



Healthier communities in food deserts: Indications for reinforcing health education and promotion, especially in disadvantaged populations

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ABSTRACT

In a constantly evolving and fast-paced world where healthy foods are scarce and where available food options are not necessarily healthful, identifying healthy alternatives may be apt. Community supported agriculture Farmshare (CSA-F) programs in food desert areas in San Bernardino, California, USA was explored to augment available food options. In this eight-week mixed, longitudinal, quasi-experimental study with non-equivalent groups, 76 intervention participants received once-weekly Farmshare produce, 1 h health-education class, and participated in a 1 h weekly physical-activity (PA). Comparison participants (n=106) attended a once-weekly 1 h PA. Utilizing concepts from the theory of planned behavior (TPB) and grounded theory (GT), a research question was posed as: "How do CSA-F participants' behavioral intentions (BI), attitudes (ATT) and perceived behavioral control (PBC) for fruit and vegetable consumption differ from non-participants?". Intervention participants' PBC and BI scores improved significantly (PBC $p < 0.001$; BI $p < 0.001$); however, comparison participants' attitudes to healthy eating appeared to need significant reinforcement ($p = 0.02$). Barriers that influence interviewed participants' produce choices as reported include: cost, time (preparation), accessibility, preferences and lack of awareness on benefits of healthy living. In improving healthy food access, enlightenment on long-term benefits of healthier eating and economic limitations were indicated as issues of primary concerns in noted disadvantaged populations. When social determinants of health are limiting, continual reinforcing through health education/promotion efforts on relevant health benefits of healthier living are highly recommended.

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INTRODUCTION

There has been a documentation that where people live and their settings in terms of created or pristine environments can significantly affects their quality of life (White et al., 2013). In California Center for Public Health Advocacy (CCPHA) 2007 study, San Bernardino's Retail

Food Environmental Index (RFEI) was rated 5.72 on a rating of cities comprising of stores offering mainly unhealthy food options (for example, cheese-dripping pizza, easy/quick-fix microwave meals, processed foods, etc.), compared to those providing healthy choices (for example, fruits and vegetables). The RFEI is a ratio of the total number of fast food eateries/convenience stores to the total number of supermarkets and produce vendors in a city, county, or an area (Hoffman et al., 2011). Areas

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with high RFEIs indicate 'food deserts' when quality, affordable, and healthful food choices are difficult to obtain due to physical, social, or economic barriers; these have been associated with increased obesity and poor health outcomes.

From Hoffman et al. (2011) report, the RFEI for California was 4.2, which meant that there were more than four food outlets that offered "junk foods, for example, pizza" in California for every one that offered fruit and vegetable.

According to a 2011 report, San Bernardino's Home and School RFEI (HS RFEI) was rated highest in California with an index of 8.9 while California was rated 7.9 (Babey et al., 2011). The HS RFEI is used to describe the density of food stores that are less likely to have healthy food options relative to unhealthy food choices within a 0.5 mile radius of adolescents' schools. Based on San Bernardino's HS RFEI, there are about nine stores that offer mainly unhealthy foods in the school area for every store offering healthy options.

A compilation of incidents of health outcomes in San Bernardino City compared to San Bernardino County and California State's rates indicated disparities directing a community/stakeholders' response according to Hoffman et al. (2011) report.

Many of the indicated health outcomes (cardiovascular diseases, cancers and diabetes) have been associated with poor nutrition, low physical activity (PA) levels, and unhealthy environmental conditions (Kimura et al., 2009).

Study aims

The primary aim of this study was to explore the implications of community supported agriculture Farmshare (CSA-F) as an alternative food network. A CSA-F program is a collaborative effort whereby community residents partner with local farmers by pre-paying for their fresh farm goods (for example, produce that is supplied directly by farmers weekly or bi-weekly during the Farmshare season, which is about 13 weeks).

This CSA-F's alliance by local farmers and community residents can provide healthier food alternatives to patrons, can promote agriculture, may sustain the environment (via reduced mechanization, reduced food mileage, and low carbon imprint) and may enhance local economies.

Utilizing the theory of planned behavior (TPB) constructs (Ajzen, 1985; Jianfeng, 2013), how Farmshare participants' BI, ATT and PBC for fruits and vegetable consumption differed from non-participants were evaluated. Key barriers influencing participants' choices of healthy food options were explored from a GT perspective.

MATERIALS AND METHODS

The research protocol utilized for this research was as approved by Loma Linda University Office of Sponsored Research. Outreach was done to publicize the program through community announcements at Healthy San Bernardino Coalition (HSBC) meetings, and by doing door-to-door canvassing and flyer distribution within the San Bernardino Waterman Gardens Community (WGC) area. Participation for this study was voluntary, participants who indicated interests were invited for briefings that detailed what the study was about; questions were answered, consents were signed. As a community participatory research, convenient sampling was decided on, following stakeholders' (HSBC) and community residents' feedback. The WGC residents as well as HSBC feedback indicated that since this was a pilot study, they would rather have it open to any WGC resident who was willing to participate.

Study design

The design was a mixed, longitudinal, quasi-experimental study with non-equivalent comparison groups. Interventions were delivered once weekly for eight weeks and participants were measured at baseline, and after eight weeks; they completed surveys assessing their fruit and vegetable consumption practices and intentions. Following literature text analyses and focus groups on food access issues in San Bernardino City, fifteen willing participants were further interviewed on their fruit and vegetable consumption practices and on possible factors (if any) that influence their produce choices. Intervention participants were residents of San Bernardino WGC, an affordable housing and low socio-economic (SES) community, located in the Inland Empire of San Bernardino, CA. The comparison group participants were community residents living within 3-5 miles of WGC; also considered living in a low SES region.

Intervention and procedures

In the parent-study, 182 participants (ages 18 and up/one person per family) were enrolled. Two groups were involved in this study: intervention and comparison participants. The intervention recipients [group 1 (n= 76)] received: once weekly Farmshare (supplied by Old Grove Farmers, Inland Empire, CA), 1 h weekly health education and they participated in a 1 h weekly PA session. The comparison participants [group 2 (n= 106)] participated in a 1 h weekly PA. CSA-F program is a collaborative effort where community residents partner with local farmers for their direct supply of their fresh farm goods supplied weekly, bi-weekly, or according to pre-

determined contract through the Farmshare season. These goods can include vegetables, fruits, poultry products, meat, etc. According to the current study farmer patrons, Farmshare was valued at \$28 for a full Farmshare for each week and \$364 for a season or 13 weeks.

Background theories and application

Theory of planned behavior

Ajzen (1985) TPB concepts were applied in understanding current research endeavor with regards to participants' ATT, subjective norm (SN), PBC and intentions towards fruit and vegetable choices. The TPB focuses on individuals' attitudes towards a behavior, their perceptions of considered norms, beliefs, and perceived control about adopting new behaviors (Ajzen, 1985; Gullatte, 2006; Jones and Alony, 2011; Jianfeng, 2013). The theory, originally developed in 1960s as theory of reasoned action (TRA) by Ajzen and Fishbein (1980) was developed with the assumption that people being generally rational, will systematically process and use information as they find available. According to TRA, ATT as well as BIs can predict people's behaviors (APA, 1996; Fisher et al., 2013).

The intentions to implement certain behaviors are also a function of the attitude as well as perception of support from those considered significant in the individual's life [(subjective norm), Fisher et al., 2013]. In TPB, behaviors are affected by intentions to perform them. These intentions are influenced by attitudes towards the behaviors. The perception of support (subjective norm), and the perception of control that a person has that he/she can successfully implement a behavior can also directly influence his/her intention [(Fisher et al., 2013) (perceived behavioral control)] to perform it.

The TPB have been used successfully by many researchers to predict a wide variety of health behaviors and intentions including substance use and alcohol drinking (Ajzen and Sheikh, 2013), smoking (Hukkelberg et al., 2014), health service utilization (Ajzen, 1985; Gullate, 2006), and eating disorder and body satisfaction (Pickett et al., 2012) among many others.

The TPB states that behavioral accomplishments depend on both motivation (intentions) and ability (behavioral control). It distinguishes between three types of beliefs: behavioral, normative, and control (Ajzen, 1991). For this study, respondents' BIs, SNs, ATTs and PBC were evaluated. BIs refer to the strength of an individual's commitment towards performing a behavior; it can be influenced by ATT and SNs (Pickett et al., 2012). A BI example from the survey tool is the statement: "...I will be willing to use my Women, Infants, and Children Program (WIC), or farmers market nutrition program

(FMNP), or CalFresh checks / vouchers to buy into my own Farmshare in the next harvest/ season. SNs can arise from expectations for respected authority figures, groups, or society with the intention of that individual to conform (Ajzen and Fishbein, 1975, as cited in Pickett et al., 2012).

A SN example from current study's survey is the statement: *Most members of my family think that fresh fruits and vegetables are too expensive.* Attitudes refer to total belief about behaviors weighed against the consequences of engaging in such, for example, *I like to try new vegetables.* The consequence of trying new fruits may be weighed over the implications of its cost, taste, or nutrient benefits. PBC refers to the expectations of one's capacity to carry out a behavior. A person's PBC can be affected by two main factors: control belief; which is the perception of how difficult a behavior may be, and perceived power which is the perception of how a person feels he/she can or cannot successfully perform an indicated behavior (Manstead, 2011) (Figure 1). An example of a PBC survey question from this study is: *It will take me too much time to prepare fresh fruits and vegetables to eat.*

For this study, participants were surveyed at week 1, and after 8 weeks of the intervention to answer the research question of how Farmshare participants' BIs, ATTs and PBC for fruits and vegetable consumption differed from non-participants. The planned behavior variables were adapted from Ajzen's (2006) article "Constructing a TPB questionnaire: Conceptual and methodological considerations". Five points bipolar adjectives (1= Agree and 5= Disagree) were utilized to identify respondents' ATT, SNs, PBC and intentions. Respondents were asked to circle the number representing their opinions on each statement. For other TPB construct, examples incorporated in this study, see Figure 1.

Grounded theory

Glaser and Strauss' (1967) grounded theory (GT) framework was utilized to address qualitative question components in this study. The GT developed in 1967 by Glaser and Strauss (as cited in Bitsch, 2005) provides the methodology to inductively develop theories that are grounded in systematically collated data. According to Bitsch (2005), the processes of building GT include deciding on the research problem, framing the research question, collecting data, coding and analyzing data, and then developing the theory. As corroborated by Bitsch's article, a GT process project does not begin with a theory from which hypotheses are deducted, but rather with a field of study, or a research question, and therein, relevant themes are allowed to emerge during the data collection research process (Bitsch, 2005). For the

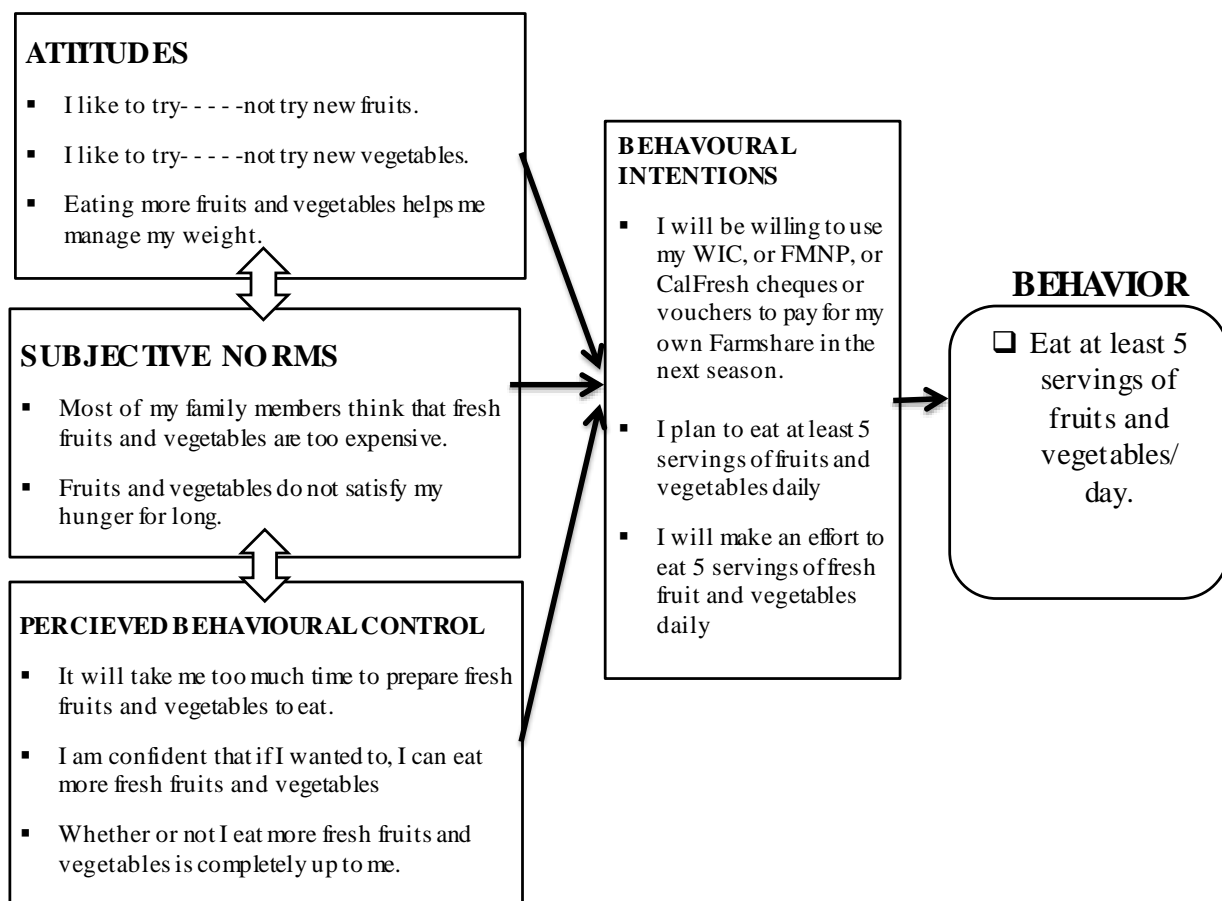


Figure 1. Theory of planned behavior application to the food access problem. Theory construct variables were adapted from Ajzens & Sheikh's: Action versus Inaction: anticipated affect in theory of planned behavior (2013).

current study, different key concepts of the GT (Bitsch, 2005; Bulawa, 2014) were incorporated: From literature background, to articulating the research problem and from gathering data to saturation, to the development of the conceptual model (Figure 2).

In order to evaluate barriers influencing produce choices as reported by participants', the GT approach as developed by Glaser and Strauss (as cited in Bitsch, 2005) was used. Literature text analyses for food access issues in San Bernardino were completed. The reports indicated that the city of San Bernardino is a "food desert" (CCPHA, 2007; Hoffman et al., 2011). "Food deserts" are areas where healthy foods and alternatives are unavailable or inaccessible for any reason be it economic, political, or infrastructural. Hoffman et al. (2011) reported that in California, there were at least four alternatives of unhealthy foods for every healthy option (for example, four global fast-food restaurant chains for every one produce store). After conducting the literature text analyses that indicated a food access problem in San Bernardino, focus group discussions were held with key

informants in the WGC. Data were gathered through field notes, journals, and by further literature consults on food access issues in San Bernardino.

Following the initial textual analyses to understand the food access issues in the city, a semi-structured guided interview survey was then utilized to obtain feedback from Farmshare intervention participants about their fruit and vegetable choice experiences. For this qualitative exploration, participants were conveniently sampled and interviewed till saturation (ages 18-55, mean age 38). Four interviewers were engaged in this guided interview exercise and two of them were bilingual promotor as for Spanish and English interpretation and translation as needed.

Fifteen participants were interviewed (face to face) comprising of 12 women and three men. Of the participants interviewed, nine were identified as being of Hispanic origin, three as Black/African- African Americans, one as Asian, and two as mixed races, Hispanic/White and Black/White. Participants were interviewed for about 10-15 min at the Waterman

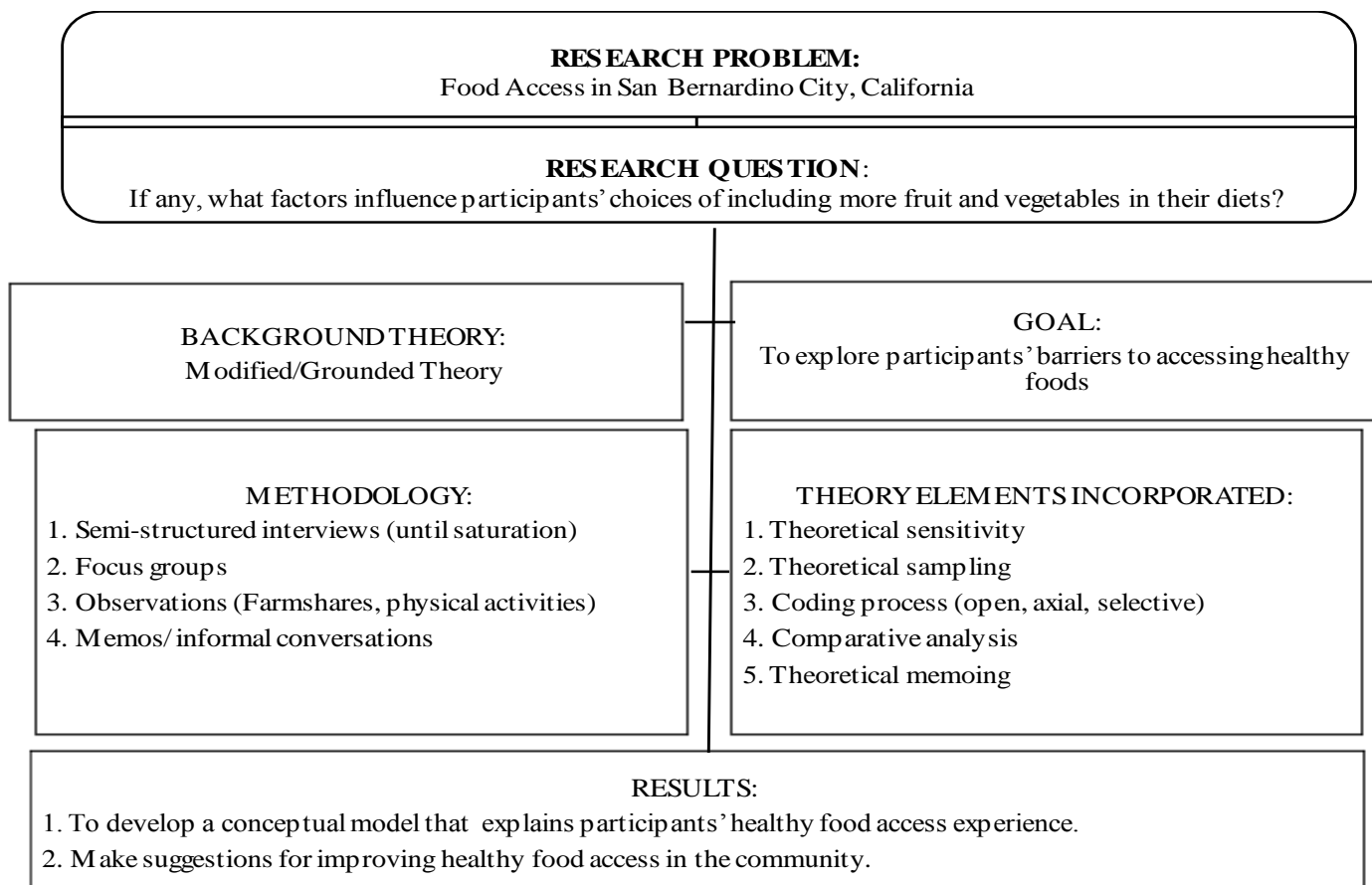


Figure 2. Grounded theory application to the food access problem in San Bernardino City, CA. Theory concepts was adapted from Glaser & Strauss 1967 (as cited in Bulawa, 2014).

Gardens’ community center. Interview questions were open-ended with room for significant prompting, directing and focusing (for example, “If any, what factors make it difficult for you to eat more fruits and vegetables?” “How can those factors (identified limitations) be addressed?” “What do you know about Farmshare programs?” “How would you improve current Farmshare programs?”).

As researchers, efforts were made to be aware of and consideration was given to ensure that the coding and analysis were iteratively evaluated for recurrent patterns and themes (comparative analysis). For the schematic framework of elements incorporated in this study, see Figure 1. During the study implementation, interviewees met weekly to review data themes and to reconcile thematic saturation. Codes were read and reread for an enhanced understanding of emergent themes. The raw data was examined and given a first-level coding, which was categorized into themes, and common themes were organized on similarities reflecting emerging phenomena. From evolved phenomena, patterns of social process of interest (reasons for not including fruits and vegetables in

diets) as these became recurrent and were itemized to form the core category ‘barriers’ (see Figure 3 for the evolved conceptual model).

Data analyses

Paired t-test analysis to compare outcome variables

Paired *t*-tests were used to complete analyses for participants who completed the evaluations by week eight of program intervention to evaluate their ATT, PBC, SNS, and BIs to include more produce in their diets.

Sensitivity analysis to evaluate attrition

Even though 182 participants started the study, by week 8, participants who remained in the study were 90 (about 50%). A sensitivity analysis was therefore completed to explore if participants who were absent by week 8

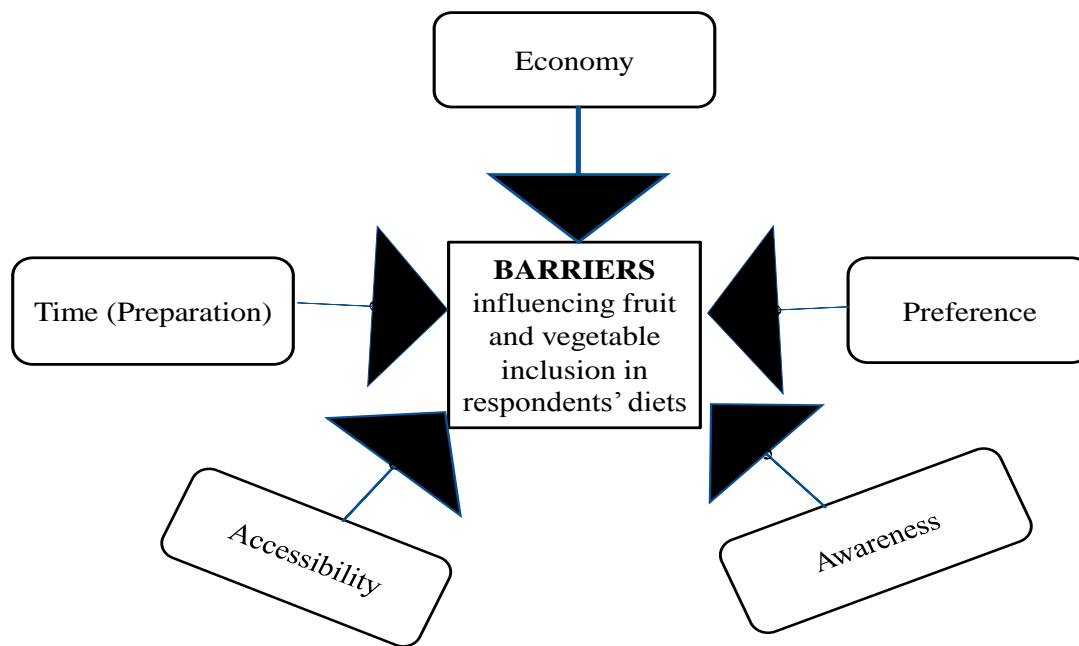


Figure 3. The basic social process: main factors influencing Farmshare study participants' fruit and vegetable choices (n=15).

differed significantly from those who continued.

RESULTS

Demographics

Of the 182 participants enrolled in the study, 76 (41.8%) were in the intervention group and 106 (58.2%) in the comparison group. By week 8, a total 27 (35%) intervention recipients had dropped out from the study and 65 (61%) had also been lost to attrition among the comparison participants. Most of the participants in the study were female [160(88%)].

The mean age among the intervention group was 42.3 years, and 36.7 years for the comparison group. Most participants in the intervention group [53 (69.7%)] also identified as Hispanic, and 92 (86.8%) of those in the comparison group identified as Hispanic.

Theory of planned behavior constructs scores

In evaluating the TPB constructs from participants' scores at base line and after eight weeks, the intervention participants improved their PBC and BI scores significantly [mean PBC scores difference: 3.69, SE = 0.79, $t(45) = -2.41$, $p = <0.001$]; mean BI scores

difference: 3.41, SE = 0.83, $t(45) = 4.13$, $p = <0.001$].

Among the comparison participants, while their later BI and PBC scores were not significantly different from baselines', their attitudes to eating healthy appeared to need significant reinforcement by the end of the study [mean diff: -1.05, SE = 0.44, $t(42) = -2.41$, $p = 0.02$; see Table 1 and Figure 4].

Barriers identified preventing inclusion of more fruits and vegetables in diets

In exploring factors influencing interviewed respondents' fruit and vegetable choices, participants' feedback provided some insights on their experience of this study as well as on their fruit and vegetable choices.

Overall, participants seemed to appreciate the CSA-F program and appeared to have learned about CSA-F and healthier eating. The following was voiced by a Hispanic participant: "Thank you for your support and your teaching for me and my family. They were of use because I learned the portion quantities for my plate of food, the five food groups, which were fruits, vegetables, grains, lacto, and proteins. I also liked that we were able to mix fruits and vegetables, which added a wonderful flavor to food. I cooked vegetables that I had never cooked or used before. Everything was excellent, but I would like for these classes to expand because I have much to learn." Participants reported different reasons for

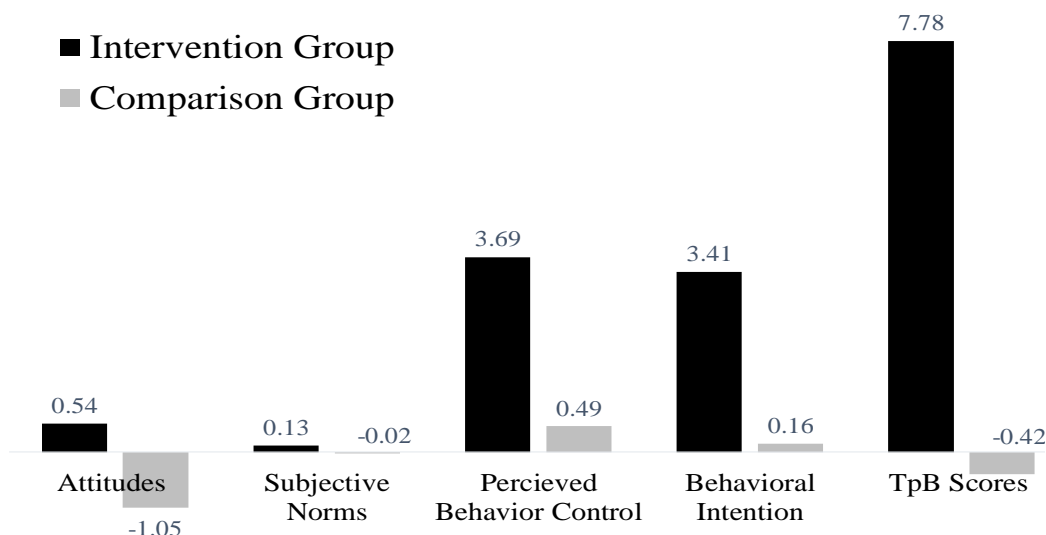


Figure 4. Differences in TPB construct scores after eight weeks.

Table 1. TPB scores: Baseline verse eighth week.

TPB constructs	Mean Diff. ± Std.	p-Value
Intervention group		
ATT	0.54 ± 4.58	0.426
SNs	0.13 ± 3.75	0.815
PBC	3.69 ± 5.37	0.000**
BI	3.41 ± 5.62	0.000**
Total TPB scores	7.78 ± 14.41	0.001*
Comparison group		
ATT	-1.05 ± 2.85	0.021*
SN	-0.02 ± 3.90	0.097
PBC	0.49 ± 2.97	0.287
BI	0.16 ± 3.94	0.788
Total TPB Scores	-0.42 ± 10.19	0.789

*, p-value <0.05; **, p-value <0.001.

not including more fruits and vegetables in their diets, although it appeared that most indicated a willingness to eat better and make healthier lifestyle choices. According to an Asian female participant, “Because I have to cook, I have to use it (referring to kale vegetable). Price is one thing that makes it difficult. I need to make a bigger effort to eat healthy.” It is understood that people may also have different priorities, and moving the needle in behavioral modification could be somewhat stepwise for many, as noted from an African-American female participant: “That’s a personal choice and it’s on me, so if I don’t want to eat more fruit and veggies, there’s nothing that can be done about it,” she voiced.

In answering the main qualitative research question, the major factors influencing participants’ inclusion of

fruits and vegetables in their diets were clustered into five groups of “barriers”: economy (do not feel they can afford the cost), time (of some of the fruit/vegetable preparation), individual preferences, accessibility (ease of obtaining), and awareness (lack of awareness on Farmshare benefits and on importance of including fruits and vegetables in diets) (Figure 3).

Identified barriers preventing participation in CSA-F

In this study, participants were able to explain their understanding of what Farmshare (CSA-F) is in their own words. Having this understanding could be considered important because in the literature, CSA-F was reported

and seemed associated with the “elite.” Most patrons of CSA-F have been reported as living in higher socioeconomics and particularly being White/Caucasian (Allen, 2010; Lang, 2010; Wilson, 2013). Having this understanding could be considered important because from literature, CSA-F have been associated in the domains of the “elite.” Most patrons of CSA-F have been reported to be of higher socioeconomics and particularly of White/Caucasian backgrounds (Allen, 2010; Lang, 2010; Wilson, 2013). In describing CSA-F, one participant explained: *“Local farmers provide fresh produce to people in the program. Participants participate depending on the options that they pay for.”* In regards to feelings about bringing CSA-F to the community, one participant stated, *“We learned about dealing with healthy foods, how to get other foods. We also learn about advocacy. It’s a program where I get fruits and vegetables, fresh and organic. I have to participate in the activities to be a part of the program.”*

In noting some of the possible obstacles that may determine whether or not she could participate in CSA-F, one Hispanic female participant said, *“I don’t have that much time to cook the vegetables. Also, buying enough of fruits and vegetables to eat is not easy. \$28 a week is too much. I won’t spend a \$100 a month on produce. I probably spend like \$50 or \$60 a month. It’s a family of three, but that’s how much we can afford.”* Some of the main reasons (barriers) participants cited on why or what they do not like about CSA-F include the perception or reality (as reported) of not being able to afford it (cost), not having enough time to prepare the produce, not knowing how to prepare some of the unfamiliar fruits and vegetables, not having enough variety in their weekly share, some scheduling conflicts for Farmshare pick up inconvenience, and non-flexible payment for shares.

Lesson learned on ways to improve CSA-F

Study participants were asked how they could improve the Farmshare program and some of their feedbacks were telling. In elaborating on how respondents think Farmshare programs could be made better, here are a few of the statements uttered: *“Too expensive. It’s great, but I can’t afford it.” “Provide more variety of produce that consumers like, less fennel please!” “Provide more recipes on how to make unfamiliar foods.” “Decrease the price of the produce, and I would love it if they accept CalFresh.”* Suggested themes to improve CSA-F from the participants interviewed were the following.

Explore flexible payment plans with reasonable pricing

The way Farmshare programs are designed, participants must prepay at the beginning of the Farmshare season

so the farmers have the finances to plan/plant for the next season. To include people living in lower socioeconomic areas in CSA-F, flexible payment options may be helpful because most participants indicated that having to pay for the entire season at the beginning of the season would be overwhelming. The use of nutrition assistive vouchers from WIC and CalFresh programs are being explored, however, not all farmers accept or have resources or trained personnel to accept these supplemental nutrition vouchers and/or options.

Increase variety of produce

Some participants reported that they did not have enough variety in their weekly produce choices; some indicated they wanted, for example, banana in their weekly shares. This request may not be immediately realistic for the following reason: Farmshare programs operate with farmers focusing on growing and distributing limited or seasonal produce which are grown locally. Patrons may therefore, need to understand that Farmshare programs may not necessarily meet all fruit/vegetable needs throughout the year unless extensive planning and storage are implemented. People may also desire other fruits/vegetables that may not be grown locally or available year-round. Innovative ways to provide more variety of fruits and vegetables especially desired produce from local farmers to meet patrons’ needs may foster more communal engagement.

Promote awareness and engagement of CSA-F

One main goal of CSA-F is to engage community members in a food connection with local farmers such that all partners benefit from the collaboration. The gains of this partnership include, but are not limited to, farmers continue to have jobs, patrons have fresh locally grown foods with less carbon/ecological footprints, and the local economy also thrives. Understanding these CSA-F benefits can elicit social responsibility with an intuitive appeal from the environmental and food justice that this agricultural system indicates. Other ways that the interviewees suggested on improving awareness of Farmshare programs could be through testimonials, newsletters, social media, email blasts, flyers, etc.

Explore indicated barriers to and expand CSA-F to different populations/settings

Specific measures to engage participants from minority populations to break the myth on the elitist CSA-F participation through flexible pick-up/payments plans were suggested. As alternative food options, CSA-F can be expanded to workplace settings, schools, private and

public institutions with participants contributing to their local economy, reaping the associated benefits and sharing relevant risks with the farmers.

Continue to improve on CSA-F and include components like cooking demonstrations, recipe samples, etc.

Some locally grown produce (depending on different regions) may be unfamiliar to some people, so the use, preparation and storage of these types of produce maybe problematic. Some participants indicated that having cooking demonstrations and providing cooking recipes may increase the change of them buying and preparing them and thus bolster their participation in the program. While it did not seem to be a problem for the participants in this study, transportation (to go to pick up weekly produce) maybe an issue for others participating in similar program in other geographical areas.

Program sustainability

In the current parent study involving the 182 enrolled participants, 76 (42%) of those participants were enrolled to receive weekly Farmshares costing \$364 for 13 weeks and \$28 per week. While the participants were receiving the weekly Farmshares, with an hour of weekly health education and an hour of weekly exercise sessions, an Economic Mobility Coordinator (EMC) was available to assist Farmshare recipients (if willing) with their accounts to budget and put money aside towards future Farmshares. In the feedback regarding interests, the majority of Farmshare participants indicated that they liked the Farmshares and would like to continue receiving them after the intervention was completed. In indicating their commitment, 22 participants (29%) started saving money towards future shares with the EMC.

Over three months, the total savings towards the Farmshares from the 22 participants was \$865, which would be about 11% of what full Farmshares for those 22 participants would have been. This contribution (savings) indicates that at least 29% of the WGC participants were willing to commit to eating healthier by considering Farmshare options to the point of putting money aside (saving) towards their own shares. The savings, however, were still short of what was needed to pay for full shares. Therefore, exploring other ways to supplement the savings, like having flexible payment plans and accepting supplemental nutrition vouchers, such as WIC and CalFresh vouchers, are much indicated.

DISCUSSION

This study was an attempt to explore possible implications in addressing a food access problem in the

city of San Bernardino by introducing CSA-F to residents who would not ordinarily patronize local farmers due to reported high cost of the farm goods. Local farmers may not necessarily be blamed for these costs because their goods are in competition with multi-global retail chains whose focus are more efficiency driven, but not without the carbon/ecological footprints in their trail. Having conversations that engage local residents with their local farmers can foster a food connection bond with all partners such that dialogues on how every stakeholder can benefit from the collaboration may be appropriate. These dialogues were part of the aims of this research to explore barriers that influence respondents' fruit and vegetable choices.

It was enlightening to note that while the intervention participants appeared to improve in the TPB constructs scores after eight weeks, the comparison group participants' attitudes towards healthy eating or including fruit and vegetable in their diets plummeted. Possible implication is that there is need for reinforcement on benefits especially among this population group. It is also possible that some of the comparison participants are aware of the intervention group and the associated Farmshare and education that those received weekly during the study. The knowledge that some people were receiving Farmshare while they could not create ill feelings that could be reflected in comparison participants' downturned attitudes; this is however a conjecture. To minimize possible ill feelings or cross over influence between the two groups, efforts were made so program and sessions were delivered at different locations for the two groups.

The inclusion of more fresh fruits and vegetables has been shown to be protective for many health conditions, such as cardiovascular diseases, Type 2 diabetes and obesity (Dauchet et al., 2007; Liu et al., 2012; Montonen et al., 2005). Pitts et al. (2014) reported that people who participate in Community Supported Agriculture (CSA), such as farmers' markets are likely to consume more fruits and vegetables than those who do not. Engaging in CSA-F as alternative food networks is one way of increasing access to healthy food options, as well as in promoting ecological sustainability. While the values and principles in CSA-F might be considered laudable, there are still concerns about the equity and social justice represented in their operation and participation. Most CSAs have similar composition; average membership consists of middle-class white consumers (Lang, 2010; Wilson, 2013). In a report, Wilson (2013) documented that there is a need to further explore the justice and equity issues in representation and participation in CSAs to ensure that they are open to all and to make their indicated benefits not (the main and only) forefront in the discussions.

From feedback and findings of this study, participants reported affordability of Farmshares as one of their main

obstacles that may hinder their future participation. This is with the backdrop that the majority of people in WGC live mainly on low-incomes. The structures of most CSA-Fs are such that patrons prepay for farm goods at the beginning of the Farmshare season. Farmshare participants may also share associated seasonal risks with their farmers depending on farms' yield whether through abundance or deficits in Farmshare produce. In order to expand the reach of CSA-F, especially to populations with limited monetary means, the suggestions from participants' feedback in this study are presented below:

- Explore flexible payment plans/pricing.
- Increase variety of produce.
- Promote awareness and engagement of CSA-F.
- Explore indicated barriers to and expand CSA-F to different populations/settings.
- Continue to improve on CSA-F and include components like cooking demonstrations, recipe samples, etc.

The barriers (for participating in CSA-F) indicated from participants in this study only slightly differed from those reported by people living on low incomes in other studies. Hamilton et al. (2001) identified such barriers reported by low income CSA-F participants as low variety in fruit and vegetable options, difficulty with shopping due to supermarkets' location, no child care and lack of free time (Andreatta et al., 2008). In consonance with this study, Andreatta et al. (2008) further reported that cost was one of the major indicated impediments to healthy eating in their study. With affordability of Farmshares identified as a major obstacle from literature as well as in this study, sustainability of CSA-F with participants living in disadvantaged or low socioeconomic settings becomes a problem that needs addressing with innovative approaches. Providing funding for whole Farmshare as implemented in this study for enrolled Waterman Gardens' residents is not sustainable on the long run. Residents/other participants will need to demonstrate their interests or passion for this system of agriculture. As interests mount in CSA-F programs, additional/supplementary resources may be sought, and local farmers can be lenient in their expectations, especially in diverse or other economically-challenged settings.

Attempted was made to gauge participants' willingness to continue participating in future Farmshare programs by their commitment to contribute through their personal savings towards the upcoming season's Farmshare with the program accountant. Having a 29% commitment in a community where monthly rent is as low as \$190 (as reported by a participant; this is probably supplemented since community comprises of low-income federal housing units) might be noteworthy. In their study, Andreatta et al. (2008, p. 138) further reported that only

two participants (5%) from the 39 low-income Farmshare holder household members that received similar Farmshare produce indicated "willingness"—note that they had intentions, not necessarily commitments—to purchase their own shares "*when they were back on their feet financially*". Savings of about \$10 weekly—commitment—towards a program like this (especially when such contribution is optional). There is also a lot of room for improvement to turn the dial towards better eating and lifestyle choices, especially in the San Bernardino community. With the disproportionate trends in health outcomes in San Bernardino in comparison with San Bernardino County's and California's rates as indicated by Hoffman et al. (2011), innovative ways to engage this community to explore healthier food options would be useful.

IMPLICATIONS

Through this study, the problem of healthy food access in a disadvantaged setting (low income community) was explored. Attempt was made to promote an alternative food network (Farmshare program) and associated activity and health education in a food desert region in San Bernardino City. Attempt was also made to connect local farmers to local consumers in the San Bernardino City community through this agricultural venture. In filling this food desert infrastructural gap, it was hoped that this will influence and reduce health disparities related to healthy food access in the city. Findings from this study may motivate educators and other professionals to design interventions focused on increasing healthy food access specifically via CSA-Farmshare/Farmers markets targeting lower income and rural communities' members. These "disadvantaged" populations may not be as informed on CSA practices. Expanding healthy food options or similar interventions can improve health and general wellbeing of community members by reducing chronic diseases that may be associated with obesity.

LIMITATIONS

This study is not without limitations. A convenient sampling technique was used (study was non-randomized), this further limit current study's generalizability to other populations or settings. The barriers identified here while relevant from participants' reports, may not compare to other impediments in different settings or from other reports. The self-reported nature of collated data precludes an objective evaluation of respondents' statuses or intentions. With data analyses and interpretations from participants' viewpoints and with researchers' interpretation, participants' reports could be biased from the information being collected;

respondents may over or under report certain instances, which can influence interpretations of results.

Conclusion

In this study, the TPB constructs was utilized to evaluate changes in attitudes, perceived behavior control, SNs and BI among participants after eight weeks of current study. Participants in the intervention group reported significant improvement in their perceived behavior control and behavior intentions. On the other hand, participants in the comparison group appeared to need more education regarding benefits of healthful eating as reflected in their later attitudinal scores after eight weeks. The GT was also utilized to evaluate respondents' reflections on an alternative food network CSA-F program.

In exploring the main research question on barriers influencing participants' choices of fruits and vegetables, the main factors include economy (cost), time (fruit/vegetable preparation), individual preferences, accessibility (ease of obtaining) and awareness (enlightenment on long-term benefits of fruits and vegetables in diets). In regards to what barriers may influence participants' engagement in Farmshare programs, the thematic factors indicated are economy (cost), time, not enough variety, schedule for pick up/inconvenience and non-flexible payment.

This study was an endeavor to guide participants into exploring Farmshares as healthy alternatives. Findings indicate that decisions regarding healthy eating in disadvantaged communities could be hampered by many factors of which cost implications are paramount. One way in which these populations may be able to participate in this agricultural system can include having flexible pricing, payment plans, and accepting food assistive vouchers for produce exchange by local farmers.

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Abbreviations: **ATT**, Attitudes; **BI**, behavioral intentions; **CCPHA**, California Center for Public Health Advocacy; **CSA**, Community Supported Agriculture; **CSA-F**, Community Supported Agriculture Farmshare; **EMC**, Economic Mobility Coordinator; **FMNP**, Farmers Market Nutrition Program; **GT**, grounded theory; **HS RFEI**, Home and School Retail Food Environment Index; **HSBC**, Healthy San Bernardino Coalition; **mean diff**, mean difference; **PA**, physical activity; **PBC**, perceived

behavioral control; **RFEI**, Retail Food Environmental Index; **SE**, standard error; **SES**, socio economic status; **TpB/TPB**, theory of planned behavior; **TRA/TPB**, theory of reasoned action and planned behavior; **WGC**, Waterman Gardens Community; **WIC**, Women, Infant, and Children Program.

REFERENCES

- Ajzen I. & Fishbein M. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs, NJ: Prentice-Hall.
- Ajzen I. & Sheikh S. (2013). Action versus inaction: anticipated affect in the theory of planned behavior. *J. Appl. Soc. Psychol.* 43(1):155-162. doi:10.1111/j.1559-1816.2012.00989.x
- Ajzen I. (1985). From intentions to action: A theory of planned behavior. In: J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behavior*. Heidelberg, Germany: Springer. Pp. 11-39.
- Ajzen I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decision Process.* 50:179-211.
- Ajzen I. (2006). Constructing a TPB questionnaire: Conceptual and Methodological Considerations. <http://www.unix.oit.umass.edu/TPB.measurement.pdf>
- Allen P. (2010). Realizing justice in local food systems. *Cambridge Journal of Regions, Economy and Society.* 3:295-308.
- American Psychiatric Association (1996). *Diagnostic and statistical manual for mental disorders (4th Ed.)*. Washington, DC: Author.
- Andreatta S., Rhyne M. & Dery N. (2008). Lessons learned from advocating for low-income and food insecure households. *Southern Rural Sociology.* 25(1):116-148.
- Babey S. H., Wolstein J. & Diamant A. L. (2011). Food environments near home and school related to consumption of soda and fast food. Los Angeles, CA: UCLA Center for Health Policy Research.
- Bitsch V. (2005). Qualitative research: A grounded theory example and evaluation criteria. *Journal of Agribusiness.* 23(1):75-91.
- Bulawa P. (2014). Adapting grounded theory in qualitative research: Reflections from personal experience. *Int. Res. Educ.* 2:145-168.
- California Center for Public Health Advocacy (CCPHA) (2007). Searching for healthy food: The food landscape in California cities and counties. Retrieved from CCPHA website: http://www.publichealthadvocacy.org/RFEI/presskit_RFEI.pdf
- Dauchet L., Kesse-Guyot E., Czernichow S., Bertrais S., Estaquio C., Péneau S., Vergnaud A. C., Chat-Yung S., Castetbon K., Deschamps V., Brindel P. & Hercberg S. (2007). Dietary patterns and blood pressure change over 5-y follow-up in the SU.VI.MAX cohort. *Am. J. Clin. Nutr. (AJCN).* 85(6):1650-1656.
- Fisher W. A., Kohut T., Salisbury C. A. & Salvadori M. I. (2013). Understanding human papillomavirus vaccination intentions: Comparative utility of the theory of reasoned action and the theory of planned behavior in vaccine target age women and men. *J. Sex. Med.* 10(10):2455-2464. doi:10.1111/jsm.12211
- Gullatte M. (2006). The influence of spirituality and religiosity on breast cancer screening delay in African American women: application of the Theory of Reasoned Action and Planned Behavior (TRA/TPB). *ABNF Journal.* 17(2):89-94.
- Hamilton J. H., Anliker J., Miller J. C., Mullis R. M. (2001). Food shopping practices are associated with dietary quality in low-income households. *J. Nutr. Educ.* 33:S16-S26.
- Hoffman M., Trevino E., De Luca E. & Hazlet P. (2011). City of San Bernardino environmental scan: A model for building communities that support healthy eating and active living. The Planning Center | DC & E.
- Hukkelberg S., Hagtvet K. & Kovac V. (2014). Latent interaction effects in the theory of planned behaviour applied to quitting smoking. *Brit. J. Health Psychol.* 19(1):83-100. doi:10.1111/bjhp.12034.
- Jianfeng Y. (2013). The theory of planned behavior and prediction of entrepreneurial intention among Chinese undergraduates. *Social behavior and personality: An International Journal.* 41(3):367-376.

- doi:10.2224/sbp.2013.41.3.367.
- Jones M. & Alony I. (2011). Guiding the use of grounded theory in doctoral studies-An example from the Australian film industry. *Int. J. Doc. Stud.* 6:95-114.
- Kimura Y., Wada T., Ishine M., Ishimoto Y., Kasahara Y., Konno A., Nakatsuka M., Sakamoto R., Okumiya K., Fujisawa M., Otsuka K. & Matsubayashi K. (2009). Food diversity is closely associated with activities of daily living, depression, and quality of life in community-dwelling elderly people. *Journal of The American Geriatrics Society.* 57(5):922-924. doi:10.1111/j.1532-5415.2009.02235.x
- Lang K. (2010). The changing face of community-supported agriculture. *culture and agriculture.* 32(1):17-26. doi:10.1111/j.1556-486X.2010.01032.x
- Liu Y. T., Dai J. J., Xu C. H., Lu Y. K., Fan Y. Y., Zhang X. L., Zhang C. X. & Chen Y. M. (2012). Greater intake of fruit and vegetables is associated with lower risk of nasopharyngeal carcinoma in Chinese adults: a case-control study. *Cancer Causes & Control.* 23(4):589-599. doi:10.1007/s10552-012-9923-z
- Manstead A. (2011). The benefits of a critical stance: A reflection on past papers on the theories of reasoned action and planned behaviour. *Brit. J. Soc. Psychol.* 50(3):366-373. doi:10.1111/j.2044-8309.2011.02043.x
- Montonen J., Järvinen R., Heliövaara M., Reunanen A., Aromaa A. & Knekt P. (2005). *Eur. J. Clin. Nutr.* 59(3):441-448. DOI: 10.1038/sj.ejcn.1602094.
- Pickett L. L., Ginsburg H. J., Mendez R. V., Lim D. E., Blankenship K. R., Foster L. E. & Sheffield S. B. (2012). Ajzen's theory of planned behavior as it relates to eating disorders and body satisfaction. *North American Journal of Psychology* 14(2):339-354.
- White M. P., Alcock I., Wheeler B. W., & Depledge M. H. (2013). Would you be happier living in a greener urban area? A fixed-effects analysis of panel data. *Psychol. Sci.* 24(6):920-928. doi:10.1177/0956797612464659
- Wilson A. (2013). Beyond alternative: Exploring the potential for autonomous food spaces. *Antipode* 45(3):719-737. doi:10.1111/j.1467-8330.2012.01020.x