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What is This?
Formal Theory Versus Stakeholder Theory: New Insights From a Tobacco-Focused Prevention Program Evaluation

Huey T. Chen¹ and Nannette C. Turner²

Abstract
Health promotion and social betterment program interventions are based on either formal theory from academia or stakeholder theory from stakeholders’ observations and experiences in working with clients. Over time, formal theory-based interventions have acquired high prestige, while stakeholder theory-based interventions have been held in low esteem. Here we examine the assumption that formal theory-based interventions are superior to stakeholder-based interventions in addressing community problems. The article elaborates on these ideas via a case study of a community-based, environmental tobacco smoke prevention program evaluation. The authors conclude that although both types of interventions had their strengths and limitations in the real world, the stakeholder theory-based intervention was more viable and effective than the formal theory-based intervention in this case due to implementation reasons. Findings are useful in understanding these two intervention types, in developing better strategies to address community problems, and in advancing program theory and theory-driven evaluation.

Keywords
program theory, formal theory-based intervention, stakeholder theory-based intervention, environmental tobacco smoke prevention, theory-driven evaluation

Sources of program theory for interventions have been an important topic in evaluation (Chen, 1990, 2005, 2010; Coryn, Noakes, Westine, & Schoroter, 2011; Donaldson, 2007; Hansen & Vedung, 2010; Pawson & Tilly, 1997; Wasserman, 2010; Weiss, 1998). In health promotion or social betterment programs, interventions are usually based on either formal theories or stakeholder theories (Chen, 2005). Formal theory-based interventions follow well-traveled paths of social and
behavioral science theories such as social learning or reasoned action developed in academia. This kind of deductive approach for formulating program theory is familiar to researchers and evaluators (Christie, 2003). By contrast, stakeholder intervention theories mainly originate from stakeholders’ ideas, observations, and experiences in working with clients and partners in a community. Stakeholder intervention theories are implicit, inductive, and less systematic and coherent in comparison with formal theories.

In terms of reputation and priority for research and evaluation funding and dissemination, these two kinds of interventions have fared differently. Researchers, academic institutions, and funding agencies consider formal theory-based interventions to have stronger theoretical basis and potential for impact. As a result, formal theory-based interventions are more likely than stakeholder theory-based interventions to receive funding for research or evaluation. In fields such as public health, researchers often apply randomized control trials or other traditionally rigorous methods to assess the efficacy of formal theory-based interventions. Because of this evidence, researchers and funders prioritize these formal theory-based interventions for both funding and publication (Donaldson, Christie, & Mark, 2008). Compared with their prestigious-theory family members, stakeholder theory-based interventions are the poor relation. These interventions are usually not systematically studied. Researchers regard them as lower quality in terms of their underlying theory and potential for effectiveness. If these interventions are evaluated, the evaluation designs used are often quasi-experimental or nonexperimental rather than experimental. Due to a lack of evidence of their efficacy, stakeholder theory-based interventions are less likely than formal theory-based interventions to receive funding, be included in the published literature, or be recommended for dissemination.

Evaluators have mixed opinions on stakeholder intervention theory. One the one hand, some evaluators argued that a systematic integration of quasi-experimental methods with stakeholder theory greatly enhance the credibility and quality of the evaluations (Connell, Kubisch, Schorr, & Weiss, 1995; Fulbright-Anderson, Kubisch, & Connell, 1998; Weitzman, Mijanovich, Silver, & Brecher, 2009). On the other hand, critics questioned whether stakeholders have any theory at all in designing an intervention or whether stakeholders’ ideas, views, and rationales on interventions are qualified as a “theory” (Scriven, 1998; Sufflebeam, 2007). Recently, however, evaluators’ appreciation of the merits of stakeholder theory and stakeholder theory-based interventions has grown (Chen, 2010; Chen & Garbe, 2011; Coryn et al., 2011; Hansen & Vedung, 2010).

But in terms of practical applications, a different picture emerges. Practitioners regard stakeholder theory-based interventions as practical and having local relevancy. Stakeholders favor stakeholder theory-based interventions and practice them in communities, despite lack of rigorous evidence of effectiveness (Chen, 2010; Chen & Garbe, 2011). This is not the case with most formal theory-based interventions or evidence-based interventions. Practitioners do not often use formal theory-based interventions in practice. Many scholars have raised concerns about the gap between science and practice (Glasgow, Lichtenstein, & Marcus, 2003; Green & Glasgow, 2006; Wandersman et al., 2008). Researchers and funding agencies propose ways to narrow this gap. One strategy is to encourage or persuade communities to use formal theory-based interventions as exemplified in the current evidence-based intervention movement (Donaldson et al., 2008). Funding agencies offer stakeholders incentives such as funds, technical assistance, or capacity building to help adopt formal theory-based interventions. The assumption is that formal theory-based interventions with efficacious evidence are superior to stakeholder theory-based interventions in addressing community problems.

This assumption is questionable on several fronts. Consider the issue of evidence in evidence-based interventions. Such so-called evidence is mainly efficacious evidence produced in ideal and controlled settings. The majority of evidence-based interventions lack practical evidence—we simply do not know how these interventions will work when ordinary community-based organizations attempt to organize, manage, and implement them, and whether such interventions can
satisfactorily address real clients’ problems in a real-world setting (Chen, 2010; Chen & Garbe, 2011). Few evaluations or studies have empirically compared relative merits between a formal theory-based and stakeholder theory-based intervention in practice. Too many unanswered questions remain, including the following:

- Are formal theory-based interventions superior to stakeholder theory-based interventions in practice?
- If so, what are the areas of the superiority?
- If formal theory-based interventions are superior, why do stakeholders not enthusiastically embrace them?
- If stakeholder theory-based interventions are inferior, why do stakeholders frequently apply them in practice?

Despite many unanswered questions, funding agencies have frequently used this assumption of superiority as a basis to fund formal theory-based interventions and promote evidence-based interventions. Since this superiority assumption and its subsequent actions could result in wasted money or missing opportunities for finding better interventions, we must start to empirically examine the truth of the assumption and other related issues.

This article uses an evaluation of a community-based, environmental tobacco smoke prevention program to examine the two intervention types. The program contained both a formal theory-based intervention and a stakeholder theory-based intervention. The evaluation of this intervention provides an opportunity to contrast empirically the relative merits of these two types of approaches. Findings and implications from the evaluation could contribute to development of a balanced view on the merits of the two types of intervention approaches. In turn, we hope to provide insight that could contribute to narrow the divide between research and practice communities and on advancing program theory and theory-driven evaluation.

**Background**

Exposure to environmental tobacco smoke is a serious problem in the United States. More than 126 million nonsmokers are still exposed to secondhand smoke in homes, vehicles, workplaces, and public places (U.S. Department of Health and Human Services, 2006). According to some estimates, exposure to environmental tobacco smoke among adult nonsmokers in the United States results in 3,400 deaths annually from lung cancer and as many as 69,600 deaths from coronary heart disease (California Environmental Protection Agency, 2005). Chronic exposure to environmental tobacco smoke is also associated with detrimental health effects among children, including an increased risk of lower respiratory infections, ear disorders, severity of asthma symptoms, and sudden infant death syndrome (Centers for Disease Control and Prevention [CDC], 2010; U.S. Department of Health and Human Services, 2006). In the United States, disparities in smoking and in exposure to environmental tobacco smoke result in low-income groups and members of certain racial, ethnic, and cultural minority groups bearing the greatest burden of smoking-related morbidity and mortality (Pirkle, Bernert, Caudill, Sosnoff, & Pechacek, 2006; Singh, Siahpush, & Kogan, 2010).

In 2006, an environmental tobacco smoke prevention program for a low-income housing community in Georgia was proposed and implemented. The pilot project intended to address associated health disparities connected with secondhand smoke. The target population was residents living in a public housing complex owned and managed by the local housing authority in a midsize Georgia city. Because stakeholders were interested in knowing not only whether the program was effective but also how well the program was integrated in a community setting, we applied a conceptual
framework provided by the theory-driven evaluation approach (Chen, 1990, 2005) to evaluate this community-based program for meeting stakeholders’ needs.

**Conceptual Framework of Program Theory**

Theory-driven evaluation assesses processes and outcomes by analyzing the program theory on which the intervention is based. Program theory is a set of explicit or implicit assumptions about actions required to solve a social or health problem and why the problem will respond to such actions (Chen, 1990, 2005). More specifically, program theory comprises a change model and action model. The change model is a set of *descriptive* assumptions concerning the causal processes underlying whatever problem a program tries to address. Formal theory or stakeholder theory could provide the basis for a change model. An action model, on the other hand, is a set of *prescriptive* assumptions that program designers and stakeholders see as necessary activities to maximize a change model’s program for success—activation of an action model sets the change model in motion. Through an assessment of both action and change model, theory-driven evaluation provides information on not only whether a program is effective and/or viable but also how and why the program has such outcomes.

What follows is a discussion of the change and action models underlying the environmental tobacco smoke prevention program.

**Change Model**

The tobacco smoke control program’s change model contained two interventions calculated to address the environmental tobacco smoke problem. The first intervention was formal theory-based and became known as the community health advisor (CHA; Cornell et al., 2009; Martin et al., 2011; Wallerstein & Bernstein, 1994). Members of the planning committee affiliated with universities in an instructor or doctoral student capacity proposed this evidence-based intervention. The second intervention was proposed by other committee members with extensive experience in delivering social services in low-income neighborhoods but without university affiliations. It was a stakeholder theory-based intervention known as the education and signage intervention.

Using the theory-driven evaluation approach, evaluators began the project by studying the background of these two interventions and assisting stakeholders in clarifying the theories underlying the interventions. To help stakeholders clarify their intervention and to clarify the program theory underlying the intervention, evaluators applied conceptualization facilitation techniques such as backward and forward reasoning (Chen, 2005). CHA proposed to identify and train indigenous lay health advisors to improve the health of persons in a community (Fleury, Keller, Perez, & Lee, 2009; Wallerstein & Bernstein, 1994). CHA postulated that within every community, formal and informal social networks exchange health information and influence health behavior decisions. CHAs are social network members and are familiar with a particular community. When CHAs receive social cognitive theory-based training (Bandura, 1977) including didactic methods, role-playing, motivational interviewing techniques, and ongoing mastery testing of the intervention curriculum, they have the capacity to raise community awareness on health problems and enhance community members’ self-efficacy for changing health risk behaviors. Ideally, to build relationships and to deliver services, CHA requires multiple contacts.

During the planning meeting, some members of the committee raised concerns about the feasibility of applying the CHA model to residents in a low-income housing complex. Training—and especially service delivery—is labor-intensive and time-consuming. Some committee members proposed the education and signage intervention as an additional option. The intervention aimed to educate the residents about the harmful effects of tobacco smoke on family members especially children and persuade residents to display policy signage such as at the window sticker and a refrigerator magnet stating “This is a nonsmoking home.” To reduce tobacco smoke exposure, residents
could declare a smoking restriction policy for their apartments. The idea of the intervention came from stakeholders’ experience in working with low-income families in housing complexes and in their observations on how residents interact with their tobacco-smoking guests.

But the low-income, public housing residents in the community are largely single, young African American women with children. Members of the planning committee observed that these young women had difficulty challenging the smoking behaviors of those visiting their homes such as parents, relatives, friends, and significant others. This kind of concern might hinder residents’ capacity to prevent tobacco smoke exposure at home. Displaying nonsmoking signs in a home could alleviate the problem. The sign makes a formal announcement to visitors that the household has a smoking-restrictive policy. When visitors attempt to smoke, a host could use the sign as an excuse for engaging conversations on the apartment’s nonsmoking policy. If many nonsmoking signs were displayed in a neighborhood, their high visibility could establish a social norm on restricting tobacco smoke in the neighborhood. This in turn could further affect individual decisions, and that could lead to reducing environmental tobacco smoke in apartments. If a family member smokes, the decal could assist discussions on how that smoker needs to reduce others’ exposure to tobacco smoke by smoking outside or by smoking cessation efforts. Although the education and signage intervention’s effectiveness is unsupported by evidence, stakeholders believed that residents would be more receptive to the education and signage intervention than to the CHA intervention.

The committee discussed both interventions and reviewed their respective potential strengths. To increase the chances for success in the housing complex, they decided to apply both interventions. For example, if a resident rejected the CHA intervention, that resident might still respond to the education and signage intervention. We discuss in the next section the procedure for putting these two interventions into practice.

**Action Model**

An action model specifies factors or context that stakeholders believe are essential for starting or supporting an intervention (Chen, 2005). An action model includes the following components: implementing organizations, implementers, intervention/service delivery protocols, target population, and partners. An action model is useful to assess implementation process to understand the relationship between intervention and its environment and to provide a context in which to interpret intervention outcomes. With evaluators’ assistance, stakeholders clarified their action model for both interventions of their program as discussed below:

**Target Population.** The target population of the program was 1,785 residents in two Columbus Housing Authority complexes: Booker T. Washington (BTW) and Baker Village (BV). According to the baseline survey, 43% of the residents reported at least a tobacco user at home and 57% of residents expressed they were exposed to secondhand smoke at home.

**Intervention Protocols.** Intervention protocols include the following components.

*The education and signage intervention protocol.* The protocol of the education and signage intervention included a smoke-free kit with a set of antismoking brochures for residents, nonsmoking signage items, and a service delivery manual for outreach workers. Policy signage items were created in multiple forms including window decals, door-handle decals, refrigerator magnets, and tabletop tents. All had the statement: “This is a Non-Smoking Home.” The brochures for residents described and documented harmful effects of environmental tobacco smoke. The manual for outreach workers contained the following practical information: Approach residents in the home, engage conversations with the primary resident, use antismoking brochures to the
explain harmful effects of environmental tobacco smoke especially to family members, discuss the functions of the nonsmoking signage, encourage residents to display multiple nonsmoking signage items at home to declare a smoking restriction policy, explain the implications of the signage to guests who are smokers, deal with problems if some family members are smokers, and help family members by locating smoking cessation services if those family members wanted to quit smoking. The training for the intervention was 3 hr. The delivery of the education and signage intervention was estimated to take 20 min.

The CHA protocol. The 3-day CHA training curriculum (a total of 20 hr) training modules concentrated on tobacco smoke and health issues and leadership development. The protocol covered activities for developing specific skills needed to implement the intervention. The purposes were to ensure CHAs to be familiar with how to communicate with clients on second smoke issues and how to encourage clients to take actions. CHAs learned and practiced skills through various role-plays and received feedback from other CHAs. Trainees were paid by a stipend as an incentive for them to complete all the modules. After the CHA training, outreach workers became CHAs in this project. CHAs were to take an estimated 45 min per client visit to go through the intervention. The training stressed the importance for CHAs to conduct multiple visits to monitor and to encourage residents establishing a smoke-free home.

Mode of Service Delivery. The planning committee’s idea was to deliver the two interventions in sequential order. Because they expected that residents would be more receptive to education and signage intervention than to CHA, the education signage intervention was delivered first. Trained outreach workers went to the target housing authority apartment complex to solicit participants. If an adult resident of an apartment agreed to participate in the program, the outreach worker provided the education and signage intervention. At the end of the education/signage intervention, the outreach worker asked participants if they were willing to receive additional CHA intervention in the near future. If the resident agreed to the CHA intervention, the outreach worker made an appointment with the resident for a follow-up visit or multiple visits to complete the intervention.

Implementing Organization and Partners. The implementing organization was a local church with a long history of community service. The church was located close to the housing authority complexes and had a good working relationship with the housing authority itself. The church connected well with other community-based organizations in the area. Project partners included a cancer prevention coalition, a local college, a clinic, an urban development group, a girl-empowerment organization, and the local housing authority.

Implementers. The housing authority partners recommended unemployed BTW residents as candidates for outreach project workers. These particular residents were readily available to work for the project and could use their natural networks to reach other residents to deliver services. Unemployed residents were also attracted to the positions because their participation as outreach workers would allow them to claim community services hours—a requirement for staying in their apartments. The positions were announced at the complex. Criteria used to screen the candidates included educational background, employment history, smoking status, relationships with neighbors especially in offering advice, and willingness to complete the program training requirements. Seven tenants met these criteria and were recruited for the project. They agreed to participate in the training to deliver the interventions. They were paid $10 per hour.

Ecological Context. Ecological context includes those contextual factors relevant to an intervention program. The planning committee initiated several community activities related to the program.
Those activities included a talent show and a mother/daughter double-Dutch jump rope competition as well as a seminar devoted to discuss smoking and secondhand smoke problem. The activities were open to BTW residents and to the public. These community activities were to enhance public awareness about secondhand or environmental smoke problems of tobacco smoke on health as well as to create an atmosphere for BTW residents to accept the interventions. Another contextual factor was a citywide effort to enact a clean indoor air ordinance. Such an ordinance could also enhance BTW residents’ willingness for participating in the project.

**Methodology**

The evaluation included both process and outcome evaluation components. This section first briefly discusses the process study then elaborates on the outcome evaluation. After discussing the evaluation design features, we describe data, measures, and the analytic approach.

**Process Evaluation**

Process evaluation assesses how an intervention program is implemented. In this evaluation, stakeholders and evaluators were particularly interested in the implementer’s and client’s experiences with or reception to the interventions. We collected the following data:

- Training exit survey: After training, outreach workers were asked to complete an anonymous exit survey on their satisfaction with the trainings and their suggestions for future improvement.
- Record of outreach and service delivery: Outreach workers were asked to record the number of contacts, residents’ acceptance or rejection for each intervention, and length of visit in each trip.
- Outreach debriefing: We collected narratives on each outreach worker’s weekly meetings with the supervisor to discuss experiences in reaching clients and providing services. The supervisor used the debriefing to check outreach workers’ service delivery against the protocols and to remind them of the expectation of fidelity in implementation. The supervisor documented the conversations.

**Outcome Evaluation**

Using the change model, we devised an outcome evaluation that used a quasi-experimental design to contrast differences between these two types of interventions. Specifically, we used a nonequivalent comparison group design (Shadish, Cook, & Campbell, 2002) to assess the effectiveness of the interventions. Two housing complexes of the Columbia Housing Authority comprised the sample, with the intervention group being the Booker T. Washington Authority Apartment Complex (BTW). The complex was geographically close to the implementing organization. Outreach workers would deliver two interventions as described in the service delivery protocol to residents of the complex. The comparison group was Baker Village Housing Authority Apartment Complex (BV). Residents in BV did not receive interventions.

**Measurement.** A survey instrument was designed to collect basic demographic data as well as data on smoking status, prior smoking restriction rule, and exposure to secondhand smoke. Research staff collected the pretest data 1 month before the intervention. The posttest data were collected 6 months after the intervention. The questions on the instrument were taken from the CDC Office of Smoking and Health (2004) Questionnaire Inventory on Tobacco (QIT) questionnaire. Specifically, the instruments measured the variables as detailed next.
Self-efficacy. The University of Alabama at Birmingham Head Start Baseline 2002 Self-Efficacy scale measured self-efficacy. The 11-point scale included items such as “How confident are you that you could forbid smoking in the house,” and the subquestions “When you don’t want to upset the smoker?” “When you are worried about hurting the smoker’s feelings?” “When several smokers are in the house?” and “When the smoker is someone in authority?” The Cronbach’s α for the scale was .90.

Number of nonsmoking signage displays. Research staff documented the number of nonsmoking signage. Research staff counted the number of “nonsmoking” signs in the form of window decals, table tents, refrigerator magnets, and door hangers they observed at a resident’s apartment during the interview.

Extent of exposure to secondhand smoke. The extent of exposure to secondhand smoke is an index composed of several questions: “Where do they [visitors] smoke?” “Where do you smoke when you are home?” “How many other adults living in the house smoke?” and “Where do other adults who live in the house smoke?” The Cronbach’s α for the index was .60.

Intervention variable. Because the evaluators expected a substantial number of participants in the intervention group to agree to participate in one rather than both interventions, we operationalized definition of our intervention variable in a set of two dummy variables. This approach is justified because participants commonly vary in the way they respond to an intervention in terms of level of dosage or the number of components after implementation (Rossi, Lirsey, & Freeman, 2004). Since CHA was much more time-consuming, it was possible that more participants would agree for the education and signage intervention than for CHA. Under these circumstances, participants within the intervention groups were divided into two groups: (1) the education and signage only group and (2) the education and signage plus CHA group. The intervention variable, therefore, code, in one binary variable, those who received the education and signage intervention as “1” and others, “0.” In a second binary variable, those who received the CHA intervention plus the education and signage intervention were coded as “1” and others “0.” This coding implies a three-group design. Although measuring our intervention variable in this way reduce sample sizes of intervention groups, it would allow comparing differences among the comparison group, education and signage group, and CHA plus group.

Causal Model. Figure 1 suggests the causal model that we subsequently analyzed. From left to right, the model postulates two causal chains. The top portion illustrates that the education and signage intervention is expected to increase the number of nonsmoking signage displays that, in turn, would decrease the extent of exposure to tobacco smoke. The bottom portion indicates that the enhanced intervention with CHA is expected to increase participants’ self-efficacy in addressing the environmental smoke problem. That, in turn, would reduce the extent of exposure to tobacco smoke. Given that the enhanced intervention also has the education and signage intervention component; the intervention is expected to affect the number of nonsmoking signage display. In addition to the indirect effects, both interventions are postulated to have a direct effect on tobacco smoke exposure.

An assessment of the causal model would provide information on the comparative advantages and weaknesses of the casual models associated with these two interventions. For example, if the education and signage intervention and CHA intervention work equally well, then both should follow the pathways detailed in the causal models. This, in turn, should reduce tobacco smoke exposure. But if one intervention can activate the casual chain, while the other fails to do so, then the former is superior to the other.
Statistical Models. This study applied path analysis (Everitt & Dunn, 1991) to examine causal relationships as put forth in the Figure 1. The ordinary least square regression model considers three outcomes of interest: the number of signage displays, self-efficacy, and the extent of exposure to tobacco smoke. In the first model, the dependent variable is the number of signage displays, with the two intervention variables as independent variables. Other explanatory variables in the equation include age, smoking status, number of children in the household, education, and previous home smoking restrictions. The second model analyzes self-efficacy as a function of the enhanced intervention (i.e., education and signage intervention plus CHA) and the other explanatory variables also included in the first model. In the third model, the dependent variable is the extent of exposure to secondhand smoke, modeled as a function of the two intervention variables, nonsmoking signage displays, self-efficacy, and the remaining explanatory variables as before.

Sample and Data Source. To select the sample, we obtained a complete list of 786 residents for BTW and 987 residents for BV apartment complexes from the Columbus Housing Authority. The list was sorted to include only residents >18 years of age. From this list, 600 residents (300 from each complex) were randomly selected to participate in the study. Trained field data collectors visited each selected resident in the sample at that resident’s home. Up to three attempts were made at varying times for persons not at home at the time of the interviewer’s original pass. After each unsuccessful attempt, the interviewer left the resident a notice or letter requesting an interview. The data collectors used research questionnaires to interview participants 2 weeks before and 6 months after the intervention. Residents were not included in the analysis if they did not participate in both the baseline and the follow-up surveys. A total of 138 BTW residents and 121 BV residents agreed to participate in the projects and completed the baseline and the follow-up surveys.

Demographic characteristics of the sample appear in Table 1: The right column of Table 1 indicates that the majority (82%) of the participants were female. The great majority of them (96%) were African Americans. Those between ages of 19 and 34 years old were the largest age group (42.9%). In terms of marital status, the majority of them (64.5%) were single. Table 1 also shows the breakdown of the sample by the intervention and comparison groups. In general,
there are no substantial differences between these two groups in terms of demographic characteristics.

### Evaluation Findings

#### Process Evaluation

Process evaluation indicates that the assumptions made in the action model held true in implementation except for the areas of outreach worker training and client recruitment. These two areas consider training outreach workers and participants’ acceptance of the intervention, as summarized next.

**Training Outreach Workers.** Seven trainees attended a 3-hr training for the education/policy signage intervention and a 20-hr training for the CHA intervention. According to an exit survey, the training on the education and signage intervention achieved its purpose. The trainees found value in the role-play exercises on recruiting residents for participating in the intervention. The exit survey also indicated that the CHA intervention training was not as successful. Trainees were frustrated with the lengthy protocol and challenges of leadership skills, with two trainees dropping out due to frustration. The remaining five trainees stayed with the project and agreed to serve as outreach workers to deliver both interventions.
Participants’ Acceptance of Interventions. Among the 138 participants in the intervention group, 104 (75\% of them attended the education and signage intervention. The rest of the residents (34 or 25\%) agreed to have the education and signage intervention plus CHA. Furthermore, only 12 of these 34 residents agreed to have more than one CHA visit. Debriefing data from five outreach workers indicated that participants were more receptive to the education and signage intervention than CHA.

Outcome Evaluation

The evaluation considers a three-group version as previously discussed: comparison group, education and signage, and CHA plus education and signage. The analysis model provides an opportunity to assess the extent to which the education and signage arm might increase signage displays as postulated in the stakeholder theory and whether the CHA plus arm could increase self-efficacy by reducing tobacco smoke exposure as postulated by the formal theory.

Table 2 illustrates the results of the three models, considering the effects of number of nonsmoking signage displays, self-efficacy, and extent of exposure to tobacco smoke at home. In Table 2, Model 1 reports the regression results regarding the number of nonsmoking signage displays. Results show that participants’ nonsmoking status and prior smoking restriction were related to the number of nonsmoking signage displays. As predicted, two intervention variables—education and signage intervention and CHA plus education and signage intervention—appear to increase the number of nonsmoking signage displays at home. Model 2 in Table 2 shows the regression results regarding self-efficacy. The independent variables that affect self-efficacy were nonsmoking status and prior
self-efficacy. The CHA plus education and signage intervention was expected to affect self-efficacy, but results do not support this hypothesis. Model 3 shows regression results for exposure to tobacco smoke. As expected, two determinants (the number of nonsmoking signage displays and self-efficacy) significantly decreased the extent of exposure to tobacco smoke at home. In addition, nonsmoking status and age reduced exposure to tobacco smoke.

These findings suggest a revision of the originally proposed casual model. This revised model, portrayed in Figure 2, indicates that the education and signage intervention followed the causal pathway as described in the stakeholder theory. The intervention affected the determinant (the number of nonsmoking signage displays) which, in turn, reduced the exposure to tobacco smoke. In contrast, Figure 1 indicated that CHA plus education and signage was theoretically expected to affect self-efficacy, but this relationship was not observed; nevertheless, self-efficacy did appear to affect the extent of exposure to tobacco smoke as predicted.

**Relative Strengths and Limitations of a Formal Theory-Based and Stakeholder Theory-Based Interventions**

The findings from this examination of a tobacco cessation intervention provides insight on the relative strengths and limitations of formal theory-based and stakeholder theory-based interventions in terms of planning, implementation, and outcomes. This section elaborates on the findings and implications.

**Theoretical Sophistication and Prior Evidence**

This example found that a particular formal theory-based intervention was superior to a stakeholder theory-based intervention in terms of theory sophistication and prior evidence (Martin et al., 2011). As demonstrated in this illustration, CHA is based on social cognition theory—a well-known formal theory. Both the theory and the CHA are well studied and well respected in academic circles and are attractive to researchers and funding agencies.

On the other hand, a stakeholder theory-based intervention found in this study had not been studied. Stakeholder theory of the education and signage intervention originates from stakeholders’
ideas, experiences, and observations. These stakeholder-based theories are hardly studied and are rarely if ever discussed in the literature. They are often regarded as common sense or informal theory. Neither the stakeholder theory nor the education and signage intervention had been formally studied, and no prior evidence supports either version of the intervention. Because of the lack of academically based theoretical foundation and prior rigorous evidence, the education and signage intervention is not as attractive as CHA to researchers or funding agencies.

**Efforts in Clarifying a Change Model and Action Model in Program Theory**

The literature explicitly discusses formal theory and formal theory-based interventions. Thus, evaluators can use the literature to construct a change model. A clear delineation of a stakeholder theory underlying a stakeholder theory-based intervention is usually not available from prior research or documents. Evaluators must expend considerable effort to facilitate the process of having stakeholders articulate and clarify such theories. As shown in this study, the literature discussed the theory underlying the CHA intervention, while the literature does not formally discuss the education and signage intervention. In terms of an action model, the intervention protocol component tends to fare better in formal theory-based interventions. A formal theory-based intervention is more likely to have a protocol accompanying the intervention. Evaluators can use the protocol for assessing implementation process. A stakeholder theory-based intervention may not have a well-developed protocol ready for evaluation purposes. Evaluators may need to facilitate stakeholders to develop a protocol for evaluation purposes. For example, in this study, evaluators worked with stakeholders to clarify their education and signage intervention theory and facilitated them to develop an intervention protocol.

**Efficacious Evidence Versus Practical Effectiveness**

As discussed in the introduction, an intervention that proves efficacious in an ideal and controlled setting does not necessarily mean the intervention will be effective in practice (Chen, 2010; Chen & Garbe, 2011). Whether such evidence-based interventions would be effective in practice is not known. In other words, an evidence-based intervention could be ineffective in the real world. This study provides some evidence to support the argument. For example, as indicated in the Model 2 of Table 1, CHA was ineffective in influencing self-efficacy. This ineffectiveness may be attributed to implementation problems. Examples of the weaknesses include the potential problem of fidelity in service delivery or the qualification problem for using unemployed workers as CHAs. Nevertheless, stakeholders view these implementation problems as indicators of weaknesses of applying formal theory-based interventions or of evidence-based interventions. They regard difficulties in hiring highly qualified, highly motivated staff, or maintaining fidelity in practice as indicators of the limitations of these interventions.

As discussed in the introduction, lack of prior evidence to substantiate efficacy or effectiveness limits stakeholder theory-based interventions in acceptance. Lack of evidence may reflect the low priority assigned to evaluating them rather than an indication of their ineffectiveness. Not all stakeholder theory-based interventions are ineffective. This evaluation’s findings support for the argument by showing the effectiveness of the education and signage intervention. More research on stakeholder-based interventions is needed.

**Viability**

Evidence-based interventions use evidence of efficacy as the major criterion for judging the merits of interventions. This criterion is too narrow to adequately reflect stakeholders’ views on the relative merits of interventions. To better reflect stakeholders’ interests, both viability and effectuality should be included in the scope of evaluation (Chen, 2010; Chen & Garbe, 2011). Viability refers to an intervention that is viable in practice. More specifically, viability means stakeholders regard
an intervention as practical, suitable, affordable, evaluable, and helpful. Because stakeholders are responsible for organizing and implementing an intervention, they are concerned about that intervention’s viability. Researchers are less likely to be interested in viability issues. When researchers develop a formal theory-based intervention, their main interests pertain to theoretical sophistication and methodological rigor, than practicality or service deliverability. This evaluation provides some evidence in support of this argument, based on the observation that two of the seven trainees quit the project because of frustration with the CHA training.

When stakeholders propose an intervention, they tend to factor in implementers’ skills, community organization’s capacity, cultural sensibility, resource availability, and clients’ preference. Since stakeholders generally tend to factor viability into their theory of an intervention, they tend to propose interventions with higher viability than researchers do. This study demonstrated that both outreach workers and clients were more receptive to the education and signage intervention than they were to CHA in the housing complex setting.

**Relative Strengths in Action Theory Success and Conceptual Theory Success**

In the program theory literature, action theory success refers to an intervention that successfully affects a determinant; otherwise, it is action theory failure. Conceptual theory success refers to a determinant that successfully affects an outcome; otherwise, it is conceptual theory failure (Chen, 1990, 2005). The differences between these two types of success are illustrated in Figure 3:

A successful intervention requires both action theory success and conceptual theory success. Generally, a formal theory-based intervention tends to have an advantage over conceptual theory success. The determinant in a social science theory-based intervention in a real-world application is usually a well-studied construct that has been proven as a powerful force for modifying human behaviors. Self-efficacy is such a determinant. This evaluation supports such an assertion. For example, self-efficacy reduced exposure to tobacco smoke in this study.

The potential weakness of a formal theory-based intervention tends to be at the action theory level. That is, the intervention may not be potent enough to affect a determinant in practice. As shown in this study, CHA failed to change self-efficacy in this community setting. For researchers’
future development of formal theory-based interventions, they must learn how to develop a robust intervention that successfully affects a theoretical construct in practice.

On the contrary, the potential strength of a stakeholder theory-based stems from the action theory. A stakeholder-theory based intervention usually reflects stakeholders’ practical experience. In this evaluation, for example, this experience contributes to environmental change as expressed in the number of nonsmoking signage displays, a practical determinant rather than a theoretical construct like self-efficacy. Yet, if stakeholder theory-based intervention has weaknesses, those weaknesses are more likely to be in reaching conceptual theory success. Determinants that stakeholders believe are important may not actually be strong enough to change human behavior. One reason is that these determinants are not often studied and subject to the refinements that formal theory-based determinant experience. Even so, this evaluation’s findings are encouraging: the evaluation demonstrates that stakeholder theory-based interventions could have both action theory success and conceptual theory success. This evaluation portends future intensive studies on strategies to strengthen conceptual theory success of stakeholder theory-based interventions.

Discussion and Conclusion

Formal theory and stakeholder theory are two major intervention methods. The common assumption has been that formal theory-based interventions are superior to stakeholder theory-based interventions. Still, few studies have empirically examined the relative merits of these interventions based on the two theory types. This evaluation contributes to filling the gap in this area by conducting a case study to contrast relative merits of a formal theory-based intervention (CHA) and a stakeholder theory-based intervention (education and signage intervention) in a community setting.

CHA is based on a well-studied theory, social cognition theory. Prior evidence also supports the intervention. In terms of explicitness of theoretical foundation, CHA intervention also has advantages. CHA’s theoretical underpinnings are clearly discussed in the literature. In terms of implementation, however, this study found that the CHA intervention was much more resource and labor demanding than the education and signage intervention from a community viewpoint. Neither implementers nor clients were receptive to the CHA intervention. In addition, in the evaluation, CHA was found to be ineffective: the CHA intervention did not lead to an increase of self-efficacy, as the causal model suggested.

The lack of the CHA intervention’s favorable impacts, as found in this study, might be attributed to implementation problems, including CHAs’ qualifications and insufficient time spent with clients. Yet, even if true, stakeholders usually include implementation difficulties as part of the limitations of an intervention. When judging an intervention’s merits, stakeholders use criteria broader than the traditional criterion such as efficacy or effectiveness. Stakeholders consider an intervention unwieldy if it requires hiring expensive implementers if it burdens staff time and efforts in reaching and serving clients, or if it demands large changes in organizational structure or service routine.

This study is not alone in reporting challenges in implementing formal theory-/evidence-based interventions. For example, the Stanford Chronic Self-Management Program, a formal theory-based/evidence-based intervention, requires a core group of health professional and lay leaders to take full responsibility of program activities including preparing, scheduling, and leading courses; and recruiting, registering and follow-up participants. Community-based organizations faced challenging in implementation the program because of lacking capacity or incapable of maintaining ongoing capacity (Freeman, Kadiyala, Bell, & Martin, 2008).

A common mechanism stakeholders use to cope with implementation difficulties is to modify a formal theory-based/evidence-based intervention to fit a specific situation or need. The modification often means an adaptation or even a reinvention of an evidence-based intervention. For example,
recipients of HIV prevention funding were required to implement evidence-based interventions such as VOICES/VOCES and Mpower (Veniegas, Kao, & Rosales, 2009). In spite of stressing fidelity in the announcement, the community-based organizations in the study considerably modified key characteristics or redesigned evidence-based interventions. Changes included modification of the number and duration of sessions, addition of extra elements, and modification of the intervention content and delivery methods. The adaptations and reinventions were carried out during preimplementation, implementation, and maintenance phases. With such adaptations and reinventions, we could raise a legitimate question on how relevant of the evidence provided by a formal theory-based/evidence-based intervention is in application.

That said, the education and signage intervention too had disadvantages. Principally, no prior evidence demonstrates its efficacy or effectiveness. Its theory is implicit and undocumented. Evaluators need to spend time and effort assisting stakeholders in clarifying their theory. For example, no previous studies found favorable evidence on the effectiveness of this education and signage intervention. Yet, the evaluation found merits of the education and signage intervention, a stakeholder theory-based intervention. This intervention was found to be more viable than the CHA intervention in terms of implementers and clients’ acceptance. It was relatively easy to implement and intuitive appealing. The intervention worked well in the community. It increased the nonsmoking signage displays and reduced exposure to secondhand tobacco smoke as predicted in the causal model. Normally, stakeholder theory-based interventions tend to have strength in action theory success but relatively weak in conceptual theory success. This was not the case in this study. The theory of the education and signage intervention was well grounded in stakeholders’ experience and observation, which may have been responsible for its conceptual theory success.

The most influential variable in our regressions was smoking status: that is, smokers at home were the biggest source of tobacco smoke polluters at home. This program only provided referral information to smokers for getting treatments. Obviously, the referral was not sufficient to address the problem. This study suggests that future anti-second smoke prevention programs should have stronger links with smoking cessation programs.

Furthermore, resource constraints and stakeholders’ preference made this evaluation impossible for applying a formal, prospective three-group design. Because the formal theory and stakeholder theory-based intervention were differentiated within in the intervention group after implementation, this is not an ideal design for a comparison of these two types of intervention. Future research on the topic might consider more systematic comparisons of these two types of interventions prospectively, rather than retrospectively, as was the case here.

This example elaborated here provides some support of the arguments made by the integrative validity model and bottom-up approach, which stresses credible evidence that consists of components of viability, effectuality, and transferability, rather than effectuality alone, as focused by the traditional perspective (Chen, 2010; Chen & Garbe, 2011). The new perspective recognizes potential merits of stakeholders’ theories and interventions and implies the following future directions for intervention development and evaluation priority.

First, it is our contention that evaluators and researchers need to intensify in studying and evaluating stakeholder theory-based interventions. This new perspective stresses that intervention science should systematically study, evaluate, cumulate, and disseminate stakeholder theory-based interventions just as researchers do for formal theory-based interventions. Funding agencies should provide funds to encourage systematic study and evaluation of stakeholder theory-based interventions. Promising stakeholder theory-based interventions should have a chance to be rigorously studied and to become evidence-based interventions similar to formal theory-based interventions. Promising stakeholder theory-based interventions could be identified using viability evaluation (Chen, 2010; Chen & Garbe, 2011) or the Systematic Screening and Assessment Method (Leviton, Khan, & Dawkins, 2010).
Our second assertion for future directions is that we should expand the scope of formal theory-based interventions for addressing viability issues. This example recognizes the efforts and contributions made by formal theory-based interventions. But for their development and evaluation, this new perspective suggests a different route. Advocates of formal theory-based interventions have focused in providing efficacious evidence but neglect practical issues. Such a narrow focus has difficulties in generating stakeholder interest and application—unless, of course, funders mandate them. The new perspective argues that evaluations of a formal theory-based intervention should address viability issues at the beginning; this will ensure the intervention has support from stakeholders and has a good chance to prosper or survive in a community before launching an expensive and time-consuming efficacy or effectiveness evaluation (Chen, 2010).

Third, we claim that evaluators should assist in interfacing formal theory and stakeholder theory. As indicated in the last sections, both formal theory-based interventions and stakeholder theory-based interventions have their advantages and disadvantages. Accordingly, a possible collaboration between them may be fruitful. For example, researchers could learn from stakeholders about formulating a theory and intervention with high viability. Stakeholders could learn from researchers about enhancing the sophistication of their theory and intervention or strengthening rigor of evidence. This collaboration could provide an arena for developing theories and interventions interested to both researchers and stakeholders. One of the major barriers to success is that researchers and stakeholders do not have common interests or agendas. For example, stakeholders often view current formal theory as too abstract to practice. In contrast, researchers frequently regard stakeholder theory is too trivial to be worthy of investigation. Perhaps, the collaboration efforts could help develop a new kind of middle-range intervention theory to which both researchers and stakeholders could relate and could contribute to narrowing the gap between science and service.

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