Article

Social Marketing Quarterly
2020, Vol. 26(1) 28-46

DOI: 10.1177/1524500419901254
journals.sagepub.com/home/smq
SAGE

Using Motivation, Opportunity, and Ability Model in Social Marketing to Predict "Galamsey" Behavior in Ghana

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Abstract

Background: Illegal mining (hereafter referred to as "galamsey") has adverse effect on human life, the environment, and other living organisms that support human existence. However, the traditional strategies employed by governments and other stakeholders to tackle "galamsey" have proved ineffective in changing "galamseyers" behavior.

Focus: This research thus aims to apply the motivation, opportunity, and ability (MOA) model in social marketing to predict and explain behavior change toward galamsey activities in Ghana. Specifically, the paper investigates the influence of Motivation (i.e., attitudes toward stopping "galamsey" activities, beliefs and subjective norms) on intentions toward the behavior, as well as opportunity and ability on the intentions–behavior nexus.

Key Hypotheses: The study tested the following key hypotheses: There is a positive and significant relationship between beliefs and intention to stop galamsey activities, there is a positive and significant relationship between attitude and intention to stop galamsey activities, there is a positive and significant relationship between social norms and behavioral intention to stop galamsey activities, and there is a positive and significant relationship between intention to stop galamsey and galamsey behavior change.

Methods: Self-administered survey was used to collect data from "galamsey" operators ($n = 238$) in Kyebi-Ghana, using convenience and snowball sampling techniques. The hypothesized relationships were analyzed using partial least squares structural equation modeling (PLS-SEM).

Results: The findings of the study reveal that "galamseyers" behavioral intention toward stopping "galamsey" is mainly determined by the respondents' beliefs about and positive attitudes toward the behavior. The results further establish a positive significant relationship between intention and actual behavior change. Moreover, the findings suggest a strong interactive relationship between intentions and ability, intentions and opportunity and actual behavior. The study however did not find a significant relationship between social norms and intentions to stop "galamsey" activities.

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Recommendation for Research or Practice: These findings can be used to develop interventions aimed at fostering positive behavior change toward "galamsey."
Importance to Social Marketing Field: By applying the MOA model to a social marketing context, the study contributes to knowledge by providing a deeper theoretical understanding from an emerging economy context.
Limitation: Although the MOA model was able to predict "galamsey" behavior change, the model has been criticized for including opportunities and failing to mention that inhibitors (barriers) to be reduced to foster sustainable behavior change. Hence, future studies should include other variables in the model to cater for this gap.

Keywords
social marketing, motivation, opportunity, ability, attitude, intentions, beliefs

Background of the Study

Undisputedly, mining globally has adverse effects on the environment and biodiversity (Majer, 2013; Samimi-Namin et al., 2011). Illegal artisanal mining (Galamsey) further exacerbates the problem particularly in Ghana where majority of the people are unemployed (Ackah-Baidoo, 2016; Hilson & Osei, 2014) and concerns for environmental protection attract little attention (Ezeonu, 2004; Hilson & Osei, 2014). In a recent study, Boateng et al. (2014) assert that communities in Ghana where galamsey activities are prevalent are more susceptible to environmental problems such as fresh water pollution, land degradation, and air pollution among others. Samimi-Namin et al. (2011) corroborate that galamsey activities cause considerable environmental degradation resulting from loss of vegetative cover, land degradation and ecosystem disruption.

According to Boadi et al. (2016), galamsey activities in forest reserves in Ghana particularly pose threats to sustainable forest management and impact negatively on community livelihoods. Statistical evidence suggests that about 2.4 million hectors of Ghana's arable land has been destroyed by galamsey activities and reclaiming such land costs the taxpayer US$29 billion yearly (Frimpong-Boateng, 2018). To confirm this, the government of Ghana has dedicated $100 million under the Multi Sectoral Mining Integrated Project to reclaim lands degraded by galamsey activities (Citifmonline, 2017; CSIR-Forestry Research Institute of Ghana, 2017). In relation to health, scholars such as Saha et al. (2011) indicate that illegal mining poses negative health externalities such as respiratory diseases and malaria in mining dominant communities. In a same vein, Banchirigah (2008) posits that the rise of prostitution and spread of HIV-AIDS in mining communities can largely be attributed to the growth of galamsey activities in recent times. Deadly chemicals such as mercury which aids in so called processing of gold is documented to have serious health implications for people living in areas prone to galamsey activities (Joy News, 2019).

Recent concerns about the negative impact of galamsey activities in Ghana have resulted in various policy interventions, education, and awareness creation campaigns to curb the menace and conserve the environment. For instance, in a bid to discourage galamsey activities, the government of Ghana in the year 2017 launched "Operation Vanguard," a joint military anti-galamsey task force tasked to prevent galamsey activities in gold and diamond rich communities (Ministry of Lands and Natural Resources-MLNR, 2017). Prior to this campaign, a 6-month ban on galamsey activities was imposed, and with the help of Media Coalition against Galamsey, Ghanaians were mobilized to help address the problem.

Despite the efforts made by the government and other stakeholders to help curb this menace, evidence exists to suggest that barriers such as poverty and high unemployment, cumbersome legal

regime and licensing procedures and people's burning desire to "get rich quick" have impeded these efforts, making "galamsey" activities more appealing. There seems to be no corresponding results because little or no effort has been made to understand the motivations behind people engaging in "galamsey" activities. To this end, understating the behavioral as well as psychological mechanisms that influence galamsey activities could lead to a better and a more effective intervention program. Similarly, Albarracín et al. (2003) assert that for intervention programs on "galamsey" to be effective, it must extend to consist arguments designed to induce favorable attitudes, norms, and behavioral skills, and this is where social marketing comes in.

The extant literature emphasizes the application of social marketing in influencing downstream (individual) behavior change toward activities such as physical exercise, anti-smoking, consumption of fruits and vegetables, condom use, cancer awareness, mammograms among others (Andreasen, 2010, 2012; Maibach, 2003; Singaiah & Laskar, 2015; Tweneboah-Koduah, 2014). Over the years, the concept has evolved from this traditional focus of influencing individual behavior change to change that occurs within the society and the environment where the individual resides. As such, social marketing has been employed to address broader environmental problems such as climate change, energy conservation, environmental sustainability, waste management, and water conservation (Dolcinar & Hurlimann, 2010; Domegan, 2008; Fielding et al., 2012; Kennedy & Parsons, 2012; Tweneboah-Koduah et al., 2020). However, despite the successful contributions of social marketing to these aforementioned areas, its application to "galamsey" is non-existent in literature.

Studies on "galamsey" over the years have focused on areas such as the negative impacts of "galamsey" on the environment (Bansah et al., 2016; Boadi et al., 2016), gender specific motivations (Maclin et al., 2017), formalization (Teschner, 2012), and employment creation (Ackah-Baidoo, 2016), to the neglect of the behavioral change aspect of "galamsey" activities. Consequently, understanding what motivates individuals to engage in "galamsey" is important, since most complex social issues have behavioral underpinnings that can be addressed using social marketing.

Social marketing theorists have proposed that, an integration of social marketing and behavioral change theories/models presents a useful complementary approach for the success of interventions aimed at pro-environmental behaviors (such as stopping galamsey; Andreasen, 2002). This is evidenced in the numerous studies that have used theories to understand a social marketing phenomenon (Hargreaves, 2011; Masud et al., 2016; Sahin, 2013; Sawitri et al., 2015). Some of the theories that have been widely used over the years to understand and predict environmentalism, conservation, and pro-environmental behaviors include theory of reasoned action (Fishbein & Ajzen, 1975), theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1975), values-beliefs-norms theory (Stern et al., 1999), social cognitive theory (Bandura, 1986), and social practice theory (Shove, 2010).

It must however be mentioned that most of these aforementioned behavior change theories used to explain pro-environmental behaviors are single theories, which are mostly found to be insufficient to explain and account for the nuances and complexities of a given phenomenon (Buchan et al., 2012). As a result, scholars such as Olander and Thorgersen (1995) have proposed their integrative MOA model as an overall guiding model for social marketing programs, which helps provide a better understanding of the nuances regarding complex social issues. Similarly, some authors affirm that the model provides the basis for a comprehensive strategy for interventions aimed at complex social issues (such as "galamsey"; Binney et al., 2006; Olander & Thogersen, 1995) and also take into account both external and psychological influences. To the best of the authors' knowledge, relatively little work has been done using the MOA model in social marketing to understand behavior change (e.g., "galamsey" behavior change), thereby limiting the model's applicability and utility.

Thus, this article aims to apply the MOA model in social marketing to predict and explain "galamsey" behavior change in Ghana. Specifically, this study examines the influence of motivation (attitudes, beliefs, and social norms) on intention and intention on actual behavior. The study further examines the moderating effect of opportunity and ability on the relationship between intention and

actual behavior (stopping galamsey). This is particularly important in this study because our aim is not only to understand "galamseyers" intention toward the behavior but also to identify possible opportunities and abilities that could lead to action (behavior).

From the foregoing discussion, this study makes two major contributions to the growing body of literature. First, in terms of social marketing theory building, this article contributes to the social marketing literature by providing a validated model by drawing on the MOA model to depict the relationships between motivations (beliefs, attitudes toward the behavior, and social norms) and intentions to stop "galamsey" activities in an emerging economy such as Ghana, and the role of opportunity and ability in the intention–behavior relationship. Second, the finding of this study has the potential to offer managers of social marketing programs, researchers, as well as policy makers with a deeper understanding of the variables they need to adopt to develop successful and effective "galamsey" behavior change intervention. The remainder of this article is structured as follows: First, the theoretical background and research model are discussed. This is followed by hypotheses development, research methodology, and data analysis, discussion of findings, theoretical and managerial implications as well as limitations and future research avenues.

Literature Review

Although used as a cliché for many things, social marketing predominantly centers on interventions targeted at changing individual behavior (Andreasen, 1995, 2002; French et al., 2010; Maibach, 2003; Singaiah & Laskar, 2015), and its application has gained recognition in areas such as health, communication and transportation, leisure and tourism, environmental protection, and sustainability (McKenzie-Mohr et al., 2012; Truong, 2016). Lately, calls are being made by conservation scholars and practitioners for the application of social marketing to pro-environmental behaviors for conservation of the environment and protection of biodiversity (Bennett et al., 2017; Verissimo, 2013; Wright et al., 2015). In the wake of brutal abuse of the environment by galamsey activities in Ghana, social marketing, a behavior change tool (Hastings & Angus, 2011), provides solutions to changing people's behavior toward this activity with the intention of conserving the environment for posterity (Verissimo, 2013). Within the context of environmental and biodiversity conservation, scholars aver that altering human behavior can contribute immensely to containing certain environmental problems (Bennett et al., 2017; Stern, 2000) as against just describing environmental problems and highlighting factors that influence biodiversity loss (Verissimo, 2013).

This is aptly demonstrated by Green et al. (2013) in a study that sought to change landowners' conservation behavior toward the clearing of Mexican tropical forest. Similarly, by infusing behavior change tools into conservation activities, Martinez et al. (2013) sampled downstream water users and upstream farmers to conserve riparian forest areas in the Peruvian Andes. Indicatively, these studies trumpet the extent to which conservation activities are more effective when combined with behavioral change tool such as social marketing.

Theoretical Foundation and Hypotheses Development

This study draws on the integrated MOA model proposed by Olander and Thogersen (1995). Olander and Thogersen build on the TPB (Ajzen, 1991) by incorporating concepts from Triandis (1977) model of choice. The MOA model posits that motivation, opportunity, and ability are fundamental in predicting behavior change (Binney et al., 2007). The model has been successfully applied to various application context including travel intentions (Hung & Petrick, 2016; Trost et al., 2016), transit migration (Syed, 2019), teaching approaches (Lai et al., 2018); sustainable consumption (Ukenne & Nkamnebe, 2016); environment and land management behaviors (Binney et al., 2007) and pro-environmentalism (Nye & Hargreaves, 2010). The constructs of the MOA model are further discussed in sub-sections.

Hypotheses Development

Motivation antecedents: Beliefs, attitude, and social norms. While the degree or level of motivation has previously been used in operationalizing motivation, in line with Olander and Thogersen (1995), this study, we operationalize motivation as "belief evaluations, attitudes toward the behavior (stopping "galamsey"), and social norms." Beliefs are defined simply as underlying convictions regarding a particular situation (Dillion & Gayform, 1997). According to Ogunbode and Arnold (2014), beliefs are the most salient factors needed to perform pro-environmental behaviors. They posit that when people believe the performance of a particular behavior will make a difference, they are more likely to perform that behavior. Evidences are seen in (Jannson et al., 2011; Smith & O'Sullivan, 2012) while studying environmentalism and adoption of ecologically friendly behaviors. In this study, the extent to which galamsyers believe stopping "galamsey" will save water bodies, land, and forest and generally save the environment for posterity was conceptualized as beliefs.

Attitude denotes an individual's positive or negative evaluations of objects or behavior (Ajzen and Fishbein, 1980) and can be derived cognitively, affectively, and conatively. In examining the relationship between attitudes and intentions, most findings attest that attitudes correlate well with behavioral intentions and are good predictors of intentions (Ajzen, 1991). For instance, Vlek (2000) argues that positive attitude toward pro-environmental issues has direct correlation with the intention to conserve the environment. Pakpour et al. (2014) also find attitude to significantly predict household conservation behaviors. In this study, we argue that "galamseyers" favorable disposition (e.g., stopping "galamsey" activities will protect the environment; stopping galamsey is a good idea; stopping "galamsey" is a wise idea) toward the behavior will more likely influence their intention to stop "galamsey."

The immediate support group and wider social influences on an individual's behavior are what is referred to as social norms (French, 2017). Barrientos-Gutierrez et al. (2007) define social norms as "group defined standards of appropriate behavior" and social controls that regulate behavior. Hence, individuals sanction themselves when they do not comply with internalized norms or experience external sanctions when they do not comply with societal expectations or norms (Stam et al., 2015). Cialdini et al. (1991) group social norms into injunctive norm (a socially shared rule of conduct) and descriptive norm (the visible behavior of others) normally referred to as subjective norm or normative beliefs. While many argue that there is a weak relationship between social norms and actual behavior change (Ajzen, 1991; Bratt, 1999), consistent evidences prove that there is a relationship between social norms and behavioral intentions (Nigbur et al., 2010; Rimal & Lapinsky, 2015). Thus, in the case of galamsey activities, an individual will either follow social guidelines that abhor galamsey to form behavioral intention to stop or imitate others who have already stopped. Based on the foregoing discourse, the following hypotheses are developed.

Hypothesis 1: There is a positive and significant relationship between beliefs and intention to stop galamsey activities.

Hypothesis 2: There is a positive and significant relationship between attitude and intention to stop galamsey activities.

Hypothesis 3: There is a positive and significant relationship between social norms and behavioral intention to stop galamsey activities.

Intentions and Galamsey Behavior Change

The key precursor to behavior change is intention (Ajzen, 1991). French (2017) reveals that strong and positive intention to performing behavior correlates with volitional behavior change. Intention is determined by positive evaluations of the behavior, strong perceptions of social pressure, and ease

of performing a behavior (Ajzen, 1991). Therefore, in this study, we expect that the stronger the intention of a galamseyer toward stopping galamsey behavior, the more likely he or she will stop the behavior. Thus, galamsey behavior change in this study assessed whether currently galamseyers have disposed of their tools, sought alternative employment, stopped going to galamsey sites, or joined campaigns aimed at eradicating the menace. The following hypothesis is formulated.

Hypothesis 4: There is a positive and significant relationship between intention to stop galamsey and galamsey behavior change.

The Moderating Roles of Opportunity and Ability

Opportunity refers to the extent to which contextual or other external circumstances facilitate or inhibit the performance of a behavior (Binney et al., 2007; Olander & Thogersen, 1995). On the one hand, Maclnnis et al. (1991) define opportunity as the extent to which the consumer/individual is able to process information without any form of restrictions. In a social marketing context, opportunity occurs when an individual is not limited in his or her desire to act by factors in their external environment (Binney et al., 2006; Olander & Thogersen, 1995) such as financial constraints, geographical location, limited infrastructure, and social structures including laws and policies (Binney et al. 2007). Thus, Cary et al. (2002) indicate that these are significant reasons for non-adoption of pro-environmental behavior. Ukenna and Nkamnebe (2017) also argue that increasing opportunities lead to the performance of pro-environmental behaviors. In Ou-Yang et al.'s (2014) study, financial factors, cultural exposure, and career opportunities significantly impact opportunity to study abroad. Opportunity in this study is thus operationalized as the availability of relevant information on the effect of galamsey on the environment, availability of alternative income earnings, and government providing alternative livelihood support for people who are currently engaging in "galamsey" to help stop galamsey activities.

Regarding ability, Binney et al. (2007) assert that, irrespective of how much an individual is motivated, motivation may not necessarily lead to behavior change if ability is low. Studies prove that at any point in time, people must possess the appropriate abilities to be able to perform a given behavior (Hung & Petrick, 2016). For instance, Osbaldiston and Sheldon (2003) suggest that when individuals possess the requisite ability, they get highly motivated to perform behaviors. Ability is individual's internal capacities, knowledge, proficiencies, skills, or self-efficacy toward the performance of behavior (Hung & Petrick, 2016; Trost et al., 2016). In other words, ability reflects the extent to which an individual's skills and capabilities influence them to engage in a certain behavior (Hoyer & MacInnis, 1997). Ajzen and Fishbein (1980) proffer that people with strong skills and ability are likely to perform a particular behavior contrary to people who believe that they lack some requisite skills. In the context of this study, we postulate that if "galamseyers" possess the requisite skills, capabilities, proficiencies, and knowledge that will enable them to engage in other profitable ventures, the more likely galamsey behavior change can occur. We thus hypothesize the following:

Hypothesis 5: The relationship between intention to stop galamsey activities and galamsey behavior change will be stronger when opportunity is positive.

Hypothesis 6: The relationship between intention to stop galamsey and galamsey behavior change will be stronger when ability is positive.

Our research model in Figure 1 theorizes that "galamseyers" behavioral intentions to stop galamsey activities is influenced by their beliefs, attitudes toward the behavior as well as their social norms pertaining the behavior. We further contend that opportunity and ability strengthens the positive effect of the intention–behavior relationship.

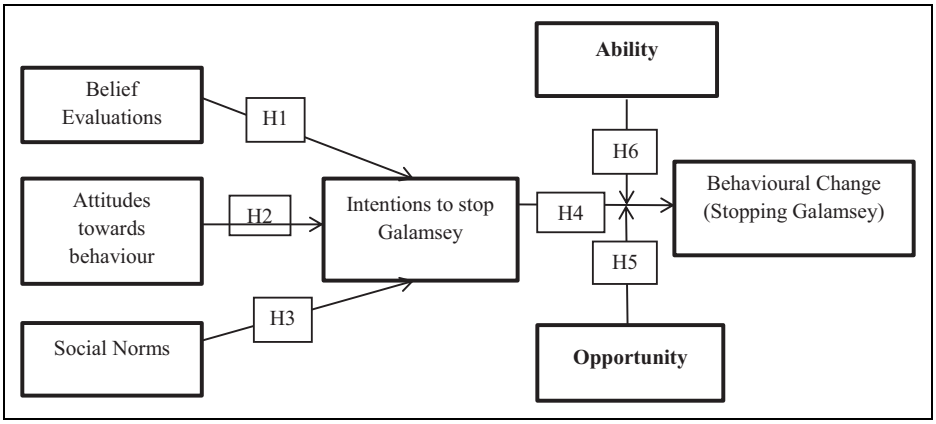

Figure 1. Research model.

Research Method

The study sets out to examine the role of the MOA model in social marketing in predicting illegal mining (galamsey) behavior change in Ghana. To test the hypotheses set out in the literature and find numeric answers to the research questions (Kuada, 2015), a quantitative research method was adopted to examine how social marketing theory (MOAM) could help predict behavior change toward "galamsey" activities in Ghana. The target population for the study was made up of all "galamsey" operators in Kyebi in the Eastern Region of Ghana who are currently engaging in galamsey activities. The selection of this region is the result of a statement made by a former president of Ghana to the effect that "the headquarters of galamsey activities in Ghana is Kyebi" (*Daily Graphic*, 2014). The assumption here was that because this region records the highest number of "galamseyers," data could easily be provided for the study. Questionnaires were distributed to 300 people who were participants in galamsey activities. The 300 respondents targeted for the study are within the minimum sample sizes needed for robust quantitative analysis as recommended by Crouch (1984). Snowball sampling procedure was adopted for this study. However, prior to doing this, convenient sampling technique was used to draw a small number of respondents who were available, accessible, and willing to offer the needed information. This small group of respondents was subsequently impressed on to refer others they know are also into this activity to the researchers (Wilson, 2003). Snowball sampling was adopted because "galamsey" is an illegal activity, and people normally cover up their operational traces to avoid being arrested.

Survey questionnaire was designed to collect data. The questionnaire was divided into two main sections. The first section sought responses on the demographic profile of respondents, whereas the second section elicited responses on beliefs, attitudes, social norms (descriptive and injunctive), intention, opportunity, ability, and actual behavior change. Because galamsey activities do not require any formal education, and most respondents can't read or write, the questionnaire was translated into Twi, a popular Ghanaian language, to improve understanding and elicit the cooperation of respondents as suggested by Forsyth et al.'s (2006) translation process. All questions were anchored on a 5-point Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The scales measuring all the constructs were adapted from Binney et al. (2006), Jepson et al. (2012), and Olander & Thogersen (1995). Of the 300 responses, 286 were returned and 48 responses were rejected for incompleteness and missing data. In the end, 238 responses representing 79% were used in the final analysis. Statistical analysis of data was carried out using PLS-SEM.

Ethically, the following were the issues addressed in the study: During the questionnaire administration, the authors informed respondents that they were not obligated to answer any questions that might make them uncomfortable, and can stop answering the questions at any point should they experience discomfort. The authors ensured that the respondents felt comfortable by addressing their apprehensions: provided them with adequate information about the purpose of the research and confidentiality at the start of questionnaire administration. The data were analyzed and interpreted in an unbiased manner.

Data Analysis

As shown in Table 1, the statement "I believe 'galamsey' is a good activity to engage in" recorded the lowest mean of 2.42. This finding suggests that "galamseyers" do not believe that galamsey is a good activity to engage in.

Measurement Model Assessment

We first conducted a confirmatory factor analysis of our model using SmartPLS (Ringle et al., 2005) Version 2.0 to validate the measurement model. To establish convergent validity, outer loadings and average variance extracted (AVE) were used in showing that measures actually measured their intended constructs. The convergent validity of the measurement scales was all found to be acceptable because all the factor loadings were above 0.50 (Fornell & Lacker, 1981) and were all highly significant (Anderson & Gerbing, 1988; see Table 2). The calculated goodness of fit was 0.67, which exceeded the recommended threshold of 0.36 (Wetzels et al., 2009), indicating that our model fits the data satisfactorily.

Additionally, we assessed the measurement reliability and validity of the proposed measurement model. Construct reliability was evident as the Cronbach's α and composite reliability scores were above the 0.70 rule of thumb. The AVE for establishing convergent validity for each construct exceeded the suggested cut-off point of 0.50 (Hair et al., 2017) as presented in Table 2. Furthermore, Table 3 shows that the squared roots of the AVEs for the constructs are consistently greater than the squared correlations between the constructs (Fornell & Lacker, 1981), hence giving support to satisfactory discriminant validity.

Structural Model (Hypotheses Testing)

After confirming the reliability and validity of the measurement model, we proceeded to test the structural model by testing the hypothesized relationships formulated in the Literature Review section. Following the bootstrapping resampling method, the structural model was examined to establish the model's predictive ability and the relationships between the constructs (Hair et al., 2013). The R^2 values in the model ranged from 0.23 (23%) to 0.74 (74%) for intentions to stop Galamsey and behavioral change, respectively. Additionally, all paths are statistically significant at the 0.05 level and are in the expected direction with the exception of descriptive social norms ($\beta = .05$; $T = 0.95$) and injunctive social norms ($\beta = .03$; $T = 0.55$) which were not significantly related to intentions to stop Galamsey.

The proposed model is considered to have good predictive power, as the remaining paths were significant. More specifically, the path coefficient between attitudes toward behavior and intentions to stop Galamsey was ($\beta = .55$; $T = 12.98$), while that of belief evaluations and intentions to stop Galamsey was ($\beta = .34$; $T = 3.95$). We also found intentions to stop Galamsey to be significantly associated with behavioral change of stopping Galamsey ($\beta = .49$; $T = 4.40$). The results for the structural model are shown in Table 4 and Figure 2.

Table 1. Descriptive Statistics.

Scale Item	Variable Code	Mean	*SD*	*SE*
Beliefs				
I believe galamsey is a good activity to engage in	BBI1	2.42	1.38	0.09
I believe that stopping galamsey will save water bodies	BBI2	4.27	0.84	0.05
I believe that stopping galamsey will save land and forest resources	BBI3	3.93	1.11	0.07
I believe that stopping galamsey will save the environment for posterity	BBI4	3.94	1.09	0.07
I believe that stopping galamsey will have positive impact on the environment	BBI5	3.88	1.15	0.07
I believe that stopping galamsey will take employment from the youth	BBI6	3.51	1.42	0.09
Attitude				
Stopping galamsey activities is a good idea	ATT1	2.68	1.05	0.07
Stopping galamsey activities will protect the environment	ATT2	3.44	1.29	0.08
Stopping galamsey is a wise idea	ATT3	2.94	1.26	0.07
Stopping galamsey activities would be pleasant	ATT4	3.32	0.99	0.06
Stopping galamsey activities will be an interesting task	ATT5	2.52	1.40	0.08
Injunctive social norms				
I know that the whole community does not support galamsey activities anymore because of its negative impact on the environment	ISN1	3.39	1.13	0.07
I know that punitive measures have been put in place by chiefs and opinion leaders to stop galamsey	ISN2	2.89	1.26	0.08
I know I will be punished if I engage in galamsey activities	ISN3	4.29	0.67	0.04
Government's operation vanguard has put restrictions on galamsey activities to stop the menace	ISN4	4.59	0.54	0.04
Descriptive social norms				
Most of my friends who engaged in galamsey activities have stopped because it destroys the environment and think I should do the same	DSN1	2.89	1.05	0.07
My family members who engaged in galamsey have stopped because it destroys the environment and think I should also stop	DSN2	2.86	.812	.053
I want to do what most of my friends think I should do by stopping galamsey	DSN3	2.81	.947	.061
I want to do what most members of my family think I should do by stopping galamsey	DSN4	2.84	.870	.056
Intention				
I intend to stop galamsey immediately I'm provided with alternative employment	INT1	3.83	1.18	.077
I intend to stop galamsey within the next six months when I find alternative employment	INT2	3.66	1.13	.073
I intend to stop galamsey within the next one year when I find alternative employment	INT3	3.68	1.11	.072
I intend to stop galamsey forever once I find another way of making a living	INT4	4.39	1.08	.070
Opportunity				
There is much information on the negative effects of galamsey on the environment	OPP1	3.43	1.03	.067
Ii is easy to get information on the effect of galamsey activities on the environment	OPP2	3.22	1.10	.071
The government generally provides alternative livelihood support for people who are currently engaged in galamsey	OPP3	3.54	0.94	.061
I do not have alternative income earnings so galamsey becomes the only available option	OPP4	3.72	0.91	.059
I know how to get information on galamsey activities on the environment				
Ability		3.33	1.43	.094
I possess the skills to stop galamsey even though I have no alternative sources of income	ABI1	2.84	1.25	.081

(continued)

Table 1. (continued)

Scale Item	Variable Code	Mean	*SD*	*SE*
If I want to, I can easily stop galamsey activities because I know it affects the environment negatively	ABI2	2.91	1.19	.077
If I decide to stop galamsey I will develop a daily habit/routine to remind myself of my decision	ABI3	2.95	0.96	.063
The more I think about stopping galamsey, the easier I develop the desire to stop	ABI4	2.91	0.99	.064
I have a good level of knowledge that stopping galamsey will improve and conserve the environment	ABI5	3.72	0.91	.059
Galamsey behavior change				
Currently, I have disposed of all the tools I use for galamsey activities	ABC1	2.58	1.32	.086
Currently, I do not go to the galamsey site because I have found alternative employment	ABC2	2.68	1.29	.084
I currently do not go to the galamsey site because of operation vanguard	ABC4	3.67	1.13	.073
I am currently not interested in galamsey because of its effects on the environment	ABC5	3.41	1.14	.075
I have joined the campaign to educate others on the need to stop galamsey to save the environment	ABC6	2.92	1.37	.089

Test for Moderation

We further tested the interaction effect of ability on intentions to stop Galamsey and intentions to stop Galamsey and opportunity which were both significantly related to behavioral change of stopping Galamsey, thus ($\beta = .56$; $T = 2.99$) and ($\beta = .88$; $T = 5.96$), respectively (see Table 4 and Figure 2).

Discussion of Findings

In response to calls to simulate and influence behavior change to protect biodiversity (Veríssimo, 2013; Wright et al., 2015), this study applies the MOA model in social marketing to understand Ghanaians behavioral change toward eradicating "galamsey."

The results of our initial hypotheses (Hypotheses 1 and 2) indicate a positive significant relationship between belief evaluations, attitude (both motivational factors) and intention toward stopping "galamsey." Thus, the findings of this study suggest that "galamseyers" are more likely to have a higher intention toward stopping galamsey activities, when they think that "stopping galamsey activities will protect the environment" (positive attitude) and also "believe that stopping galamsey will save land and forest resources," as well as water bodies. To this end, it is important for practitioners planning "galamsey" intervention programs to focus on promoting the respondents favorable disposition toward the behavior in order to increase the respondents' intentions toward galamsey behavior change. This corroborates studies like Ou-Yang et al. (2014), Jepson et al. (2012), and Vlek (2000), which found that intention to do a particular behavior is strongly driven by motivation, in this case beliefs and attitude. Specifically, Ajzen (1991) stresses that attitude has positive correlation to and a good predictor of intentions, while beliefs are well-established to positively correlate to behavior change (Gockeritz et al., 2010).

On the other hand, social norms was found to have no significant relationship with intentions toward stopping galamsey (Hypothesis 3). This finding is quite surprising as it contradicts the arguments of Nigbur et al. (2010). For example, Nigbur et al. (2010) argue that individuals will perform a particular behavior when they believe their referent others want them to. However, this study's findings suggest that in Ghana, social controls that seek to regulate and prevent people from engaging in galamsey activities may not be effective. Furthermore, the referent others perceptions or opinions

Table 2. Measurement Model Assessment.

Constructs	Item	Outer Loadings	AVE	CR	CA
Ability	ABI1	0.70***	0.70	0.93	0.91
	ABI2	0.83***			
	ABI3	0.88***			
	ABI4	0.81***			
	ABI5	0.89***			
	ABI6	0.84***			
Attitude toward behavior	ATT1	0.97***	0.73	0.82	0.66
	ATT2	0.68***			
Behavioural change (stopping Galamsey)	ABC1	0.75***	0.63	0.87	0.80
	ABC2	0.62***			
	ABC4	0.89***			
	ABC5	0.90***			
Belief evaluations	BB1	0.95***	0.95	0.98	0.98
	BB2	0.99***			
	BB3	0.99***			
Descriptive social norms	DSN1	0.86***	0.79	0.94	0.92
	DSN2	0.78***			
	DSN3	0.95***			
	DSN4	0.95***			
Injunctive social norms	ISN1	0.51***	0.50	0.73	0.80
	ISN2	0.99***			
	ISN3	0.51***			
Intentions to stop Galamsey	INT1	0.91***	0.82	0.95	0.93
	INT2	0.96***			
	INT3	0.95***			
	INT4	0.78***			
Opportunity	OPP1	0.82***	0.69	0.87	0.78
	OPP2	0.89***			
	OPP3	0.79***			

Note. AVE = average variance extracted; CR = Composite Reliability; CA = Cronbach's alpha.

Table 3. Discriminant Validity.

Details	AVE	1	2	3	4	5	6	7	8
1. Ability	.70	.84							
2. Attitudes toward behavior	.73	.32	.85						
3. Behavioural Change	.63	.83	.49	.79					
4. Belief Evaluations	.95	.68	.50	.72	.97				
5. Descriptive Social Norms	.79	.69	.34	.70	.67	.89			
6. Injunctive Social Norms	.50	.11	.26	.17	.16	.27	.71		
7. Intentions to stop Galamsey	.82	.11	.35	.10	.11	.10	.05	.91	
8. Opportunity	.69	.76	.27	.64	.61	.54	.21	.52	.83

Note. Square root of the AVEs are on the diagonal, and the inter-construct correlations are off-diagonal. AVE = average variance extracted.

about the behavior may not matter to the galamsey operators and, as a result, would not influence them to stop engaging in galamsey activities. Thus, it is possible that the study group make their decisions toward stopping galamsey activities based on their own assessments and the value they perceive to derive from it and not what their significant others think.

Table 4. Structural Model Results.

Path	Original Sample (O)	*T* Statistics (|O/STERR|)
Direct effect		
Attitudes toward behavior → Intentions to stop Galamsey	.55	12.98
Belief Evaluations → Intentions to stop Galamsey	.34	3.95
Descriptive Social Norms → Intentions to stop Galamsey	.05	0.95
Injunctive Social Norms → Intentions to stop Galamsey	.03	0.55
Intentions to stop Galamsey → Behavioural Change (stopping Galamsey)	.49	4.40
Moderation effect		
Intentions to stop Galamsey × Ability → Behavioural Change (stopping Galamsey)	.56	2.99
Intentions to stop Galamsey × Opportunity → Behavioural Change (stopping Galamsey)	.88	5.96

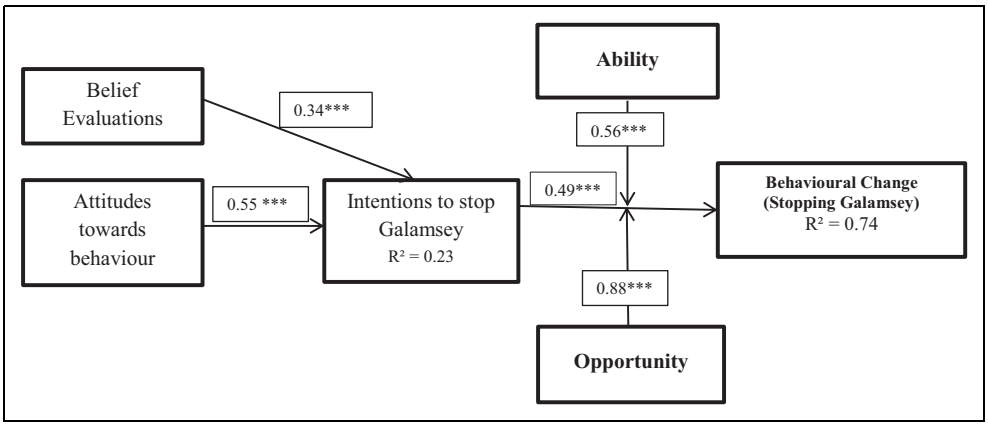

Figure 2. Final research model. ***$p < .001$.

Regarding Hypothesis 4, the findings of this study reveal that there exists a significant correlation between intention and actual behavior and that the stronger the intention to perform the behavior, the more likely the performance of the behavior (French, 2017). Thus, in the Ghanaian context, "galamseyers" positive intention toward stopping "galamsey" has some form of influence on their actual behavior adoption.

Finally, (Hypotheses 5 and 6) examined the moderating effect of opportunity and ability on the intention and actual behavior change relationship and found out that the interaction relationships were supported in the case of stopping people from engaging in galamsey. The argument is that galamsey operators' behavior change is stronger when intention is influenced by opportunity and ability. Opportunity in this study was operationalized as the availability of information (on the impact of galamsey on the environment) and alternative sources of income and employment. Ability was defined as the skills and self-proficiencies needed to perform tasks (Hung & Petrick, 2016; Trost et al., 2016). Consequently, findings from the study suggest that opportunity and ability reinforce the relationship between intentions and behavior change. This is similar to Cary et al.'s (2002) findings articulating that lack of requisite opportunity in the performance of behavior hampers the adoption of pro-environmental behavior. Moreover, motivation may not lead to behavior change if ability to perform behavior is low (Binney et al., 2007).

Theoretical and Managerial Implications

This article makes several contributions to the growing body of literature. First, in terms of social marketing theory building, this study departs from previous studies that utilized a single theory to understand pro-environmental behaviors, by applying Olander and Thogersen's (1995) integrated MOA model to understand a complex social issue ("galamsey"). More specifically, the study investigates "galamseyers" beliefs, attitudes, and social norms, influence on intention to stop galamsey, and the role of opportunity and ability on the intention–behavior relationship. The study found beliefs and attitudes to be the most significant motivation factors predicting "galamseyers" intention to stop "galamsey." Our results further provide a prima facie evidence that high opportunity and ability improves the impact of intention on behavior change (stopping "galamsey"). Another theoretical contribution of the study is that, in the Ghanaian context, social norms is not a relevant motivating factor that influences intention to cease or stop "galamsey" activities. This finding could be explained against the backdrop that the respondents in this study do not consider the decisions of significant others (e.g., what they think or do) when making decisions to stop engaging in "galamsey" activities. Thus, it is possible that the respondents make their decisions toward stopping "galamsey" activities based on their own assessments and the value they perceive to derive from it and not what their significant others and regulators think.

It is worthy to mention that although the MOA model has been empirically proven for its predictive ability to explain a significant amount of variance in a range of behaviors Gruen et al., 2006), applying it to a social marketing context ("galamsey" behavior) provides a better explanatory power to our model (74%). Therefore, at the conceptual level, this study responds to calls for an integrated model in social marketing that can help provide a comprehensive understanding of the nuances regarding complex social issues (such as "galamsey"; Binney et al., 2006; Olander & Thogersen, 1995).

The study also has the following managerial implications: It is the case that many interventions designed to encourage positive environmental behaviors have not been successful (de Young, 2000), and particularly in Ghana, efforts to discourage "galamsey" activities that have severe consequences on the environment have proven a daunting task for both environmental managers and government. Consequently, the study's position is that the application of social marketing offers potential for influencing behavior change among "galamsey" operators in Ghana.

From this perspective, our study offers useful insights and recommendations for managers and implementers of social marketing intervention programs on galamsey. First and foremost, this study confirms that respondents' favorable attitudes and beliefs toward the behavior (i.e., stopping "galamsey" will protect the environment, save land and forest resources, as well as water bodies) are very crucial in determining their intentions toward stopping galamsey operations in the Ghana. Therefore, we recommend that practitioners planning social marketing intervention on "galamsey" should focus on stimulating the "galamseyers" mindset, by trying to act on their favorable disposition toward choosing "galamsey" behavior change, leading them to believe that the choice would be consistent with their way of thinking. The objective is to bring those involved in "galamsey" activities to believe in the positive impact of the proposed behavior (stopping "galamsey") on the environment as this is likely to influence their adoption.

Similarly, the positive interaction of opportunity and ability on intention and behavior change demonstrates that the provision of increased opportunity and ability is critical for social marketers seeking to increase the positive intentions of galamsey operators toward stopping galamsey activities and subsequent behavior adoption. According to Olander and Thogersen (1995) and Binney et al. (2007), opportunity is the extent to which contextual, situational, or other external circumstances facilitate or inhibit the performance of a behavior (e.g., "galamsey" behavior change). In the context of this study, opportunity refers to the availability of alternative income earnings for "galamseyers," availability of relevant information on the effect of "galamsey" activities on the environment, and government providing alternative livelihood support for people who are currently engaging in

"galamsey" to motivate them to stop. Ability on the other hand describes the skills, capabilities and self-proficiencies and task knowledge that are needed to support an individual's intention toward adopting a particular behavior (stopping "galamsey").

From this perspective and based on our findings, the authors conclude that, once there are no barriers to prevent the performance of the recommended behavior, and the individuals perceive that they have the requisite resources, skills, and capabilities to perform the recommended behavior, there is a high likelihood that the recommended behavior will be performed (Fishbein & Cappella, 2006). We therefore recommend that the government and those involved in social marketing intervention programs on "galamsey" in Ghana should focus on increasing opportunities by first providing more alternative income sources to make the living conditions of "galamseyers" better to make "galamsey" activities unattractive. Second, information on galamsey activities must be made available, so "galamseyers" will be more aware of the impact of their activities on the environment, and finally, governments should provide alternative employment opportunities to "galamseyers" while decreasing the barriers (unemployment, cumbersome licensing procedures, and people's burning desire to "get rich quick"; Labonne, 2003) associated with the behavior to encourage performance.

Finally, subjective norm recorded an insignificant relationship with intentions toward the behavior. The study concludes that, respondents of this study do not agree they possess high levels of subjective norms to influence their decision toward stopping "galamsey" activities. We therefore recommend that, in the Ghanaian context, social marketers when designing intervention programs on galamsey operations should focus on increasing the target audiences' positive attitudes and beliefs and also provide adequate resources and appropriate skills to achieve sustainable behavior, rather than their normative beliefs, since this does not affect their decision to adopt the behavior.

Limitations and Future Research Avenues

While the study makes modest contribution to social marketing research, it is limited in certain key aspects. First, it targeted only one galamsey prone community (Kyebi) in Ghana. Although respondents from this community qualified to partake in the study, using more communities may have painted a better picture and reinforced the robustness of the data used for the analysis. Second, although the MOA model was able to predict "galamsey" behavior change, the model has been criticized for including opportunities and failing to mention that inhibitors (barriers) be reduced to foster sustainable behavior change. Hence, future studies should include other variables in the model to cater for this gap. Moreover, the snowball sampling method adopted may have recorded biases in the data as respondents may have recommended others who hold similar views and ideas as themselves to be part of the study (Wilson, 2003). These limitations though do not render the study weak but limit the generalizability of the study. Future studies could explore qualitative research methods to understand how behavior change occurs among "galamseyers" in Ghana. Again, avenues exist for future studies to investigate other moderating factors that may influence behavior change toward galamsey. The model developed in this study can be tested in other contexts such as forest conservation and water resources conservation.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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