]. White Americans are more skeptical of DTCA than Hispanics [12]. After exposure to DTCA, Hispanic Americans are more likely to request medications from physicians than either African Americans or White Americans [13]. Asians/Asian Americans have greater trust for DTCA than White Americans [4].

Hypothesis 1. Race/ethnicity is associated with increased trust in online social media DTCA with non-white racial/ethnic groups having greater trust than White Americans.

Bonding and bridging social capital

Bonding social capital refers to close-knit relationships among people with similar characteristics, while bridging social capital refers to relationships that connect those who do not have similar characteristics [14]. Both bonding and bridging social capital are important for understanding responses to advertising [15]. White Americans and Asians had greater bonding social capital for online news media than African Americans and Hispanic Americans, while no differences between these racial/ethnic groups occurred for bridging social capital [16]. Bridging social capital with friends composed of different race/ethnicities was greatest for Asians/Asian Americans as compared to other race/ethnicities [17]. Concerning social media, there are conflicting findings. One study found that Asians and Hispanic Americans had greater bridging social capital than White Americans for the use of social networking websites while no association occurred for bonding social capital [18]. However, another study found that American college students had higher bridging social capital from social media than Korean college students, while bonding social capital was not significantly different between the two groups [19].

Hypothesis 2a. Race/ethnicity is associated with increased social capital with Asian/Asian American race/ethnicity having greater bonding and bridging social capital than other racial/ethnic groups.

Hypothesis 2b. If there are bonding and bridging social capital differences between the racial/ethnic groups, Asian/Asian American race/ethnicity is associated with increased trust in online social media DTCA after adjusting for social capital.

Tie strength

Tie strength is a summary of the emotional connection, time spent together, the level of confiding in each other, and the reciprocal services that characterize the tie [20]. Tie strength is positively associated with click-through rates for advertisements on social media [21]. Tie strength for product endorsers is positively associated with consumer purchase intention for hedonic products but not for utilitarian products [22]. Korean college students had greater tie strength than American college students on online social media [19].

Hypothesis 3a. Race/ethnicity is associated with increased tie strength with Asian/Asian American race/ethnicity having greater tie strength than other racial/ethnic groups.

Hypothesis 3b. If there are tie strength differences between the racial/ethnic groups, Asian/Asian American race/ethnicity is associated with increased trust in online social media DTCA after adjusting for tie strength.

Homophily

Homophily is the tendency of people to associate with those who are similar [23]. People with similar interests participate and stay in an online social media network due to mutual trustworthiness among those who are part of this social media network [24]. Advertising on social media is more effective when the advertiser provides homophilous details [25]. In the community and the workplace, White Americans have the greatest homophily while African Americans and Hispanic Americans have moderate homophily with those of similar race/ethnicity as part of their network [26]. However, another study of homophily for those of similar race/ethnicity reported that White Americans have the least homophily, African Americans have the greatest homophily, and African Americans and Hispanic Americans had greater homophily than Asians [27].

Hypothesis 4a. Race/ethnicity is associated with increased homophily with African American race/ethnicity having greater homophily than other racial/ethnic groups.

Hypothesis 4b. If there are homophily differences between the racial/ethnic groups, African American race/ethnicity is associated with increased trust in online social media DTCA after adjusting for homophily.

Method

Participants

The sample was obtained from students surveyed at a New York City college. Of the 821 students approached, 41 declined to participate, and 88 submitted surveys were invalid because many questions were unanswered. The survey response rate was 86.4% (821/950*100%). To allow for a more consistent college-aged sample, we excluded 23 students above the age of 35. We also excluded 131 people without exposure to online social media DTCA and two people who did not respond to the race/ethnicity question. Data were evaluated from 665 people who had exposure to online social media DTCA from any of the following social media platforms of Facebook, Google+, Instagram, LinkedIn, Pinterest, Snapchat, Twitter, Tumblr, and YouTube. The anonymous survey was completed by participants in lecture halls and classrooms. Informed consent was received from each participant. The survey received ethical approval from the college Institutional Review Board. The survey was conducted during September and October 2017.

Demographics

Demographics included age (years), sex (men/women), and current use of one or more prescription medications (no/yes). Race/ethnicity had categories of White American, African American, Hispanic American, Asian/Asian American, South Asian (India, Pakistan, surrounding areas), and Other.

Bonding social capital

There were 10 items for the bonding social capital scale. A sample item is, "There is someone on my online social network that I feel comfortable talking to about intimate personal problems." Each scale item ranged from 1=strongly disagree to 7=strongly agree. The total score was a summation of all 10 items. These questions came from Williams [28]. The original scale reports acceptable construct validity with similar measures with moderate correlations as high as $r=0.43$ [28]. We modified two reversed items to

Table 1
Characteristics of a sample of 665 participants.

Variable	WA M (SD) or # (%) (n = 205)	AA M (SD) or # (%) (n = 89)	HISP M (SD) or # (%) (n = 100)	ASA M (SD) or # (%) (n = 145)	South Asian M (SD) or # (%) (n = 59)	Other M (SD) or # (%) (n = 67)	p-value	Post-Hoc (p-value)
Age	22.7 (4.33)	22.6 (3.71)	22.5 (3.30)	21.7 (3.15)	21.1 (3.11)	22.2 (3.56)	0.03	WA > ASA (p = 0.03) WA > South Asian (p = 0.004) AA > South Asian (p = 0.01) HISP > South Asian (p = 0.01)
Sex (women)	113 (55.1)	55 (61.8)	48 (48.0)	72 (49.7)	30 (50.8)	31 (46.3)	0.30	
Prescription (yes)	39 (19.1)	23 (25.8)	21 (21.0)	20 (14.1)	9 (15.3)	15 (22.4)	0.29	

Note: M=mean, SD=standard deviation, WA=White American, AA=African American, HISP=Hispanic American, ASA=Asian/Asian American. Sample size varies for prescription (total n = 661) due to omissions by participants with Whites (n = 204) and Asians (n = 142).

be in the same direction as the other items. In addition, we modified “online” to “on my online social network.” Cronbach alpha reliability for this sample was 0.94.

Bridging social capital

There were 10 items for the bridging social capital scale. A sample item is, “Interacting with people on my online social network makes me feel like part of a larger community.” Each scale item ranged from 1 = strongly agree to 7 = strongly disagree. The total score was a summation of all 10 items. These questions came from Williams [28]. The original scale reports acceptable construct validity with similar measures with moderate correlations as high as $r=0.50$ [28]. We modified “online” to “on my online social network.” Cronbach alpha reliability for this sample was 0.93.

Tie strength

There were three items for the tie strength scale. A sample item is, “I communicate frequently with my friends on my online social network.” Each scale item ranged from 1 = strongly disagree to 7 = strongly agree. The total score was a summation of all three items. These questions came from Phua, Jin, & Kim [29]. Their questions were modified from a study where the original scale reports acceptable construct validity with confirmatory factor analysis indicating standardized loadings for each item of 0.69 or greater [30]. The phrase “on this social networking site” was changed to “on my online social network.” Cronbach alpha reliability for this sample was 0.88.

Homophily

There were three items for the homophily scale. A sample item is, “My friends on my online social network behave like me.” Each scale item ranged from 1 = strongly disagree to 7 = strongly agree. The total score was a summation of all 3 items. These questions came from Phua et al. [29]. Their questions were modified from a study where the original scale reports acceptable construct validity with confirmatory factor analysis indicating standardized loadings for each item of 0.69 or greater [30]. The phrase “on this social networking site” was changed to “on my online social network.” Cronbach alpha reliability for this sample was 0.84.

Trust

There were 13 items for the trust scale. A sample item is, “I expect I can count on prescription medicine advertisers on online social media to consider how their actions affect me.” Each scale item ranged from 1 = strongly disagree to 7 = strongly agree. The total score was a summation of all 13 items. These questions related to trust came from Ball, Manika, & Stout [31]. The original scale reports acceptable construct validity with confirmatory factor analysis indicating standardized loadings for each item of 0.71 or greater [31]. The phrase “on online social media” was added to all the questions. Cronbach alpha reliability for this sample was 0.95.

Online social media DTCA venues

Participants were asked if they saw or heard DTCA for each of the following venues of Facebook, Google+, Instagram, LinkedIn, Pinterest, Snapchat, Twitter, Tumblr, and YouTube. Response choices were no or yes.

Statistical analysis

Continuous variables were described with mean and standard deviation. Categorical variables were described with frequency and percent. Analysis of variance (ANOVA) was performed to compare the continuous variables. Least Significant Difference (LSD) post-hoc tests compared those continuous variables that significantly differed. The Pearson chi-square test was performed to compare the categorical variables. Cohen’s d effect sizes were calculated for the significant Asian/Asian American mean comparisons for the social variables. Univariate and multivariate linear regression analyses were performed for the outcome variable of trust in online social media DTCA. As age had a skewed distribution, age was logarithmic transformed for the ANOVA and regression analyses. All analyses used IBM SPSS Statistics Version 25 [32]. All p-values were two-tailed.

Results

Table 1 shows the demographic comparisons. Age significantly differed between the race/ethnicity groups ($p=0.03$). The mean age for White American participants was the highest at 22.7 years.

Table 2
Comparisons between social variables and race/ethnicity.

Variable	WA M (SD) (n = 205)	AA M (SD) (n = 89)	HISP M (SD) (n = 100)	ASA M (SD) (n = 145)	South Asian M (SD) (n = 59)	Other M (SD) (n = 67)	p-value	Post-Hoc (p-value)
Bonding	39.5 (16.86)	35.3 (17.05)	36.5 (15.98)	42.3 (13.59)	39.8 (15.54)	36.8 (15.51)	0.01	WA > AA (p = 0.04) ASA > AA (p = 0.001) ASA > HISP (p = 0.01) ASA > Other (p = 0.02)
Bridging	42.5 (15.20)	42.7 (15.36)	42.7 (14.50)	45.7 (12.25)	44.6 (14.91)	44.4 (15.02)	0.37	
Tie Strength	13.5 (5.36)	14.4 (5.59)	12.8 (5.08)	15.3 (4.20)	15.2 (4.73)	14.7 (4.44)	0.001	ASA > WA (p = 0.001) ASA > HISP (p < 0.001) South Asian > WA (p = 0.03) South Asian > HISP (p = 0.004) AA > HISP (p = 0.03) Other > HISP (p = 0.02)
Homophily	11.8 (4.62)	11.6 (4.97)	10.7 (4.63)	12.5 (3.66)	12.2 (4.10)	11.5 (4.38)	0.08	

Note: M=mean, SD=standard deviation, WA=White American, AA=African American, HISP=Hispanic American, ASA=Asian/Asian American. Sample size slightly varies for tie strength and homphily (total n = 664) due to an omissions by one participant from Other race/ethnicity (n = 66).

LSD post-hoc comparisons between the race/ethnicity groups are shown in Table 1. African Americans had the most women participants (61.8%) and the greatest current users of prescription medications (25.8%). Race/ethnicity did not significantly differ for sex or prescription medications.

Table 2 shows the social variable comparisons for race/ethnicity. Bonding social capital (p = 0.01) and tie strength (p = 0.001) each significantly differed between the race/ethnicity groups. Asians/Asian Americans had the highest mean value for bonding social capital and tie strength. It is important to note that LSD post-hoc comparisons showed that Asians/Asian Americans had higher bonding capital than African Americans (p = 0.001), Hispanic Americans (p = 0.01), and Other race/ethnicity (p = 0.02). In addition, there were medium effect sizes for these comparisons with Cohen's d values of 0.5, 0.4, and 0.4 for the respective analyses of Asians/Asian Americans with African Americans, Hispanic Americans, and Other race/ethnicity. It is also important to note that LSD post-hoc comparisons showed that Asians/Asian Americans had higher tie strength than White Americans (p = 0.001) and Hispanic Americans (p < 0.001). In addition, there were medium effect sizes for these comparisons with Cohen's d values of 0.4 and 0.5 for the respective analyses of Asians/Asian Americans with White Americans and Hispanic Americans. Race/ethnicity did not significantly differ for bridging social capital or homophily.

Table 3 shows linear regression analyses for trust in online social media DTCA. In the univariate analyses, Asians/Asian Americans (B = 7.03, SE = 1.60, p < 0.001), prescription medication use (B = 3.98, SE = 1.58, p = 0.01), bonding social capital (B = 0.36, SE = 0.04, p < 0.001), and tie strength (B = 0.81, SE = 0.12, p < 0.001) were each positively associated with trust in online social media DTCA. Age and sex were each not significantly associated with trust in online social media DTCA. In the multivariate analysis, Asians/Asian Americans (B = 6.71, SE = 1.63, p < 0.001), prescription medication use (B = 3.87, SE = 1.49, p = 0.01), and bonding social capital (B = 0.31, SE = 0.05, p < 0.001) were each positively associated with trust in online social media DTCA. The beta coefficients in the multivariate analyses for Asians/Asian Americans,

prescription medication use, and bonding social capital after simultaneously adjusting for all the variables were very similar to the beta values reported in the univariate analyses. Furthermore, the categorical variables of Asians/Asian Americans race/ethnicity and prescription medication use had large beta values compared to their respective reference categories. Specifically, Asians/Asian Americans race/ethnicity had almost a 7-unit mean trust score increase and prescription medication use had almost a 4-unit mean trust score increase. The continuous variable beta value for bonding social capital is also large, as it indicates that for every change in 1 unit of bonding social capital that the trust score increases by 0.31 units (approximately 1:3 ratio). Age, sex, and tie strength were each not significantly associated with trust in online social media DTCA.

Fig. 1 shows descriptive statistics for online social media DTCA seen or heard. Over 50% saw or heard advertisements on YouTube and Facebook. Between 49.9% and 25% saw or heard advertisements on Instagram, Google+, and Twitter. Less than 25% saw or heard prescription drug ads on Snapchat, Pinterest, Tumblr, and LinkedIn. Also, 78.0% (519/665) had online social media DTCA exposure from two or more online social media venues.

Discussion

We found support for hypothesis 1, as Asian/Asian American race/ethnicity was positively associated with trust in online social media DTCA. We found support for hypotheses 2a and 2b, as Asian/Asian American race/ethnicity had greater bonding social capital than African Americans and Hispanic Americans and also that bonding social capital was independently positively associated with trust in online social media DTCA. We found support for hypothesis 3a, as Asian/Asian American race/ethnicity had greater tie strength than White Americans and Hispanic Americans. No support was found for hypotheses 3b, 4a, and 4b. Also, current use of one or more prescription medications was positively associated with trust in online social media DTCA.

Table 3

Linear regression analyses for trust in online social media direct-to-consumer prescription medication advertisements.

Variable	Univariate Beta	SE	p-value	Multivariate Beta	SE	p-value
Race/Ethnicity						
WA	reference			reference		
AA	-0.90	1.91	0.64	0.48	1.90	0.80
HISP	1.46	1.81	0.42	2.93	1.80	0.11
ASA	7.03	1.60	<0.001	6.71	1.63	<0.001
South Asian	3.28	2.15	0.13	1.53	2.20	0.49
Other	-1.22	2.11	0.57	0.17	2.14	0.94
Age (years)	-14.02	9.39	0.14	3.01	8.96	0.74
Sex (women)	-0.14	1.25	0.91	0.39	1.17	0.74
Prescription (yes)	3.98	1.58	0.01	3.87	1.49	0.01
Bonding	0.36	0.04	<0.001	0.31	0.05	<0.001
Tie Strength	0.81	0.12	<0.001	0.14	0.15	0.36
Constant	—	—	—	15.87	12.56	0.21

Note: SE=standard error, WA=White American, AA=African American, HISP=Hispanic American, ASA=Asian/Asian American. R-square for the multivariate analysis was 0.16. In the multivariate analysis, interactions of race/ethnicity and bonding were not statistically significant and also had multicollinearity concerns due to high variance inflation factor.

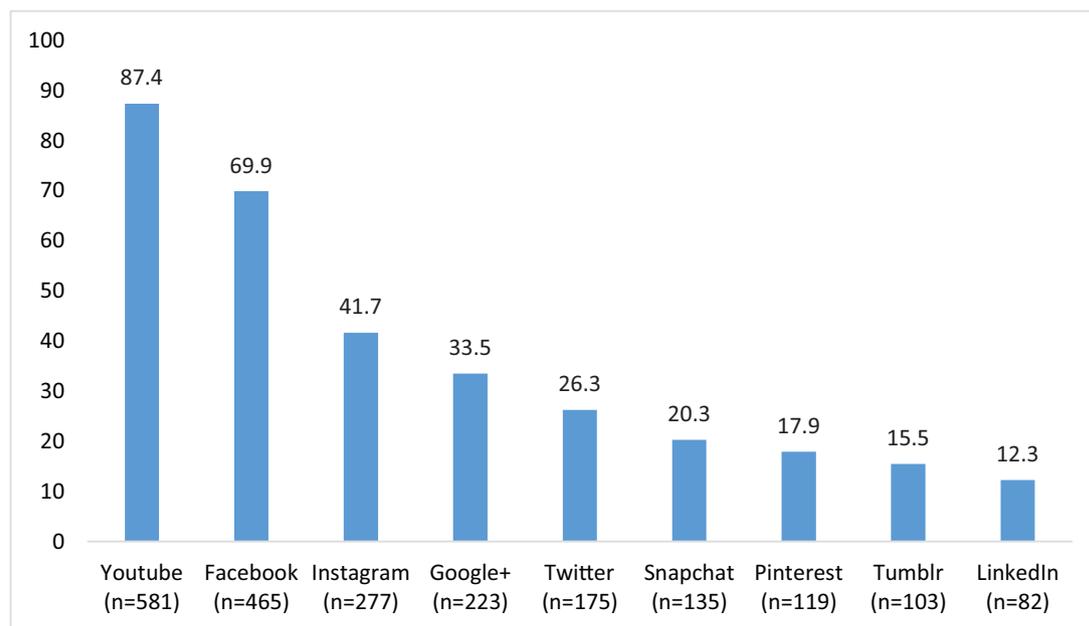


Fig. 1. Online social media direct-to-consumer prescription medication advertisements seen or heard.

Asian/Asian American race/ethnicity was positively associated with trust in online social media DTCA with a large association as compared to the reference group. One study reports that 43.3% of Asians in South Korea trust DTCA information [33]. Also, Asians/Asian Americans have greater trust for DTCA than other racial/ethnic groups [4]. We add to the literature that this trust pattern occurs with Asians/Asian Americans also for online social media DTCA. The practical relevance of our findings is that there may be an aspect of the Asian/Asian American culture that connects with online social media DTCA at a greater level than other race/ethnicity groups.

Asian/Asian American race/ethnicity had greater bonding social capital than African Americans and Hispanic Americans. Previous online social media research does not report any differences in bonding social capital between Asians and other race/ethnicity groups [18,19]. Our results differ where we found that Asians/Asian Americans had greater bonding social capital than other race/ethnicity groups. This is not only a statistically significant difference but also an important difference, as the large difference in units is indicative of an important medium effect size.

Increased online social media intensity is associated with increased bonding social capital [34]. The practical relevance is that it is possible that Asians/Asian Americans use online social media more intensively than other race/ethnicity groups and thus have greater bonding social capital than these other race/ethnicity groups.

Bonding social capital was independently positively associated with trust in online social media DTCA. This was a large association with a 1:3 ratio of change in bonding social capital with trust score. Previous research among those with bonding social capital shows that those with a self-interest incentive are positively associated with sharing commercial messages on online social media [35]. It is likely that a willingness to share commercial messages may occur due to trust in online social media.

Asian/Asian American race/ethnicity had greater tie strength than White Americans and Hispanic Americans. This is not only a statistically significant difference but also an important difference, as the large difference in units is indicative of an important medium effect size. Our results among a sample of those exposed to online social media DTCA concur with the study that Asians have greater tie strength than Americans for online social

media [19]. However, we did not find any association between tie strength and trust in online social media DTCA. Tie strength has mixed findings for engagement in electronic word-of-mouth on online social media where tie strength is positively associated with opinion seeking and opinion passing but not associated with opinion giving [36]. We suggest that these mixed findings are possibly due to ambivalent trust in online social media. This is the reason why we did not find any association of tie strength with trust in online social media DTCA.

We did not find any association of homophily with differences in race/ethnicity. This differs from previous research that reports race/ethnicity differences in homophily [27]. Our study suggests that the market segment of those exposed to online social media DTCA do not have race/ethnicity differences in homophily.

This study has several limitations. First, as the sample only consisted of young adult college students at a New York City college, this may not generalize to other age groups. Future research should study this topic among other age groups. Second, this study occurred in an urban area where there is often a lot of health information publicly available. This may have placed our participants to be more receptive to other healthcare topics such as online social media DTCA. Other areas may have different reactions to online social media DTCA. Third, the online social media DTCA seen or heard may have not targeted the young adult college students and may have been targeting all or other age groups. Future research should study if this same pattern occurs among online social media DTCA specifically targeting young adults. Fourth, we could only study online social media exposure and could not study exposure to particular social media venues such as YouTube or Facebook, as 78% of participants had exposure to two or more social media venues. Fifth, research done with race/ethnicity may also be impacted by acculturation levels. Future research should study if these same race/ethnicity patterns occur with differing levels of acculturation. Sixth, our finding of a difference in bonding social capital between Asians/Asian Americans and other race/ethnicity groups that differs from other studies that do not report any Asians/Asian Americans differences in bonding social capital may have occurred due to different populations and different questions. Furthermore, our findings do not study what is ethical or not ethical in advertising. Future research should study ethical approaches for health-related advertising that are targeted to race/ethnicity groups to determine the approaches that are most effective.

In conclusion, we found that Asians/Asian Americans and bonding social capital are each associated with increased trust for online social media DTCA. We recommend that pharmaceutical marketers revise their current marketing policy and allocate in their budgets funding for online social media DTCA that are tailored to Asians/Asian Americans and include topics relating to bonding social capital. This would be a useful approach not only from a pharmaceutical company perspective but also from a societal perspective. From a societal perspective, this would help consumers receive relevant prescription medications to possibly help address their illness(es). As the advertised prescription medications are approved by the appropriate government regulatory agency, before a consumer can use the medication, a consumer must visit a physician or other approved medication prescriber in order to obtain a prescription. This physician or other approved medication prescriber will discuss the medication with the consumer before possibly providing a prescription. Also, to increase trust for online social media DTCA among other race/ethnicities, pharmaceutical marketers should focus efforts into developing novel social media advertisements that appeal to the particular values and interests of these other race/ethnicities in ways that can lead these viewers to perceive online social media DTCA as trustworthy. As with any marketing campaign, pharmaceutical companies should consider ethical approaches towards developing this trust. Lastly, pharma-

ceutical marketers may also want to employ easily accessible approaches for sharing online social media DTCA so that those with strong bonding social capital can connect with each other.

Author statements

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