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The Lulun Project's social marketing strategy in a trial to introduce eggs during complementary feeding in Ecuador

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Abstract

The Lulun Project incorporated a social marketing strategy that accompanied a randomized controlled trial (RCT) of a food-based intervention that introduced eggs into the complementary feeding diet of Ecuadorian infants. This strategy was designed to promote behaviour change, in this case, egg consumption, through voluntary prosocial behaviour, empowerment, and brand loyalty. A three-phase social marketing strategy (design, campaigns, and evaluation) contributed to our successful RTC by applying techniques drawn from marketing, publicity, design, and communications. To develop the strategy, we conducted (a) market research focused on culturally based norms, values, and local expectations; (b) a situational assessment based on the four Ps of social marketing (people, product, place, and price); and (c) fostered a creative process to develop the project's brand and communication plan. The strategy combined a communication plan, brand, and activities that were implemented in four campaigns: outreach, recruitment, promotion, and closing. Our evaluation showed that the social marketing strategy was instrumental in promoting the RCT's objectives and responding to unforeseen events and community concerns regarding the RCT. The strategy resulted in high compliance, low attrition, and infant feeding policy change, including Ecuador's Ministry of Public Health new complementary feeding guidelines for introducing eggs early in complementary feeding. Use of social marketing techniques, like those in our study, could be key for scaling up this food-based intervention—or others like it—in Ecuador and beyond.

KEYWORDS

behaviour change, Ecuador, egg intervention, infant and child nutrition, randomized controlled trial (RCT), social marketing

1 | INTRODUCTION

Stunting affects the poorest and most vulnerable populations throughout the world. The recent Sustainable Development Goals call for reducing stunting and wasting in children <5 years by 40%, which would affect 90 million children worldwide (UNICEF, WHO, & World Bank Group, 2015). Stunting is a serious public health problem in Ecuador, affecting 25.2% of children <5 years, with only modest reductions in the past three decades (Freire et al., 2014). Applied

research can play an important role in providing evidence for cost-effective food-based alternatives to fortified complementary foods, lipid-based nutrient spreads, and micronutrient powders, which have had mixed results related to problems of adherence, cost, scalability, and sustainability (Bhutta et al., 2013).

The Lulun Project was a randomized controlled trial (RCT) conducted in 2015 in five rural parishes in the highland province of Cotacachi, Ecuador, where the prevalence of stunting among children from 0 to 23 months is 30% (Freire et al., 2014). Its purpose was to test

the efficacy of introducing eggs on a daily basis in children 6 to 9 months of age on linear growth and other outcomes (Iannotti et al., 2017). The project represented a culturally appropriate food-based intervention that reduced stunting by nearly 50% (Iannotti et al., 2017; Waters et al., 2018). The social marketing strategy described here contributed to the project's success.

Approximately 22% of the inhabitants of Cotopaxi province are indigenous by self-identification (INEC, 2010). Lulun in Kichwa (or Quechua) means “egg,” thus harkening to a locally accessible food that is a culturally appropriate part of the diet (Ferraro, 2008; Hastorf, 2003; Waters et al., 2018; Weismantel, 1998). Eggs represent an appropriate food-based nutritional intervention because they provide nutrients that are important for healthy growth and development (Iannotti, Lutter, Bunn, & Stewart, 2014). In the past, the consumption of eggs by infants was limited because Ecuador's Ministry of Public Health (MPH) recommended that whole eggs should only be introduced at 12 months of age (Waters et al., 2018).

The social marketing strategy applied a transdisciplinary approach designed to promote the Lulun Project's main objective: egg consumption in infants from 6 to 9 months. The strategy addressed six key points:

- Gaining trust among mothers/caregivers in order to be able to take baseline and end line measurements (especially providing blood samples, still a taboo in some indigenous communities).
- Addressing negative rumours that may spread in the communities (e.g., that the blood was being collected to be sold and that eggs are bad for young children).
- Developing project identity and a brand in order to instil loyalty in both the intervention and control groups.
- Addressing perceptions of inequity among mothers/caregivers of children in the control group.
- Promoting local empowerment in the communities in order to motivate effective and sustainable behaviour change
- Ensuring that the social marketing strategy would contribute to effects beyond the RCT (Gallegos, Waters, Salvador, Chapnick, & Iannotti, 2014).

2 | SOCIAL MARKETING: PROMOTING BEHAVIOUR CHANGE

Social marketing strategies are designed to promote specific behaviour changes to gain and retain loyal and satisfied customers. Unlike commercial marketing that focuses on selling goods or services for profit, social marketing promotes voluntary behaviour that benefits society (Dovidio, Piliavin, Schroeder, & Penner, 2006; Kotler & Lee, 2008) by addressing specific problems (Kotler, 2011). The relevance of social marketing to public health and nutrition is well-recognized (Gordon, McDermott, Stead, & Angus, 2006; Grier & Bryant, 2005; Hastings & Haywood, 1991; Stead & Gordon, 2009), particularly with respect to project and policy design, implementation, and evaluation (Andreasen, 1997; Farquar et al., 1985; Fox & Kotler, 1980; Mitchell, Madill, & Chreim, 2015; Williams & Girish, 2015). Social marketing strategies are the basis for

Key messages

- Social marketing can be a methodological innovation in nutrition research, programme implementation, and policy change.
- A three-phase social marketing strategy (design, campaigns, and evaluation) used techniques drawn from marketing, publicity, design, and communications.
- The strategy was informed by culturally based norms, values and local expectations, and the four Ps of social marketing: people, product, place, and price.
- The transdisciplinary approach engendered participants' empowerment and promoted brand loyalty resulting in voluntary prosocial behaviour.
- The strategy addressed community concerns about blood collection and inequity and led to high compliance, low attrition, and minimum spillover effects.

campaigns that are designed to advance project objectives (Grier & Bryant, 2005; Snyder, 2007). Complex projects often involve several strategies; each of which may incorporate one or more campaigns. Kotler and Zaltman (1971) proposed a model based on the four Ps of marketing to be included in social marketing strategies: product, place, price, and promotion. Two other Ps have subsequently been added: people and policy change (Andreasen, 2002; Gordon et al., 2006).

The *product* involves behaviour change or maintenance of psychosocial factors such as motivation and self-esteem. *Place* refers not only to physical space but also to communication channels. Examples include elements that connect people and products such as project staff, and promotional items such as calendars, caps, or shirts with project logos. In addition to the cost of project inputs and activities, *price* incorporates intangible resources and efforts as well as opportunity costs (e.g., the cost of attending project workshops vs. performing household tasks). *Promotion* includes advertising using different channels to promote empowerment and brand loyalty. Finally, *policy* change occurs when the intervention produces modifications in regulations, guidelines, or laws (Gallegos et al., 2014).

The six Ps of the Lulun Project's social marketing strategy are shown in Table 1. The RTC began after a situational assessment to analyse people, product, place, and price. Successively, a communication plan, campaigns, and branding were developed to promote the project. Advocacy for policy change was incorporated into project activities and the evaluation plan.

3 | METHODS

The strategy's design consisted of (a) market research (Andreasen, 2002), which included formative research in project communities, and (b) a creative process, which consisted of the concept and medium by which the messages were conveyed (Kinder, 2014). The creative process led to the creation of the project's brand, a mascot, promotional items, participatory activities, and a communication plan.

TABLE 1 Six Ps of the Lulun Project social marketing strategy

Eligible caregiver–infant pairs (n = 163).	
People	Community leaders, stakeholders, field staff, and researchers.
Product	<i>Behaviour 1:</i> Intervention children (n = 83) who consume one egg a day for 6 months. <i>Behaviour 2:</i> Caregivers of intervention children who feed them daily with an egg. <i>Behaviour 3:</i> Control children (n = 80) who maintain their regular diet for 6 months. <i>Behaviour 4:</i> Caregivers of control children who keep them on their regular diet.
Place	Andean region, Ecuador, central highlands; Mainly disperse rural communities in mountain terrain; Scarce and deficient means of transport; Main channels of information: elected councils, community meetings, and the public health system; and The Lulun Project staff; The presence in the field of the Lulun Project's brand.
Price	Monetary cost for the project's activities, instruments and other inputs. Physical and intellectual efforts of the project staff. Cost assumed by the participants (particularly opportunity costs).
Promotion	Communication plan: design of the message and the selection of communication channels. Implementation of four campaigns which tackled each RCT's stages (e.g., outreach and recruitment) Branding: project identify (name, mascot, symbols, and design) combined with promotional items and activities
Policy change	The Lulun Project brand was reflected explicitly at the different levels of change: <ul style="list-style-type: none"> • Local health facility relaxed their rules regarding egg consumption of project participants. • The intervention escalated from a local project to a nationwide policy. • The national policy led to new nutritional guidelines for egg consumption after the exclusive breastfeeding period.

Evaluation of the social marketing campaign incorporated information from the RCT and a qualitative assessment (Iannotti et al., 2017; Waters et al., 2018).

3.1 | Market research

Market research began with the identification of the target audience, followed by the conceptualization of different levels of influence (individual, intervention and control groups, and community). Subsequently, formative research and a situational assessment based on people, product, place, and price were conducted (Table 1). This phase concluded with field validation of the creative process.

3.1.1 | Target audience

Project participation was defined in terms of caregiver–infant pairs. After recruitment, participants were randomly divided into intervention and control groups. The intervention group received seven eggs each week for 6 months during household visits, whereas members of the control group were visited but did not receive eggs. Members of both groups participated in social marketing activities, received promotional items, and were monitored for health problems and supported in cases of health emergencies. In this sense, families in both groups developed a sense of a united community, in which people take care of each other and also have fun together. Mothers and infants in both groups received wool caps, bracelets, cooking aprons, and notebooks, which were designed to promote brand loyalty and empowerment. In addition to caregivers (85% of whom were mothers), the project promoted the involvement of other stakeholders, particularly local elected officials, religious and informal community leaders, grassroots organizations such as cooperatives and neighbourhood associations, local non-governmental organizations, and local MPH personnel (Iannotti et al., 2017).

3.1.2 | Levels of influence

The project's communication plan and activities were directed at each level and included radio spots, advertising posters, and workshops (Gallegos et al., 2014). Implementation began at the individual level because it is there that the psychosocial experience starts (Bandura, 1985; Bronfenbrenner, 1977). At the group level, the emphasis was on creating a sense of belonging, solidarity, and behaviour change for the common good. In turn, sociocultural factors, including indigenous identity, were promoted at the community level, where people are bound together by ethnicity, geography, culture, and history (Waters & Gallegos, 2014), with shared notions about aesthetics, values, and worldviews (Durkheim, 1982), and sociocentric as the central norm (Kirmayer, Brass, & Tait, 2000).

3.1.3 | Formative research

Field-based formative research analysed local expectations, beliefs, and attitudes using questionnaires and open-ended interviews in order to better define social marketing activities and communication channels.

3.1.4 | Situational assessment

The situational assessment defined the chain of events and interrelationships among them, producing a map of people, product, place, and price that informed the social marketing strategy. This assessment helped ensure timely delivery of eggs to infants in the intervention group for incorporation in their daily diet, while at the same time, optimizing inclusion of control group members.

3.2 | Creative process

The creative process included the development of the project's brand and mascot as part of the communication plan; both symbolized the project in a way that was recognized and appreciated by the target audience. This process was shaped by empirical evidence on cognition



FIGURE 1 Lulun Project's logos: Elegant style (left side) and minimalist black and white style (right side)

and language (Bandura, 1985; Brown, 2013; Gombrich, 1999; Jung, 1981; Rolf, 2013) and was guided by an understanding of the desired outcome and the characteristics of the target population (indigeneity, rurality, sociocentrism, and labour-intensive, gendered agriculture).

3.2.1 | Brand

A brand impacts cognition by establishing connections with knowledge and beliefs (Peter & Olson, 2005) and by evoking emotions and influencing individual self-monitoring and motivation (Crocker et al., 2013; Hoffman, 1984). The brand is a fundamental component of a communication strategy because it becomes the name and visible face of the project. A well-designed brand produces positive attitudes in the target audience (Peter & Olson, 2005). The brand should be consistent with the purpose of the project, inspire trust in the community, reflect shared norms and values, and raise public interest. Using the Kichwa word for egg (lulun), the project created a connection between the community's indigenous heritage and contemporary norms and values by using an effective representation of the project's central feature. Eggs are an accessible part of the local diet and traditional medicine. The word "Project" stressed the potential improvement children's nutrition through the RTC. The brand not only portrayed the project in a culturally appropriate form but also converted participants and their communities into protagonists rather than passive beneficiaries. The combination of Kichwa and English words reflected local knowledge and the contribution of western science. Even for non-Kichwa speakers, the sound "lulun" is phonetically pleasing and, along with the English word "Project," has a friendly sound.

Creation of a brand based on an effective representation or logo makes use of familiar images and acceptable colours. The Lulun brand was created using versions of the logo in different colours: a simple, elegant version was used in formal communications such as letters and business cards, whereas a more colourful version was used to promote project activities. Figure 1 portrays two versions.

The Lulun logo combines two distinctive features. An egg (the central focus of the project) is wrapped in a cloth, reflecting the way women carry infants on their backs using their ponchos, which keeps the infants snug and facilitates breastfeeding. The cloth's design incorporates a

chakana, an Andean cross that represents interconnections and a spiral that represents an indigenous concept of time that integrates the past, present, and future. This logo underscores indigenous worldviews, the relationship between the community and the project, and the importance of past, present, and future in human nutrition.

3.2.2 | Mascot: From brand to hero

In order to represent itself as a change agent and promote active participation and empowerment, a mascot was created to portray both project staff and community members. Figure 2 presents Luluma, an adaptation of the *Aya Huma* (devil's head) as a provider of eggs. *Aya Huma* is an Andean symbol of leader, counsellor, and protector who dances and celebrates with the community. Luluma was both a printed image and a costumed member of the project staff. In Figure 2, Luluma carries a basket of eggs.



FIGURE 2 Luluma in white background

3.2.3 | Communication plan

The communication plan was the project's cornerstone. Social marketing campaigns traditionally emphasize message content (Snyder, 2007). An effective communication plan should include the design of messages and the selection of communication channels (Kotler & Armstrong, 2008). The Lulun Project communication plan incorporated three message attributes: content, configuration, and tone (Kotler & Armstrong, 2008). *Content* included relevant information that was conveyed in the project area. The *configuration* of a message refers to length, word order, and selection of ideas; it involves a sender, a receiver, a communication channel, and a reaction (Kotler & Armstrong, 2008). In our project, messages were designed to reach the target audience using colloquial terms to convey interest in well-being and effectively communicate the project's content and objectives. Information about the Lulun Project was communicated through traditional information channels such as word of mouth and community celebrations. *Tone* incorporates the sound of messages and the emotions that may be evoked. The tone of the Lulun Project was designed to be consistent with project content, configuration, and concept to express a sense of a united community. Based on content, configuration, and tone, the narrative revolved around well-being, health, a united community, and consumption of eggs as an accessible means of improving infants' nutrition (Kotler & Armstrong, 2008).

4 | IMPLEMENTATION: CAMPAIGNS

Based on the social marketing strategy, project implementation consisted of four campaigns, as shown in Table 2 (LeppäNiemi &

TABLE 2 Strategy of the Lulun Project

Input	Output	Outcome
Strategy design	Market research + Creative process	Lulun Project social marketing manual: Mapping of people, product, place, and price Concept, brand, and mascot Definition of social marketing activities Communication plan Manual of corporate identity: Branding and design of promotional items
Implementation	<ol style="list-style-type: none"> 1. Publicize the project 2. Call for participation 3. Egg-based intervention 4. Project closing 	Outreach and rapport building Recruitment and baseline construction Intervention group compliance Controls marginal treatment contamination Low attrition Endline construction Fair compensation for controls caregivers
Evaluation	<ol style="list-style-type: none"> 1. Intervention integrity 2. Behavioural change 3. Policy change 	RCT objectives achieved Two sets of specific behaviours (see Table 1: Product) Internal policy of the health centre National policy for public health system New nationwide nutritional guidelines

Karjaluoto, 2008). The first P (people) included staff; some of whom were local residents, including a nutritionist with experience with children in vulnerable populations. Others had previously worked in the project area, which allowed the project to build on existing community relationships and trust (Hoffman, 2000).

Staff members not only delivered eggs and visited members of the intervention and control groups but also monitored potential side effects of egg consumption, including allergic reactions. In addition, they assisted families with unrelated medical emergencies, accessing regular health care services and providing transportation for elderly and disabled residents. They also promoted capacity building by training local authorities in project development and stimulated the local economy through the purchase of eggs and office supplies (e.g., pens, pencils, binders, and photocopies).

Campaigns are based on social marketing strategies that incorporate community-based activities (Snyder, 2007). Each campaign used specific communication channels, project narratives, branding, and activities and were designed to address participants' needs while invoking indigenous traditions and symbols that were attractive and meaningful to multiple stakeholders in the project area. The campaigns promoted key project activities, including meetings with the parish council, community leaders, and local health authorities; and workshops and special events including project inauguration, community meetings, and celebrations.

It was important that community members felt the project's presence through the prominent use of its brand and mascot in various forms. For example, the project vehicle bore the logo, so that the staff's presence could be readily recognized (see Figure S4). Additional examples included (a) business cards and name badges used by project staff; (b) rollups with the logo and the representation of Luluma used in all activities; (c) mobile recordings, posters, and other promotional material announcing project activities; (d) videos and photographs shown in public events; (e) a Web page; (f) branded aprons used during cooking workshops; and (g) project notebooks used during workshops and information sessions.

The first campaign promoted the project during its initial stages and included the diffusion of publicity using mobile audio messages, posters, and calendars. The second campaign supported participant recruitment and included entertainment for children at data collection sites and photographs of each child. The third campaign motivated caregiver empowerment by dividing participation into discrete, easily executable achievements that reinforced a sense of accomplishment (Andreasen, 2002; Reeve, 2001). Mothers/caregivers in the intervention group were motivated to feed their infants a whole egg every day; consumption was monitored using cards that featured the project's logo (see Figure S3). The monitoring cards also tracked participation in the control group so that each household visit represented a small achievement and allowed for a gift at the end of the project. This campaign also included workshops on topics of interest to mothers, which while not focusing on egg consumption, reinforced motivation and sense of belonging. In addition, social media was incorporated into the project, and promotional items, such as the wool caps, were distributed among participants in both groups. During the intervention's concluding months, a fourth campaign was implemented to support final data collection. This campaign focused on

door-to-door nutritional counselling and follow-up for families in the intervention and control groups.

Each component of the strategy was designed to instil a sense of loyalty to the project's brand, empower participants and promote project adherence (Chaudhuri & Holbrook, 2001). Additionally, a symbolic relationship was established by converting a brand into an institution that surpassed the boundaries of the RTC.

5 | RESULTS: EVALUATION

The evaluation of the social marketing strategy was based on field-work monitoring reports, RCT data, individual interviews, focus group discussions, and documentation provided by the MPH. Four interrelated results were found. First, the Lulun Project became a brand that was well recognized in the study communities, particularly by participating mothers/caregivers. Second, participants were empowered, expressed as the belief in their capacity to become a change agent. Third, the strategy influenced behavioural change (see "product" in Table 1) that was shaped by prosocial values such as prioritizing the good of the community, improving infant nutrition, and a belief that children are the future. Fourth, the Lulun Project influenced child nutrition policy at local and national levels.

Brand loyalty was reflected in high treatment compliance in the intervention group and low spillover effects in the control group (Iannotti et al., 2017). This result was monitored through weekly household visits and in qualitative research that analysed attitudes and practices (Waters et al., 2018):

The project is good, because thanks to the project we went to the cooking workshops. It is good that they delivered eggs, we [child in the control group] did not receive the eggs but my nephew [in the intervention group] was given eggs daily (Focus group discussion with caregivers of control children).

The egg is attractive, it is a delicious and comparing bread and eggs, I prefer eggs. (Interview with female community leader)

Specifically, mothers in the treatment group indicated that eggs are a healthy alternative to sweets and carbohydrates and are a better alternative than past feeding practices (Waters et al., 2018). As one participant stated:

I always carry an egg in my bag and when the baby is hungry I give it as a snack instead of giving him a candy (Focus group discussion with caregivers of intervention children).

The positioning of the brand represented a competitive advantage in the project's market. An unanticipated byproduct of brand loyalty was the reduction in the intake of sugary foods in the intervention group (Iannotti et al., 2017), which revealed an important change in food preferences and understanding of the nutritional value of eggs, especially those that are fertilized and considered more nutritious than industrially produced eggs:

Well, I really did not know about the eggs, like most people around here, [now we know] that feeding with eggs is good (Focus group discussion with caregivers of intervention children).

[When] my mother's chickens lay eggs, they are the chicken and the rooster's egg, (those are) the ones that we eat most. (Focus group discussion with caregivers of intervention children)

Empowerment was reflected in an attrition rate of only 7%, regular attendance in social marketing activities, participation in social media, and testimonies expressed during household visits. Furthermore, the project overcame negative perceptions about eggs, as expressed by one focus group participant.

[An egg] does not have cholesterol. It has been shown that the egg has nothing bad. (Focus group discussion with caregivers of intervention and control groups)

Accordingly, project activities were structured in such a way that they stimulated both behaviour maintenance among control group members and behavioural change in the intervention group, thereby converting an isolated activity (feeding one whole egg to an infant), to a habit (a whole egg every day) and ultimately, to a routine practice in each household (a full egg a day should be given to infants beginning at 6 months to improve their nutrition). A focus group participant explained her feeding strategy:

He eats the whole egg. First thing in the morning he eats [the egg], and then the rest I put in the juice and he drinks the blend (Focus group discussion with caregivers of intervention children).

Behaviour change in the intervention group resulted in a significant increase in growth compared with the control group (Iannotti et al., 2017), and positive perceptions about the effects of the intervention, as illustrated by one participant:

The egg is truly effective, and it is good for our children. Thank you for promoting campaigns to help people to know more about the egg (Focus group discussion with caregivers of intervention and control groups).

The Lulun Project also influenced the local health facility to change its recommendations regarding the introduction of eggs from 12 to 6 months:

I went to the health center; I have him checked every month. The doctor told me that the egg is good for him, that I should give it to him every day and not to miss that (Focus group discussion with caregivers of intervention and control groups).

The research of the colleague here: they are trying to incorporate the egg for the priority group [infants from the area], specifically to start giving the whole egg from early ages (Interview with local public health physicians).

A final result was that the MPH changed the national complementary feeding guidelines to promote the introduction of whole eggs earlier in the complementary feeding period (MPH, 2013). Table 2 shows the strategy inputs, outputs, and intervention outcomes.

6 | DISCUSSION

The Lulun Project developed, implemented, and tested a social marketing strategy that accompanied a RCT to evaluate an egg intervention among infants in the rural Ecuadorian highlands. The strategy was aligned with the RCT's objectives and planned according to a communication plan, branding, and social marketing activities. It responded to a vision of empowering participants to become agents of change and project owners, fostered by brand loyalty. Brand loyalty was evoked as a symbolic construct based on images and words that acquired personal and consensual meanings and hence motivated individual and collective behaviour (Blumer, 1969; Durkheim, 1982).

The simultaneous focus on empowerment and brand loyalty constituted a departure from classical views of behaviour change. A fundamental premise of symbolic interactionism theory is that the meaning that people acquire about the world around them influences their behaviour (Blumer, 1969). In this context, the RCT was not about introducing a new behaviour per se but rather changing the way eggs were defined and their contribution to infant nutrition. Hence, the project brand symbolized a redefinition of eggs during the complementary feeding period. Empowerment was key to overcoming psychological barriers to participation, such as potential suspicion that researchers might collect data for their own purposes and then leave nothing for the participants.

The social marketing strategy facilitated project promotion, motivated community members, and enhanced participation of caregiver–infant pairs, which was fundamental for reaching the required sample size and for overcoming cultural obstacles to blood collection and anthropometric measurements, and beliefs that eggs are not good for infants. The strategy was also critical to the equitable inclusion of control group members, who did not receive eggs.

The project competed with the food industry and non-governmental organizations, which also sought attention, participation, and community acceptance for their products/services. It also competed with health providers, who used established MPH guidelines for introducing eggs into complementary feeding regimens at a later age.

Finally, community-based interventions often face unforeseen events that can affect implementation or data collection, and a strong social marketing component can be instrumental in addressing these challenges. In our study, Cotopaxi, the world's highest active volcano located less than 3 miles from the project area erupted for the first time in 150 years during the final phase of data collection. This event resulted in a temporary relocation of many families. Another unforeseen event was initial opposition by health providers, who were unwilling to accept an innovative nutritional practice because they had always recommended the introduction of whole eggs at 12 months.

The results presented here are consistent with evidence provided in the human psychology literature, upon which the Lulun Project's

social marketing strategy was based (Ajzen, 1991; Hoffman, 1984; Myers, 2005; Reeve, 2001). Considering the convergence of the social marketing, public health, and nutrition literature (Gordon et al., 2006; Grier & Bryant, 2005) in the context of RCTs (Biglan, Ary, Smolkowski, Duncan, & Black, 2000; Morrison, 2001), the Lulun Project's experience was consistent with other examples of successful behaviour change interventions designed to combat chronic malnutrition (Fabrizio, van Liere, & Pelto, 2014) based on the incorporation of a social marketing strategy.

Our results suggest that there are very promising opportunities for RCTs in public health and nutrition and for food-based interventions that incorporate social marketing as a central part of the intervention.

7 | CONCLUSIONS

The Lulun Project fulfilled participants' expectations and mobilized behaviour change, thereby ensuring a successful RCT. Positive behaviour change was converted into a habit that has the potential to spread throughout the project area and beyond. The project's brand was key to achieve behaviour change because it became associated with familiar symbols and expressed through colloquial language. Furthermore, the Lulun Project became an institutionalized element that later was converted into public policy. Brand loyalty and empowerment, which are overlapping psychosocial factors, were crucial to the intervention.

The conceptual elements presented here have theoretical and methodological value for expanding the subdiscipline of social marketing. At the same time, the RCT constitutes an example of applied social marketing that may be useful for researchers, practitioners, and policy makers interested in nutrition interventions. Finally, the integration of the social marketing into the project intervention can be scaled up in Ecuador and elsewhere.

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CONFLICTS OF INTEREST

No conflicts of interest to declare.

CONTRIBUTIONS

CAG and JMS designed the social marketing strategy, with important contributions from WFW and LLI and feedback from AMC, CKL, and CPS. CAG, WFW, JMS, and AMC implemented the strategy; CAG was responsible for conceptualizing and writing the manuscript with substantial input from WFW, JMS, and LLI. WFW, AMC, CKL, CPS, and LLI reviewed and suggested modifications in the final version.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Andreasen, A. (1997). Challenges for the science and practice of social marketing. In M. E. Goldberg, M. Fishbein, & S. E. Middlestadt (Eds.), *Social marketing: Theoretical and practical perspectives* (pp. 3–19). New Jersey: Lawrence Erlbaum Associates.
- Andreasen, A. (2002). Marketing social marketing in the social change marketplace. *Journal of Public Policy & Marketing*, 21(1), 3–13. <https://doi.org/10.1509/jppm.21.1.3.17602>
- Bandura, A. (1985). *Social foundations of thought and action*. New Jersey: Prentice-Hall.
- Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., ... Lancet Nutrition Interventions Review Group (2013). Evidence-based interventions for improvement of maternal and child nutrition: What can be done and at what cost? *Lancet*, 382(9890), 452–477.
- Biglan, A., Ary, D. V., Smolkowski, K., Duncan, T., & Black, C. (2000). A randomised controlled trial of a community intervention to prevent adolescent tobacco use. *Tobacco Control*, 9, 24–32. <https://doi.org/10.1136/tc.9.1.24>
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. New Jersey: Prentice-Hall.
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513–531. <https://doi.org/10.1037/0003-066X.32.7.513>
- Brown, R. (2013). Beyond the evolutionary paradigm in consciousness studies. *The Journal of Transpersonal Psychology*, 45(2), 159–171.
- Chaudhuri, A., & Holbrook, M. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *Journal of Marketing*, 65(2), 81–93. <https://doi.org/10.1509/jmkg.65.2.81.18255>
- Crocker, L. D., Heller, W., Warren, S. L., O'Hare, A. J., Infantolino, Z. P., & Miller, G. A. (2013). Relationships among cognition, emotion, and motivation: Implications for intervention and neuroplasticity in psychopathology. *Frontiers in Human Neuroscience*, 7, 261. <https://doi.org/10.3389/fnhum.2013.00261>
- Dovidio, J. F., Piliavin, J. A., Schroeder, D. A., & Penner, L. M. (2006). *The social psychology of prosocial behavior*. New Jersey: Lawrence Erlbaum Associates Publishers.
- Durkheim, E. (1982). *The rules of sociological method*. New York: The Free Press. <https://doi.org/10.1007/978-1-349-16939-9>
- Fabrizio, C. S., van Liere, M., & Pelto, G. (2014). Identifying determinants of effective complementary feeding behaviour change interventions in developing countries. *Maternal & Child Nutrition*, 10(4), 575–592. <https://doi.org/10.1111/mcn.12119>
- Farquar, J. W., Fortmann, S. P., Maccoby, N., Haskel, W. L., Williams, P. T., Flora, J. A., ... Hully, S. B. (1985). The Stanford Five City Project: Design and methods. *American Journal of Epidemiology*, 122, 323–334. <https://doi.org/10.1093/oxfordjournals.aje.a114104>
- Ferraro, E. (2008). Kneading life: Women and the celebration of the dead in the Ecuadorian Andes. *The Journal of the Royal Anthropological Institute*, 14, 262–277. <https://doi.org/10.1111/j.1467-9655.2008.00504.x>
- Fox, K. F. A., & Kotler, P. (1980). The marketing of social causes: The first ten years. *Journal of Marketing*, 44, 24–33. <https://doi.org/10.2307/1251226>
- Freire, W. B., Ramirez-Luzuriaga, M. J., Belmont, P., Mendieta, M. J., Silva-Jaramillo, M. K., Romero, N., ... Monge, R. (2014). *Tomo I: Encuesta Nacional de Salud y Nutrición de la población ecuatoriana de cero a 59 años. ENSANUT-ECU 2012*. Quito: Ministerio de Salud Pública/Instituto Nacional de Estadísticas y Censos.
- Gallegos, C. A., Waters, W. F., Salvador, J. M., Chapnick, M., & Iannotti, L. L. (2014). *Social marketing: A psychosocial strategy for a prosocial behavioral change*. St. Louis: Washington University in St. Louis, Universidad San Francisco de Quito and Rockin' Business. Retrieved from: (in process)
- Gombrich (1999). The uses of images. In *Studies in the social function of art and visual communication*. London: Phaidon.
- Gordon, R., McDermott, L., Stead, M., & Angus, K. (2006). The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health*, 120(12), 1133–1139. <https://doi.org/10.1016/j.puhe.2006.10.008>
- Grier, S., & Bryant, C. A. (2005). Social marketing in public health. *Annual Review of Public Health*, 26, 319–339. <https://doi.org/10.1146/annurev.publhealth.26.021304.144610>
- Hastings, G., & Haywood, A. (1991). Social marketing and communication in health promotion. *Health Promotion International*, 6(2), 135–145. <https://doi.org/10.1093/heapro/6.2.135>
- Hastorf, C. A. (2003). Andean luxury foods: Special food for the ancestors, deities and the élite. *Antiquity*, 77(297), 545–554. <https://doi.org/10.1017/S0003598X00092607>
- Hoffman, M. L. (1984). Interaction of affect and cognition in empathy. In C. E. Izard, J. Kagan, & R. B. Zajonc (Eds.), *Emotions, cognition, and behavior* (pp. 103–131). Cambridge: University Press.
- Hoffman, M. L. (2000). *Empathy and moral development: Implications for caring and justice*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511805851>
- Iannotti, L., Lutter, C., Stewart, C., Gallegos-Riofrío, C. A., Malo, C., Reinhart, G., ... Waters, W. (2017). Eggs early in the complementary feeding period reduces stunting in an Andean population of Ecuador: A randomized, controlled trial. *Pediatrics*, 140(1), e20163459. <https://doi.org/10.1542/peds.2016-3459>
- Iannotti, L. L., Lutter, C. K., Bunn, D. A., & Stewart, C. P. (2014). Eggs: The uncracked potential for improving maternal and young child nutrition among the world's poor. *Nutrition Reviews*, 72(6), 355–368. <https://doi.org/10.1111/nure.12107>
- Instituto Nacional de Estadísticas y Censos (INEC), 2010. Censo de Población y Vivienda 2010. Retrieved from: <http://www.ecuadorencifras.gob.ec/censo-de-poblacion-y-vivienda/>
- Jung, C. G. (1981). *The archetypes and the collective unconscious, collected works, 9 (1) (2 ed.)*. New Jersey: Bollingen.
- Kinder, M. (2014). *Transmedia frictions: The digital, the arts, and the humanities*. California: University of California Press.
- Kirmayer, L. J., Brass, G. M., & Tait, C. L. (2000). The mental health of Aboriginal peoples: Transformations of identity and community. *The Canadian Journal of Psychiatry*, 45(7), 607–616. <https://doi.org/10.1177/070674370004500702>
- Kotler, P. (2011). Reinventing marketing to manage the environmental imperative. *Journal of Marketing*, 75(4), 132–135. <https://doi.org/10.1509/jmkg.75.4.132>
- Kotler, P., & Armstrong, G. (2008). *Principles of marketing* (12th ed.). New Jersey: Pearson Prentice Hall.
- Kotler, P., & Lee, N. R. (2008). *Social marketing: Influencing behaviors for good* (3rd ed.). Thousand Oaks, CA: Sage Publications.
- Kotler, P., & Zaltman, G. (1971). Social marketing: an approach to planned social change. *Journal of Marketing*, 35, 3–12. <https://doi.org/10.2307/1249783>
- Leppäniemi, M., & Karjaluoto, H. (2008). Mobile marketing: From marketing strategy to mobile marketing campaign implementation. *International Journal of Mobile Marketing*, 3(1), 50–61.
- Ministry of Public Health of Ecuador. (2013). Normas y Protocolos de Alimentación para Niños y Niñas Menores de 2 años (Feeding Norms and Protocols for Boys and Girls Under 2 Years). Quito, Ecuador: Ministerio de Salud Pública.
- Mitchell, A., Madill, J. J., & Chreim, S. (2015). Marketing strategy in social enterprise organizations in Canada: A structured abstract. In K. Kubacki (Ed.), *Ideas in marketing: Finding the new and polishing the old* (pp. 61–64). Cham: Springer.

- Morrison, K. (2001). Randomised controlled trials for evidence-based education: Some problems in judging 'what works'. *Evaluation and Research in Education*, 15(2), 69–83. <https://doi.org/10.1080/09500790108666984>
- Myers, D. G. (2005). *Social psychology* (8th ed.). Auckland, US: McGraw-Hill.
- Peter, P. J., & Olson, J. C. (2005). *Consumer behavior and marketing strategy* (7th ed.). New York: McGraw-Hill Irwin.
- Reeve, J. (2001). *Understanding motivation and emotion*. Auckland, US: McGraw-Hill.
- Rolf, A. Z. (2013). Embodiment and language comprehension: Reframing the discussion. *Trends in Cognitive Sciences*, 18(5), 229–234.
- Snyder, L. B. (2007). Health communication campaigns and their impact on behavior. *Journal of Nutrition Education and Behavior*, 39, S32–S40. <https://doi.org/10.1016/j.jneb.2006.09.004>
- Stead, M., & Gordon, R. (2009). Providing evidence for social marketing's effectiveness. *Social Marketing and Public Health: Theory and Practice*, 81–96. <https://doi.org/10.1093/acprof:oso/9780199550692.003.06>
- UNICEF, WHO & World Bank Group joint child malnutrition estimates. (2015). Levels and trends in child malnutrition. Key findings of the 2015 edition. Retrieved from https://www.unicef.org/media/files/JME_2015_edition_Sept_2015.pdf
- Waters, W. F., & Gallegos, C. A. (2014). Aging, health, and identity in Ecuador's indigenous communities. *Cross-Cultural Gerontology*, 29(4), 371–387. <https://doi.org/10.1007/s10823-014-9243-8>
- Waters, W. F., Gallegos, C. A., Karp, C., Lutter, C., Stewart, C., & Iannotti, L. (2018). Cracking the egg potential: Traditional knowledge, attitudes, and practices in a food-based nutrition intervention in highland Ecuador. *Food and Nutrition Bulletin*, 39(2), 206–218. <https://doi.org/10.1177/0379572118763182>
- Weismantel, M. J. (1998). *Food, gender, and poverty in the Ecuadorian Andes*. Philadelphia: University of Pennsylvania Press.
- Williams, C. B., & Girish, J. (2015). A political marketing perspective on social media adoption by us congressional campaigns. In K. Kubacki (Ed.), *Ideas in marketing: Finding the new and polishing the old* (pp. 274–281). Cham: Springer.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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