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Sanitation and Collective Efficacy: Developing a Framework for Understanding Social Context and Intervention Uptake in Rural Cambodia

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Bachelor of Health Science, Public Health
Bachelor of Arts, Anthropology
University of Florida
2016

Thesis Committee Chair: Dr. Thomas F. Clasen, JD, MSc, PhD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Background: The aim of this study was to develop a framework for collective efficacy based on qualitative data from the rural Cambodian context and compare this framework to an existing *a priori* framework for collective efficacy. The published literature suggests that men and women may perceive of and participate in collective efficacy differently. Therefore, this study also examined how these frameworks may differ by gender.

Methods: The study followed a concurrent triangulation mixed methods design. The investigator utilized a modified grounded theory approach to develop a framework for collective efficacy based on qualitative data from villages participating in the Cambodia Rural Sanitation and Hygiene Improvement Program (CRSHIP). Household survey data, from villages participating in CRSHIP, were analyzed using complex confirmatory factor analysis to compare the fit of four, sex-segregated models of collective efficacy.

Results: All four models fit the data adequately according to absolute fit statistics, including chi-square model fit test statistics and root mean square error of approximation (RMSEA). However, none of the models fit the data well according to relative/incremental fit statistics, including the comparative fit index (CFI) and Tucker-Lewis index (TLI). The qualitative-based model fit the data better than the *a priori* model for both women and men survey respondents. Women generally had higher collective efficacy factor scores overall. While small sample sizes may not provide sufficient power for sub-group analyses, the data suggest that women from poor households tended to have higher scores than women from non-poor households. Although the male sample was small, the findings suggest that there may be a difference in scores by wealth status for men as well. Respondents from households that owned latrines tended to have higher collective efficacy scores than respondents from households that did not own latrines, regardless of gender.

Implications: Absolute model fit statistics indicate that all of the models under comparison are plausible, yet all likely need further refinement via exploratory factor analysis (EFA) in order to appropriately identify the underlying structure of collective efficacy as a latent construct. The relative fit of the qualitative-based models indicates the importance of inductively conceptualizing collective efficacy.

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Introduction

Background

The WHO/UNICEF Joint Monitoring Programme on Water, Sanitation, and Hygiene (JMP) defines open defecation as "the practice of defecating in fields, forests, bushes, bodies of water, or other open spaces," (n.d.). The number of people practicing open defecation worldwide has decreased from 1,229 million in 2000 to 892 million in 2015 (JMP, n.d.). However, 90% of those still practicing defecation live in one of three geographic areas (Central and Southern Asia, Eastern and Southeast Asia, and Sub-Saharan Africa) and those countries with the highest proportions of people practicing open defecation are the same countries with the highest number of deaths in children under five years, the highest levels of malnutrition, and the largest wealth disparities (JMP, n.d.; WHO, 2017).

According to 2015 data from JMP, 41% of the population of Cambodia practices open defecation (JMP, 2018). While this represents a decline from 83% in the year 2000, the proportion of the population practicing open defecation in Cambodia remains far greater than in neighboring Southeast Asian countries (JMP, 2018). Thailand, for example, achieved 0% in 2015; in the same year, 4% of the population of Vietnam and 22% of the population of Laos practiced open defecation (JMP, 2018). The practice of open defecation is particularly concentrated in rural areas of Cambodia where 51% of the population practices open defecation, compared to only 3% of the urban population of Cambodia (JMP, 2018).

In rural Cambodia, lack of access to improved and even basic sanitation facilities poses a major challenge to reducing open defecation. Only 39% of the rural population of Cambodia has access to at least basic sanitation services (JMP, 2018). Fewer still (31%) have access to improved sanitation facilities, compared to 88% of the urban of population in Cambodia (JMP, 2018).

Lack of access to improved sanitation facilities and the continued practice of open defecation have important health consequences for the people of Cambodia. UNCIEF's most

recent data show that 6% of all deaths in children under five in Cambodia were due to diarrhea in 2016, compared to 2% in Thailand (UNICEF, 2018). The links between unsafe sanitation, improper hygiene practices and both morbidity and mortality have been well supported in the published literature (Freeman et al., 2017). Disability-adjusted life years (DALYs) account for both morbidity and mortality and provide a strong measure of the impact of unsafe sanitation and improper hygiene on the health and well-being of Cambodians (WHO, 2018). In 2016 in Cambodia, 244.54 DALYs per 100,000 were attributable to unsafe sanitation and 296.08 DALYs per 100,000 were attributable to lack of access to a handwashing facility (IHME, 2016). These measures can be compared those of Thailand in 2016, where only 14.80 DALYs per 100,000 were attributable to unsafe sanitation and 96.63 DALYs per 100,000 were attributable to lack of access to a handwashing facility (IHME, 2016).

The Cambodia Rural Sanitation and Hygiene Improvement Program seeks to prevent the negative health consequences of unsafe sanitation and hygiene by increasing access to improved sanitation and promoting proper hygiene practices among rural target communities. The program is funded by the Global Sanitation Fund of the Water Supply and Sanitation Collaborative Council. Cambodia's Ministry of Rural Development (MRD) appointed Plan International to serve as the program's executing agency and oversee implementation. The program has been implemented in two phases. The first phase, CRSHIP 1, was rolled out in 2011 and concluded in 2016. During this time, CRSHIP 1 reached a total of 2,027 villages in six provinces (Kampong Cham, Kampong Speu, Kandal, Svay Rieng, Takeo, and Tbong Khmum) (*A Retrospective Review,* 2016). However, only 756 of these communities were declared open defecation free (ODF) by the end of 2016 (*A Retrospective Review,* 2016). In the last quarter of 2016, the second phase of the program, CRSHIP 2, was rolled out and is scheduled to conclude in 2019. The second phase of the program targets an additional 1,494 villages in five new provinces (Kampong Chhnang, Kampong Thom, Kampot, Kratie, and Prey Veng) (*A Retrospective Review,* 2016).

Local non-governmental organizations (NGOs) serve as implementing partners (IPs) and carry out program activities alongside representatives from the Provincial Department of Rural Development. Each IP utilizes some combination of five participatory development approaches, including Community-Led Total Sanitation (CLTS); Sanitation Marketing; School and Community Water, Sanitation, and Hygiene (SC-WASH); Information, Education, and Communication (IEC); and Behavior Change Communication (BCC) (Plan International, 2018). These approaches focus on changing behavior and generating demand for latrines (Plan International, 2018).

Retrospective evaluations of CRSHIP 1 have identified social context as an important mediating factor between program implementation and success as measured by the proportion of households that own latrines (i.e. sanitation coverage). One such report identified "socio-cultural factors" as a limitation to program success (*A Retrospective Review,* 2016). Similarly, in the National CLTS Guidelines, the MRD asserts that CLTS-related program activities serve as "a process of social awakening…[which] makes them [the community] collectively think and act to change their behavior" (MRD, 2013). These guidelines and reports reflect the influence of social context on participatory development programming and vice versa.

In an effort to further examine this relationship, WaterAid Cambodia, the Learning and Documentation sub-grantee for CRSHIP, contracted Causal Design, an international evaluation firm, to conduct a cross-sectional analysis of a sample of CRSHIP 1 target villages. This study, which utilizes quantitative data collected by Causal Design's research team, follows a concurrent triangulation mixed methods design to identify latent factors of the social context of CRSHIP target villages such that future studies are able to model and more accurately define the relationship between these latent factors and sanitation coverage.

Research Aims and Objectives

The overall aim of this research is to identify the latent factors of collective efficacy that are specific to the rural Cambodian context. The research objectives completed in order to achieve this research aim include the following:

1. Develop a hypothesized collective efficacy factor solution using qualitative data collected in CRSHIP target villages
2. Compare the hypothesized factor solution with an existing, *a priori* collective efficacy factor solution
3. Determine which factor solution, and thus which latent factors, best explain observable measures of collective efficacy in rural Cambodia using confirmatory factor analysis

Literature Review

Collective Action and Sanitation

Improvement of sanitation status is an inherently collective process. The JMP defines an improved sanitation facility as one that "hygienically separates human excreta from human contact," (JMP, 2017). While the purchase or construction of an improved sanitation facility within the household may help to reduce transmission of disease between household members, community level change is required in order to avoid the continued contamination or recontamination of the shared environment. Fuller and Eisenberg found that water, sanitation, and hygiene (WASH) interventions are capable of providing herd protection against enteric pathogens that transmit disease via the fecal-oral route, meaning that individuals in the community who do not directly receive or participate in the intervention are able to benefit indirectly (2016). This work also supports the preponderance of the literature suggesting that sanitation interventions are the most likely WASH interventions to confer herd protection (Fuller & Eisenberg, 2016). Similarly, Oswald et al. found that sanitation usage rates of 60%-80% and 80% or more in a community were associated with lower prevalence odds of active trachoma compared to communities that had sanitation usage rates of less than 20% (Oswald et al., 2017).

Thus, each individual or household in the community benefits from the sanitary investments and hygienic behaviors of others (McGranahan & Mitlin, 2016). While somewhat more abstract than shared resources, such as water or land, or shared infrastructure, such as paved roads or school buildings, this concept demonstrates that sanitation is inherently a public good that requires collective action in order for members of the community to benefit from its use. McGranahan illustrates this point: "Someone living in an unsanitary neighborhood cannot buy their way to good sanitation, even by purchasing a high-quality toilet and a sewage connection. Others also need to improve their sanitary facilities in order to improve the neighborhood's overall sanitary conditions," (McGranahan, 2013).

The literature has established that communities of all kinds engage in collective action to maximize a variety of benefits and minimize various risks (Bromley & Feeny, 1992). Empirical studies and ample examples of collective action challenge the argument that individuals are inherently self-interested and will not behave in a manner that supports the interest of the group (Olson, 1965; Ostrom, 2000). Public good experiments have been used to measure the willingness of individuals to engage in collective action as well as to identify factors that may contribute to a group's success in a collective action situation (Ledyard, 1995; Offerman, 1997). Public good experiments have consistently found that individuals are more likely to cooperate if they believe that others will cooperate (Ostrom, 2007). These experiments have also found that individuals will expend personal resources in order to monitor and sanction those who do not cooperate as expected or desired (Ostrom, 2000). These factors are dependent upon the presence of social norms around reciprocity, fairness, and trust as well as the availability of sanctioning mechanisms and opportunities for communication amongst individual actors involved in the collective action situation or experiment (Ostrom, 2000). These findings provide a strong basis for understanding how and why social context may mediate the success of community-based, participatory sanitation programs.

Exploring Social Constructs

The literature provides several social constructs that are intended to capture social context from various angles and at a variety of levels. In order to best capture social context, it is necessary to first identify which social construct is most appropriate for understanding social context as it relates to collective action for improved community sanitation status. Explorations of the published literature and consultations with subject matter experts led to the determination that collective efficacy is the most comprehensive social construct and the most appropriate for the purposes of this study. The following sub-sections provide the theoretical and empirical evidence for this determination.

Social Capital

Social capital is defined as the "features of social organization, such as trust, norms, and networks, which can improve the efficiency of society by facilitating coordinated action," (Putnam, 1993). The concepts of social capital and collective efficacy are interrelated; community members who report higher levels of social capital, for instance, will also report higher collective efficacy (Collins, Walting Neal, & Neal, 2014). Communities with lower levels of social capital are less "able to realize common values and maintain social control," which is a crucial component of collective efficacy (Ansari, 2013). While social capital places a unique emphasis on social networking, collective efficacy implies social networking, as a community requires social capital in order to establish expectations of social control and a sense of collective efficacy (Ansari, 2013).

Thus, although social capital is a vital component of collective efficacy, this study does not find social capital sufficient to produce a comprehensive assessment of social context, nor to predict the outcomes of community-level collective action as is possible through assessments of collective efficacy (Bandura, 2000). Goddard et al. summarize the relationship between the two social constructs as well as the shortcomings of assessments of social capital alone: "Dense and trusting relational networks might reflect high levels of social capital in a group; however, the potential for such social resources to influence outcomes is reached only when a group's sense of collective efficacy is sufficiently robust to compel members to action in pursuit of desired organized attainments," (Goddard, Hoy, & Woolfolk Hoy, 2004).

Social Ecology

Several adaptations of Brofenbrenner's Ecological Systems Theory exist and account for some variation of individual, interpersonal, organizational, community, and policy level factors of the social context (Brofenbrenner, 1977; McLeroy, Bibeau, Steckler, & Glanz, 1988). Social ecology holds that "behavior is…affected by, and effect[s], multiple levels of influence,"

(McLeroy, Bibeau, Steckler, & Glanz, 1988). Several exogenous and endogenous factors, at various levels of influence, have been identified in the literature as threats to collective action (Ostrom, 2000). These include intergenerational failures to transmit principles of collective action or self-governance (interpersonal), dependence on external sources of aid that do not account for local knowledge (organizational), rapid migration into or out of a community that may weaken social norms or trust (community), and establishment of standardized rules or sanctions by national governments (policy) (Ostrom, 2000). Indeed, Ostrom calls for future research to approach collective action from a social ecological lens: "We need to understand how institutional, cultural, and biophysical contexts affect the types of individuals who are recruited into and leave particular types of collective action situations," (Ostrom, 2000, p.154).

However, unlike collective efficacy, social ecology is not used to predict the outcomes of collective or coordinated action (Hipp, 2016; McLeroy, Bibeau, Steckler, and Glanz, 1988). This study intends to utilize a social construct to explore latent factors of social contexts; future directions of this work involve the modeling of these latent factors and their relationship with sanitation uptake. Therefore, collective efficacy is more compatible than social ecology with this study, given the parameters of future analyses.

Community Capacity

Community capacity has also been used by researchers as a measure of social context and readiness for community-based programming (Goodman et al., 1998). The Division of Chronic Disease Control and Community Intervention of the Centers for Disease Control and Prevention has made efforts to build consensus around the definition of community capacity and, after convening a symposium on the topic, identified the following dimensions of community capacity: participation and leadership, skills, resources, social and inter-organizational networks, sense of community, understanding of community history, community power, community values, and critical reflection (Goodman et al., 1998). These dimensions, as they do not account for individual

or group-referent efficacy and outcome expectancies, seem to prescribe an approximation of the community's potential. Importantly, collective efficacy seeks to understand residents' own perceptions of the conjoint capabilities of their community and its members (Bandura, 1997). This study is more concerned with the emic perspective of community capabilities, as this is more likely to be predictive of group performance and achievement than any etic or prescribed measure of capacity (Bandura, 1997; Bandura, 2000).

Collective Efficacy

Albert Bandura defines collective efficacy as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainment" (Bandura, 1997). Collective efficacy stems from self-efficacy, another well-known social construct. Self-efficacy can be understood as "A person's confidence in his or her ability to perform behavior that leads to an outcome," (Glanz, Rimer, & Viswanath, 2015). Self-efficacy is the central construct that underlies Social Cognitive Theory and has been shown to predict initiation of a behavior or action toward a goal, the amount of effort an individual will expend in pursuit of that goal or mastery of that behavior, and likelihood that the individual will continue to engage in the behavior or work toward the goal when obstacles are present (Glanz, Rimer, & Viswanath, 2015). This powerful social construct can also be applied to the behavior of groups or collectives. Collective efficacy can be applied in situations in which individuals cannot achieve their goals when acting alone (Bandura, 2000). Sanitation, as articulated above, is one such circumstance. While individuals or households may choose to purchase or construct a latrine, sanitary conditions that confer protective health benefits require the cooperation and collective action of the entire community.

The relationship between collective efficacy and group performance has been demonstrated by several studies and in several contexts including schools, businesses, sports teams, and neighborhoods (Bandura, 2000). The theoretical foundation for the relationship

between collective efficacy and group performance stems from the influence that collective efficacy has on motivational investment in the given behavior or in attaining the desired goal. Bandura argues that belief in the group's conjoint capabilities will improve the group's motivation to expend effort toward its goals as well as the group's commitment to its goals (Bandura, 2000). This motivational commitment translates into 'staying power' in the face of adversity or obstacles and thus allows the group to be more resilient to any challenges it may face (Bandura, 2000). Ultimately, groups with stronger motivational commitments and increased resilience are more likely to achieve group goals (Bandura, 2000; Goddard, Hoy, & Hoy, 2014). Importantly, Bandura also specifies that collective efficacy is not simply the combination of the skills and knowledge of the individuals in the group, but rather that collective efficacy also refers to the group's "synergistic dynamics" and ability to organize and coordinate individuals, households, or families into a cohesive group (2000).

Domains

Domains can be defined as latent variables that exist as underlying and unobservable causes of collective efficacy (Bollen, 2002). Social science researchers utilize latent variables in a variety of methodological approaches; the use of latent variables is founded in the assertion that "observable phenomena are influenced by underlying and unobserved causes," (Bollen, 2002, p.606). This theoretical approach is central to many widely accepted statistical modeling techniques including multiple regression, logistic regression, factor analysis, item response theory, and structural equation models, among others (Bollen, 2002). This study utilizes factor analysis to identify the domains or latent causes of collective efficacy (Gibson, Randel, & Early, 2000). Other studies have also sought to identify the domains of collective efficacy; however, evidence has not yet determined whether these domains transcend cultural context or are, instead, context-specific. Additionally, regardless of this issue, there exists some discrepancy in the literature concerning the domains of collective efficacy.

In one study of violent crime in Chicago neighborhoods, collective efficacy is defined as "social cohesion among neighbors combined with their willingness to intervene on behalf of the common good (Sampson, Raudenbush, & Earls, 1997). The authors thus conceptualized "informal social control" and "social cohesion and trust" as the two main domains of collective efficacy (Sampson, Raudenbush, & Earls, 1997). The study utilized a Likert-type scale to measure collective efficacy by combining measures of informal social control and social cohesion and trust (Sampson, Raudenbush, & Earls, 1997). The results demonstrate that this neighborhood level measure of collective efficacy was predictive of lower rates of violent crime, even after controlling for neighborhood composition, prior violence, and other potential confounders (Sampson, Raudenbush, & Earls, 1997).

Another study investigates the latent variables underlying collective efficacy in the context of a "community network supporting the university of Blacksburg, Virginia," (Carroll, Rosson, & Zhou, 2005). Factor analysis showed that there were four main latent variables underlying collective efficacy. These domains include activism, informedness, belonging, and association (Carroll, Rosson, & Zhou, 2005). Activism refers to the tendency to work for change in the community, solve collective problems, and have ideas for improvement or development (Carroll, Rosson, & Zhou, 2005). Informedness involves knowledge of the goings on inside and outside of the community and belonging involves feeling attached to the community itself and to friends and neighbors within the community (Carroll, Rosson, & Zhou, 2005). Finally, association refers to the presence of community groups and community members' proclivities for joining groups and associations (Carroll, Rosson, & Zhou, 2005). The authors argue that collective efficacy is a stronger predictor of group performance than many other social constructs, such a locus of control and cognitive competence, that are more general purpose.

Mediators and Antecedents

Bandura outlines four main sources of influence on one's self-efficacy; these four concepts can be applied to group expectations and understood as antecedents to collective efficacy (1997). The first of these is the mastery experience, which refers to prior experiences the group may have in engaging in the desired action (Bandura, 1997). Previous experiences with a given behavior, such as collective action, allow the group to build skills needed to perform the behavior and to develop expectations about the outcomes of engaging in the behavior (Glanz, Rimer, & Viswanath, 2015). Experience with outcomes that are perceived as positive will increase collective efficacy, while experience with outcomes that are perceived as negative or bad will decrease a group's collective efficacy (Glanz, Rimer, & Viswanath, 2015).

Mastery experiences have the strongest influence on self- and collective efficacy of any of the four antecedents and confer even stronger influence when the outcomes of the behavior are attributed to the group itself rather than any external source (Goddard, Hoy, & Hoy, 2014). In a study of 28 NCAA Division III basketball teams, teams showed a higher level of within-group agreement on a collective efficacy assessment administered at the end of the season compared to one administered prior to the beginning of the season (Watson, Chemers, & Preiser, 2001). The authors of this study suggest that these results reflect a sense of ambiguity about the team's ability prior to the start of the season that was no longer present once the team had built a cognitive archive of mastery experiences (Watson, Chemers, & Preiser, 2001).

The second of these antecedents is vicarious experience, which refers to the observation of other groups engaging in the behavior (Bandura, 1997). Watching another group engage in collective action, for example, allows the observing group to develop expectations about what might happen when they themselves engage in collective action. The influence of vicarious experience on collective efficacy is stronger when the behavior is modeled by a similar group and stronger still when the constraints acting on the group modeling the behavior are similar to those acting on the group observing the behavior (Goddard, Hoy, & Hoy, 2014).

Social persuasion refers to reinforcement or encouragement, which also influence collective efficacy (Bandura, 1997). This antecedent is not as strong as mastery experience in its influence on collective efficacy; however, its influence can be strengthened when the reinforcement or encouragement comes from a source that is perceived to be trusted or credible (Goddard, Hoy, & Hoy, 2014). In the case of collective action, sources of reinforcement that are perceived to be trustworthy or credible may include neighbors, local authorities, or NGOs with which the community is familiar. These sources may function to reinforce the positive consequences of a desired behavior or to persuade the group to acknowledge the negative consequences of an undesired behavior (Glanz, Rimer, & Viswanath, 2015).

Finally, affective states or emotional arousal constitute the fourth major influence on self- and collective efficacy (Glanz, Rimer, & Viswanath, 2015; Goddard, Hoy, & Hoy). Negative emotions, such as anger or frustration, when attempting to engage in a behavior may create negative perceptions of the group's competence and thusly inform collective efficacy (Bandura, 1997). Similarly, positive emotions may create optimism amongst the group and positively influence collective efficacy (Glanz, Rimer, & Viswanath, 2015).

Various studies have identified factors that mediate the relationship between collective efficacy and group performance or outcomes of collective action. Bandura provides the theoretical basis for these findings: "efficacy plays a key role in human functioning because it effects behavior not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment," (2000). Just as Bandura suggests, one of the main mediators identified in the literature is group goals. In one experimental study, participants were randomly assigned to groups for the performance of a muscular endurance task. Prior to performing the task, the groups were asked to set group goals and were assessed for collective efficacy. Results showed that groups with higher collective efficacy scores set higher goals for themselves concerning their performance in the muscular endurance task (Bray, 2004). Group

goals were better able to predict performance than group collective efficacy scores alone (Bray, 2004).

Social norms have also been shown to mitigate the relationship between collective efficacy and group performance. In a study of neighborhood smoking behavior, researchers found that neighborhood collective efficacy was not significantly associated with odds of smoking, but that the association between collective efficacy and smoking depended on the levels of anti-smoking norms in the neighborhood (Ahren, Galea, Hubbard, & Syme, 2009). Thus, "in neighborhoods with permissive smoking norms, higher collective efficacy was associated with more smoking. In contrast, in neighborhoods with strong anti-smoking norms, higher collective efficacy was associated with less smoking," (Ahren, Galea, Hubbard, & Syme, 2009). These findings demonstrate the capacity of groups with strong collective efficacy to reinforce behavioral norms. This feature of collective efficacy is particularly important in the case of sanitation in that cessation of open defecation at a community level requires that members of that community reinforce behavioral norms in favor of improved sanitation and against open defecation.

Methods

This study followed a concurrent triangulation mixed methods design to develop and compare two different collective efficacy frameworks. The first hypothesized framework was developed based on qualitative findings from formative research conducted in rural Cambodia. A previously developed collective efficacy framework (Delea & Sclar, 2016) served as an *a priori* hypothesized factor solution. The *a priori* framework is the result of formative work on collective efficacy and other socially influenced constructs that was conducted prior to formal field studies in Ethiopia and India. Confirmatory factor analysis (CFA) was then used to evaluate the *a priori* and qualitative-based frameworks against each other and to determine which factor solution was the best fit for data collected in rural Cambodia using household surveys (Bandalos & Finney, 2010). These methods, as well as the data collection tools included in Appendix A and B, were approved by the National Ethics Committee for Health Research in Cambodia.

Setting

Approximately 97% of the 16 million people in Cambodia are Buddhist, while 1.9% of the population is Muslim (CIA, 2018). The Muslim population is largely constituted by a minority ethnic group; the Cham make up 1.2% of the population in Cambodia and are concentrated geographically (CIA, 2018). Participants in this study who were from the province of Kratie represent the Cham ethnic and religious group.

In 2017, the urban population represented only 21% of the total population of Cambodia. In rural areas, 77% of adults 15 years old and above are literate and 53% of adults 15 years old and above have at least completed a primary school education (NIS, 2016). Around 22% of household income in rural areas comes from agriculture, compared to 48% from wage and salary earnings (NIS, 2016). Approximately 90% of those considered poor in Cambodia live in rural areas (Schelzig, 2014).

Research Phases

This study was comprised of a qualitative research phase and a quantitative research phase. Data for the qualitative phase were collected in six rural provinces of Cambodia including Kampong Speu, Kampong Thom, Kampot, Kandal, Kratie, and Takeo. Data for the quantitative phase were collected in four rural provinces on Cambodia including Kampong Cham, Kampong Speu, Kandal, and Takeo. Qualitative data were collected June-July, 2017; quantitative data were collected May-June, 2017. Further details regarding both research phases are outlined below.

Qualitative Research Phase

The qualitative research phase followed a modified grounded theory approach (Corbin & Strauss, 1998; Glaser, 1992) in order to develop an inductively generated collective efficacy framework. Research methods included focus group discussions (FGDs) to explore village members' perspectives on community, perceptions of collective efficacy, and social norms around latrine ownership and key informant interviews (KIIs) to explore local authority reflections on CRSHIP programming, perceptions of collective efficacy, and beliefs about external influences on the community. Three rounds of data collection and analysis were conducted in two to three study villages per round. Changes were made to the FGD and KII guides following each round of data collection to iteratively explore emerging themes.

Sample Selection

WaterAid Cambodia identified three provinces targeted under CRSHIP 1 (Kampong Speu, Kandal, and Takeo) and three provinces targeted under CRSHIP 2 (Kampong Thom, Kampot, and Kratie). Provinces were purposively selected for variation in socio-cultural factors (e.g. presence of minority ethnic groups, practice of minority religions, etc.) and for variation in proximity to the capitol. CRSHIP implementing partners selected one village in each of their respective provinces and connected the research team to the relevant local authorities. The

research team conducted key informant interviews with the selected local authorities who also helped in identifying one active village member to serve as an additional key informant. Finally, one FGD with women and one FGD with men was conducted in each village with participants recruited with the help of local authorities. Participants were required to be at least 18 years of age and residents of the selected CRSHIP target village; no inclusion criteria concerning latrine ownership or individual program participation were used.

Due to logistical challenges, the research team was unable to conduct gender-segregated focus group discussions in Kandal but instead held two FGDs with a mix of women and men in two separate villages. A total of 19 KIIs and 12 FGDs were conducted across seven villages in the six selected provinces. For a complete list of villages included in the sample, see Appendix C.

Key Informant Interviews

In each of the study villages, KIIs were conducted with one commune-level authority (commune chief or commune councilor), one village-level authority (village chief or sub-village chief), and one active community member identified by the village-level authority. Commune level authorities harbor knowledge concerning government priorities, resource allocation, and strategic objectives for CRSHIP and are uniquely positioned to provide perspective on both local goings on and exogenous influences, such as national political and economic trends. The program was implemented, however, at the village level and heavily incorporated village-level authorities for the purposes of community mobilization and follow-up. Village-level authorities were interviewed for their knowledge of program activities and the specific social context of the village. The research team included an active community member in each village in order to provide another, different perspective on village activities and context and, thus, to reach saturation with KII findings.

The KII guide consisted of three main sections including reflections on CRSHIP programming, perceptions of collective efficacy, and beliefs about external influences on the

community. The investigator received input from the Khmer-speaking research team on the translation of terms and syntax used in each question. The research team iteratively made edits and changes to the KII guide after each round of data collection. Changes were made to the wording and translation of questions as well as to the themes explored in order to include concepts that emerged based on open coding conducted between each round of data collection.

Written consent was obtained from all KII participants at the start of the interview. Interviews were conducted in Khmer by a trained research assistant and audio recorded. The investigator and an additional field officer from WaterAid Cambodia were also present during interviews. The field officer provided real-time English translation of key points to allow the investigator an opportunity for follow up with the participant on salient topics that arose during the course of the interview. Interviews typically lasted from 60 to 90 minutes and were conducted in the commune office or participants' homes. The trained research assistant transcribed and translated interview recordings into English for analysis by the investigator.

Focus Group Discussions

Two FGDs were conducted in each study village, one with men and one with women. Focus group discussions were utilized in order to capture normative community member perceptions as well as variation in perceptions and beliefs held by different members of the community. Men and women were separated because the literature suggests that associations between collective efficacy and group performance may differ according to gender (Kocaeksi & Gazioglu, 2014; Kim, 2010). Gender-segregated FGDs allowed for comparisons of data collected from men to that collected from women.

The FGD guide consisted of three main sections including perspectives on community, perceptions of collective efficacy, and social norms around latrine ownership and use. Focus groups incorporated both open-ended discussion questions and a group activity in which participants were asked to place themselves around the room based on their level of

dis/agreement with group-referent statements. Three signs were color-coded and labeled as 'agree,' 'disagree,' and 'neutral,' and participants were asked to stand in front of the sign that best reflected their own beliefs in regard to the statements, which were read aloud by the research assistant. For example, '*People in this village share the same goals'* and '*We, as a village, can overcome obstacles that face us when we are working together to solve a problem.'* The FGD guide underwent the same review and revision process as the KII guide, including iterative changes after each round of data collection.

The focus groups ranged in size from 5 to 10 participants with the exception of the FGD in the village Trea, which included only three participants. Verbal consent was obtained from all FGD participants at the start of the discussion. Focus groups were conducted in Khmer by a trained research assistant and audio recorded. The investigator and an additional field officer from WaterAid Cambodia were also present during focus groups. The field officer provided real-time English translation of key points to allow the investigator an opportunity for follow up with participants on salient topics that arose during the course of the discussion. Focus group discussions typically lasted from 90 to 120 minutes and were conducted in a community member's home or a central location such as the village pagoda or school. The trained research assistant transcribed and translated recordings into English for analysis by the investigator.

Qualitative Analysis

The qualitative phase followed a modified grounded theory approach with open and focused coding followed by categorization and conceptualization of the coded data to generate a collective efficacy framework based on the qualitative findings (Corbin & Strauss, 1998; Glaser, 1992; Hennink, Hutter, & Bailey, 2010). Grounded theory is an inductive approach used for theory generation in which qualitative data is iteratively collected and analyzed (Corbin & Strauss, 1998; Glaser, 1992; Hennink, Hutter, & Bailey, 2010). Grounded theory was selected as the analytical approach because it was important that concepts emerge from the data itself in

order to develop an organically derived collective efficacy framework reflective of the rural Cambodian context (in contrast to the *a priori* framework, which was based on theory rather than evidence) (Corbin & Strauss, 1998). The approach is considered a modified grounded theory approach because a combination of inductive and deductive codes was used (Glaser, 1992; Hennink, Hutter, & Bailey, 2010).

Open coding was conducted by the investigator after each of the three rounds of data collection. During open coding, a majority inductive codes with some deductive codes were used. Deductive codes represented concepts expressed in the *a priori* framework and from a scope of the literature on collective efficacy and social constructs. Inductive codes reflected new and different concepts expressed by participants in the KII and FGD transcripts. Open coding allowed the investigator to develop an exhaustive list of codes to ensure that all relevant concepts and ideas around collective efficacy that emerged from the transcripts were captured (Corbin & Strauss, 1998).

This exhaustive list of codes was then organized and compared such that some codes were collapsed, expanded, added, or omitted to generate a final set of codes. The codes were formally defined and then applied across all transcripts in a process called focused coding (Charmaz, 2006). Constant comparison was utilized throughout the process of focused coding in order to refine the definitions of codes and better distinguish codes from one another (Corbin & Strauss, 1998). Additionally, transcripts were grouped according to gender to allow for constant comparisons between genders and to identify overt and nuanced differences between the perceptions of women and men (Corbin & Strauss, 1998, 1990; Hennink, Hutter, & Bailey, 2010).

These refined codes were then grouped into categories and subcategories according to the dimensions and facets of collective efficacy to which they refer, respectively. Conceptualization was employed to determine how each category and subcategory were related (Hennink, Hutter, & Bailey, 2010). The resulting conceptual framework was then verified using the concept-indicator

model to check that each domain, dimension, and facet of collective efficacy included in the framework was truly grounded in the data (Glaser & Strauss, 1967). Using this concept-indicator model, the investigator verified that each level of the framework was based on empirical indicators from the level below such that domains were grounded in dimensions, which were grounded in facets, which were grounded in codes, which were grounded in textual data (Glaser & Strauss, 1967).

Quantitative Research Phase

The quantitative research phase involved data collection in the form of a household survey and data analysis using a confirmatory factor analysis method. Sampling and data collection were conducted by a WaterAid contractor, Causal Design.

Sampling Strategy

In collaboration with WaterAid Cambodia, Causal Design identified four provinces of interest (Kampong Cham, Kampong Speu, Kandal, and Takeo) from among those targeted under CRSHIP 1. Within each of the four provinces, Causal Design randomly selected seven to eight villages such that the study sample included a total of 30, randomly selected villages. A total of 600 households were surveyed across the 30 selected villages such that the sample included 140-160 households from each of the four provinces of interest. For a complete list of villages included in the sample, see Appendix C.

Household Survey

Causal Design created a household survey based on the World Bank's Integrated Questionnaire for the Measurement of Social Capital. In addition to these indices designed to measure various components of social capital, the firm agreed to append an additional 30 items, concerning perceptions of collective efficacy, to the survey. These additional items were adapted

from the *a priori* collective efficacy framework, which was proposed by the Clasen research group at Emory University (Delea & Sclar, 2016). The majority of these items reflected group-referent statements about the respondent's community or people in his/her community, while the remainder reflected self-referent statements such as those that refer to the respondent's own self-efficacy, sense of belonging, or attachment to the community. The 30 statements were designed to assess the respondent's perceptions about various facets and dimensions of collective efficacy in his/her community.

The full collective efficacy instrument developed by the Clasen research group includes 50 items. We conducted a mapping exercise to determine which of these 50 items overlapped and were potentially redundant with the social capital items already included in Causal Design's survey. Twenty overlapping items that mapped to factors of social capital were dropped as a result. Twelve items from Causal Design's 73-item household survey were included in the analysis along with the 30 items from the Clasen research group. These 12 items were extracted from Causal Design's survey based on their ability to compensate for the 20 items omitted from the original instrument constructed by the Clasen research group. The 12 items tapped to important sub-constructs of collective efficacy that were included in the *a priori* framework, particularly social capital.

Enumerators conducted the household surveys in Khmer and were trained to read each of the 30 additional statements exactly as written, followed by each answer choice in a five-point, Likert-type response scale such that respondents were provided all five answer choices immediately after each statement. Answer choices included '*Disagree to the greatest extent*,' '*Somewhat disagree*,' '*Neither agree nor disagree*,' '*Somewhat agree*,' and '*Agree to the greatest extent*.' Verbal consent was obtained from all household survey respondents prior to survey administration. Of important note, the Causal Design survey items use a different response scale than the items included from the Clasen research group (Table 1). This will have implications for the interpretation of findings and will be addressed in the discussion section.

Confirmatory Factor Analysis

Confirmatory factor analysis is a latent variable modelling method used to assess theory- and evidence-based *a priori* models by evaluating the pattern of item-factor relationships and model fit indices to compare hypothesized models (Bandalos & Finney, 2010). Confirmatory factor analysis is used here to compare factor loadings and fit statistics for four hypothesized models: Model 1 (the hypothesized framework, based on the qualitative work, and utilizing data generated from female respondents), Model 2 (the hypothesized framework, based on the qualitative work, and utilizing data generated from male respondents), Model 3 (the *a priori* framework utilizing data generated from female respondents), and Model 4 (the *a priori* framework utilizing data generated from male respondents).

In order to conduct the sex-specific analyses, the 600-household dataset was split by sex of the respondent ($N_{FEMALE} = 410$, $N_{MALE} = 186$). Sample size guidelines for CFA range from 150 to 300 respondents, others recommend that the ratio of observations to items included in the CFA should equal at least 5:1 or 10:1 (Guadagnoli and Velicer, 1988; Comrey & Lee, 1992). Therefore, the sample size for males (186) is only borderline sufficient for confirmatory factor analysis. The implications of this sample size will be further addressed in the discussion section.

The sex of the respondent was not directly documented; therefore, sex of the respondent was discerned based on two other variables, respondent's relationship to the head of household and the sex of the head of the household. Four respondents who reported their relationship to the head of household as 'other' were excluded from the analytical sample. Descriptive statistics were generated using demographic and household data and were calculated separately for each sex as well as aggregated for the total analytical sample of 596 households.

The investigator utilized MPLUS7 software (Muthén & Muthén, Los Angeles, CA, USA) to test the four models outlined above by performing a complex CFA. Given that all items had ordinal, categorical responses, a robust weighted least-squares with mean and variance adjustment (WLSMV) estimation method based on polychoric correlation matrices was used to

perform the CFA. Non-independence of observations within 30 village clusters was addressed through the use of a sandwich estimator (Muthén & Muthén, 2012).

Prior to conducting CFA, the investigator utilized SAS 9.3 (SAS Institute, Cary, NC, USA) to estimate the frequencies of responses for all 42 items. The investigator determined distributions as well as skewness and kurtosis and identified non-normality for each item overall and for each sex separately (Brown, 2015). Programming logic was added to the survey such that a response was required for each survey prompt. As a result, there were no missing data and, therefore, no missingness assessment was required.

The pattern of item-factor relationships (i.e., factor loadings) was examined for all factors of each of the four models. Any item with a factor loading with an absolute value <0.30 was omitted (Bandalos & Finney, 2010; Tabachnick & Fidell, 2007). To compare model fit, the investigator used root mean square error of approximation, the comparative fit index, and the Tucker-Lewis index as well as the Kline method for assessing model fit using χ^2 (Bentler & Bonett, 1980; Hu & Bentler, 1999; Marsh, Hau, & Grayson, 2005; Browne & Cudek, 1989; Kline, 2010).

Estimation of Model 1, Model 2, and Model 3 failed initially as a result of non-convergence. In response, the investigator freed the first factor loading in all four models and fixed all factor variables to 1. This reflects a common approach for addressing Type 2 non-convergence issues (Muthen & Muthen, 2013). The factor loadings (Table 4 and Table 5) for the initial and final CFA as well as the fit statistics (Table 6) reflect the results of these three models after these corrections for Type 2 non-convergence were made.

Estimation of Model 4 showed that the initial model was not positive definite. In response, the investigator freed the first factor loading in all four models and fixed all factor variables to 1 (Muthen & Muthen, 2013). The factor loadings (Table 5) for the initial CFA of Model 4 reflect the results of the initial model after these corrections were made. Estimation of the final CFA for Model 4 showed that the refined model was not identified. In response, the

investigator added parameter constraints to identify the model. The investigator fixed the first factor loading to 1 to scale each of the three factors in the model and added an equivalence constraint to establish that all three latent factors are correlated with collective efficacy. Again, this reflects a common CFA strategy for ensuring model identification (Division of Statistics + Scientific Computation, 2012). The factor loadings (Table 5) and fit statistics (Table 6) for the final CFA of Model 4 reflect the results of the final model after these parameter constraints were added.

Calculating Factor Scores

In order to calculate final scores for each factor, the responses for each item in the factor were summed and the resulting sum was divided by the number of items in the factor (DiStefano, Zhu, & Mindrila, 2009). For any item that had a negative factor loading in the final model, responses were reverse coded (DiStefano, Zhu, & Mindrila, 2009). Higher scores indicate a higher level of perceived collective efficacy.

This approach reflects a "coarse" factor score computation method that was selected to allow for replication of similar work by program implementers who may not be well versed in the more nuanced statistics necessary to calculate "refined" factor scores (DiStefano, Zhu, & Mindrila, 2009). This method of averaging scores allows for retention of the scale metric and, thus, more straightforward interpretation of the factor scores. T-tests were performed using SAS 9.3 (SAS Institute, Cary, NC, USA) to identify whether mean factor scores were statistically significantly different by wealth category or household latrine ownership.

Table 1. Collective efficacy tool*

Item Name	Survey item (i.e., prompt)	Variable Values				
		1	2	3	4	5
CA1	How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?	Definitely Not	Probably Not	Uncertain	Probably	Definitely
CA3	How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?	Definitely Not	Probably Not	Uncertain	Probably	Definitely
CA7	What proportion of people in this village/community contribute time or money toward common development goals, such as building a well or repairing a road?	No one	Less than half	About half	More than half	Everyone
CA8	If there was a water supply problem in this village/community how likely is it that people will cooperate to try to solve the problem?	Definitely Not	Probably Not	Uncertain	Probably	Definitely
CA9	Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?	Definitely Not	Probably Not	Uncertain	Probably	Definitely
CE1	Most people in this community have common values, for example, they value hard work. .	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE2	People in this community live in harmony with each other most of the time.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE3	In this community, you have to be careful, otherwise your neighbors may cheat you.	Agree to the greatest extent	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree to the greatest extent
CE5	Most people in this community have similar beliefs about what is right and what is wrong.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE6	If the people of this community see crime-like activities, they will do something about it.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE9	People in this community praise households for installing a latrine.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE10	When community leaders make decisions, they are pleasing and good for most of the households in this community.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE11	Sometimes people need to bribe community leaders in order to get things done.	Agree to the greatest extent	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree to the greatest extent
CE12	During a crisis situation, such as a drought, flood, or a fire, government services are distributed equally by the community to all households in need.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE14	People in this community accept me as a member of the community.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE15	I feel attached to this community and its people.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE16	I feel proud to be part of this community.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent

CE17	I have the capacity to achieve my future aims.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE18	I have the ability to contribute to this community's development.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE19	People in this community have the capacity to make positive changes by coming together.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE20	This community needs assistance from others outside the community in order to make positive changes.	Agree to the greatest extent	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree to the greatest extent
CE21	People in this community should work together to develop the community.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE22	People in this community can be trusted.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE23	The leaders of community-based associations respond to this community's concerns.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE24	This community's leaders can be trusted.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE25	People in this community get to choose their local leaders.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE26	In this community, people prioritize their own family's welfare over community development.	Agree to the greatest extent	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Disagree to the greatest extent
CE27	Most people in this community have similar hopes about the future development of the community.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE28	If people in this community saw someone openly defecating, they would do or say something about it.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE29	We, as a community, can overcome obstacles that we encounter when working toward a common goal.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent
CE30	People in this community are motivated to achieve common development goals, even when those goals seem challenging.	Disagree to the greatest extent	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree to the greatest extent

Initial CFA included 42 items; following item reduction, there were 11 items that were not included in final CFA for any of the four models. These included Netb2, Netb4, Netb5, Netb6, Netb7, Netb8, CA5, CE4, CE7, CE8, and CE13 (Table 4 and Table 5).

Results

KII and FGD Participant Demographics

In total, 114 individuals participated in a KII or an FGD across seven villages. Fifty-two (46%) of these participants were women and 62 (54%) were men. The median age of participants was 54 years and the median length of residence in the village was 39 years. Most participants owned latrines (75%) and reported exclusive use of their latrine for defecation (61%). However, a greater proportion of men (89%) than women (60%) reported currently owning a latrine and 69% of men reported defecating exclusively in a latrine compared to 52% of women. The majority of participants (71%) had a primary school education or lower and 29% of participants were classified as poor or very poor based on a wealth indicator from the Identification of Poor Households Program of Cambodia's Ministry of Planning (Table 2).

Collective Efficacy Framework

The modified grounded theory approach yielded a multi-level framework for collective efficacy (Figure 1). The framework incorporates four domains including social control, social cohesion, social capital, and motivational investment. Each of the four domains is associated with three or four dimensions and several facets. This framework serves as a proposed factor structure that will be tested and compared to the *a priori* factor structure, through the assessment of multiple model fit indices, via CFA. The factor structure that emerged from the qualitative phase of the study is included in Table 4, which illustrates how the household survey items were mapped to each domain from the qualitative-based collective efficacy framework.

Table 2. KII/FGD participant demographics and household-level characteristics, by sex

Characteristics	Aggregate		Women		Men	
Number of village clusters	**7**					
Number of participants	**114**		**52 (46%)**		**62 (54%)**	
Participant demographics			**n (%)**			
Age (median, IQR)	54	39-63	52	37.5-60.5	55	39-65
Participant's education						
No formal education	18	16%	14	27%	4	6.5%
Primary	63	55%	26	50%	37	60%
Secondary	25	22%	8	15%	17	27%
High School	8	7.0%	4	7.7%	4	6.5%
Median number of years lived in village (IQR)*	39	34-57	41	30-56	39	35-61
Household-level characteristics						
Wealth indicator*						
ID Poor 1	14	13%	8	16%	6	10%
ID Poor 2	18	17%	12	24%	6	10%
Not ID Poor	77	71%	30	60%	47	80%
Median number of members per household (IQR)	5	4-6	5	4-6	5	4-6
Household latrine ownership*						
Current Owner	85	75%	31	60%	54	89%
Former Owner	1	0.88%	0	0	1	1.6%
Never Owner	27	24%	21	40%	6	9.8%
Exclusive Use						
Yes	70	61%	27	52%	43	69%
No	44	39%	25	48%	19	31%

All data are self-reported; For *years lived in village*: 5 participants with missing data; For *wealth indicator*: classification according to the Identification of Poor Households Program of the Royal Government of Cambodia's Ministry of Planning (ID Poor 1 considered "very poor," ID Poor 2 considered "poor"), 5 participants with missing data; For *household latrine ownership*: 1 participant with missing data.

Figure 1. Framework for collective efficacy

Sub-constructs (domain-level)	Sub-constructs (dimension-level)	Sub-constructs (facet-level)
Social Control	Social Order	
	Normative Beliefs	Community Norms
	Intervention	Interpersonal/Informal
		Formal Community Rules/Sanctions
		External Accountability
Social Cohesion	Social Equity	Distribution
		Contribution
		Power
	Solidarity	Common values/beliefs
		Shared needs/benefits (Dependency)
	Community Attachment	Partiality vs. Discrimination
		Belonging
Social Capital	Inter-Household Social Networks	Communication
		Information sharing
	Community Groups	Organic/social groups
		Community associations
	Community Leadership	Linking networks to NGOs/external sources
		Government networks
	Trust	Endogenous trust
		Exogenous trust
Motivational Investment	Self-Efficacy	Access to resources
		Mastery experience
	Agency	Power to Act
		Locus of Control
	Knowledge	Knowledge of Risks/Benefits
		How To Knowledge
	Perceived Benefit	Fulfillment of Goal/Needs
		Provision of Incentive

Four domains (social control, social capital, social cohesion, and motivational investment) were identified as the main latent variables that exist as underlying influences on the community's overall collective efficacy. Social control is comprised of social order, normative beliefs, and intervention. Social order refers to the degree to which the community exists harmoniously as well as the presence or absence of crime and crime-like activities.

> 'Interviewer (I): Can you describe about the situation in your village?
> Participant (P)1: It's fine with me. It's good and leaders help us always. The security in this village is good too now. In the past, our chickens and dogs were stolen.
> P2: Now we can raise anything without worrying someone might steal it unless it dies naturally.
> P3: Currently, my village is silent and safe.
> P2: It is silent because there are no thieves.
> P3: We do not have anything such as robbery.
> P1: We do not have anything like gangster group in our village either.'
>
> (FGD with women, Kampot)

Normative beliefs refer to unspoken or embedded community 'rules' about the kinds of behaviors that are or are not socially acceptable. For example, qualitative findings showed that all communities had strongly held norms about contributing to weddings and funerals in their communities but did not have strongly embedded norms concerning contributing to families that cannot afford to purchase or construct their own latrine. During FGDs and KIIs, participants were asked why norms around financial support for latrines and sanitation did not exist. Participants provided four main rationales including the belief that, 1) personal property does not benefit the whole community, 2) neighbors are only able to provide aid to the poor for urgent matters, 3) the

cost of a latrine and/or the number of households in the village without a latrine were prohibitive, and/or 4) NGOs would provide latrines so money should be spent on other community development projects.

> 'I: Why can people help each other in anything, but not latrine?
>
> P3: It's because it matters to the individual.
>
> P1: It serves for one family's benefit.
>
> P2: That family does not care about their own sanitation and hygiene.
>
> P3: We can help in anything, but not latrine.
>
> P1: For example, if anyone gets sick, people will visit and contribute money to help. If village chief asks people to contribute 1000 riel [0.25 USD] per household to build a latrine, some might contribute and some might not.
>
> P3: They would say "They poop by themselves so why do they need others to build latrine for them?"
>
> P1: If they get sick or [go to the] hospital, we can send them to hospital or send them to Khmer traditional doctor for treatment.'
>
> (FGD with men, Kandal)

Intervention refers to the willingness and tendency for family, neighbors, community leaders, or program officers to intervene when someone in the community is engaging in an 'undesired' behavior, such as open defecation, or to reinforce 'desired' behavior, such as the purchase or construction of a latrine. Formal community rules/sanctions are operationalized, for example, when community leaders withhold approvals for marriage licenses or loans. By contrast, interpersonal or informal intervention may occur between family members or neighbors.

> ‘If they haven’t built [a latrine] yet, I told them that they must, otherwise I won’t sign when they need to make a loan. They have to promise me, and they follow it. I have to threaten them.’
>
> (Village chief, age 64, male, Kandal)
>
> ‘Since I am a village member, it is hard to give them advice…some people might say the latrines belong to them, so I do not need to advise them. They might talk back to me, so it is hard.’
>
> (FGD with men, Kampong Speu)

Social cohesion is constituted by social equity, solidarity, and community attachment. Social equity refers to the distribution of resources and opportunities within the community and the degree to which this distribution does or does not favor certain people, families, or groups within the community.

> ‘I: What if anything happens such as disaster including flooding or drought, does everyone in this village get the same assistance?...
>
> P2: Village chief and commune chief can help when drought or flooding happen.
>
> I: Does everyone get helped?
>
> P2: Yes! They help everyone.
>
> I: What about other people? Do you think everyone gets the same assistance?
>
> P3: Yes! Everyone gets the same.
>
> I: Why? Why does everyone get the same assistance?
>
> P*: It’s because everyone faces the drought the same that’s why we get the same assistance although it’s not much.’
>
> (FGD with women, Takeo)

*research assistant unable to distinguish participants when transcribing

Solidarity is present in communities that have common values and beliefs and/or that share needs and benefits. For example, many villages were able to provide examples of collective action in the form of paving community roads. Participants reported that communities come together to construct roads because all community members are affected by the lack of a paved road and all community members will benefit from the construction of a paved road.

> 'They have solidarity because the roads that they drive are hard. For example, I live here but if I would like to try [to drive] inside the village, it's hard for me to drive too. That's why we cooperate and help each other to fix it.'
>
> (Village chief, age 24, male, Kampong Thom)

The predominance of Buddhism and Buddhist principles also provides a strong foundation for common values in many communities. Finally, community attachment refers to the degree to which members of the community feel a sense of belonging with or proclivity for their community itself and other members of their community.

> 'Normally we think of each other like brothers and sisters. We think of each other like one family. We don't have any argument or conflict. This is how it [is] in this village.'
>
> (FGD with men, Kratie)

Social capital refers to the networks and structures within a community that facilitate the dissemination of that community's social and human resources. These include social networks between neighbors, which are exemplified by instances in which neighbors look after the children of families that must suddenly leave town or contribute money or other material resources to families who have recently experienced a death or serious illness. Community groups existed in

some villages and were not often formed organically by the people themselves, but rather formed by NGOs or commune-level initiatives. However, where they were present, there was some evidence that their structure or activities facilitated the dissemination or redistribution of the community's resources.

> 'I: Why do you think having this association…is important?
> P: It was because they showed interested to help the poor people at first. Now they help both poor and rich people…They help the poor and rich people to celebrate the funeral. Everyone has this idea. This is not the rule but it is a principle for this commune to help each other when they are in trouble and to share the hardship with each other. People actively participate in this activity.'
>
> (Commune councilor, age 66, male, Takeo)

Community leadership was also an important component of social capital. Leaders, such as village chiefs and religious leaders, often worked to mobilize human resources within their own communities as well as to link villagers to resources outside of the community.

> 'I do not know where to find help from outside. I have to ask the village chief.'
>
> (Key informant, age 49, male, Kampong Speu)

Finally, trust is a particularly salient dimension of social capital. Endogenous trust refers to within-community networks such as social networks that exist between neighbors or between a village leader and community members.

> 'I: Can anyone tell me why do you think people in this village have ability to solve communal problems?

P*: When we want to mobilize a group, we collect people together. I dare to say this because we trust each other. If not, I won't say we can mobilize as a group…

P*: When anyone has a problem, we call each other to help and find solution.

I: What are the characteristics of this village that you believe people in this village can come together and solve communal problem?

P*: We trust each other [such] that we dare to mobilize as a group.'

(FGD with women, Takeo)

*research assistant unable to distinguish participants when transcribing

Exogenous trust refers to the trust of people, networks, or resources beyond the community itself. Many participants stated that their trust of NGO staff who came into their communities to implement programs stemmed from the belief that NGO staff were more knowledgeable than community members, particularly concerning matters of sanitation and hygiene.

Motivational investment is influenced by self-efficacy, agency, knowledge, and perceived benefit. Self-efficacy refers to individual community members' beliefs about their capability to contribute to a community development project or cooperate and organize with other community members. For instance, some participants reported that they did not believe their community was capable of working together toward a common goal because they themselves did not have the necessary skills, resources, or connections to contribute fully. Agency refers to beliefs about one's own or one's community's control over one's surroundings and fate.

'I think they [families in the community that find financial success] are lucky to find the right business and I have no idea how to make the right business and earn a lot of money like them. I can only work in the garment factory.'

(FGD with women, Kampong Speu)

Knowledge refers to both knowledge of the risks and benefits of engaging or not engaging in certain activities or behaviors as well as the 'how to' or action knowledge, which concerns the skills needed to carry out the given behavior or activity.

> 'I: Do you believe people in this commune have ability to work together to solve communal problem?
> P: Yes, I do!
> I: Why?
> P: They have ability. First, they understand about it and second, they know how to do it. Once again, [the NGO] triggered about cause and effect and any rules so although [the NGO] is gone, they still have ability to walk by themselves. In the past years, they were supported by NGO. Now they can walk by themselves. First, they understand about the problem. Since they had attended various meetings they gain knowledge. They start to solve problem with the small one first and it becomes bigger and bigger now.'
>
> (Commune councilor, age 61, female, Kampot)

Finally, perceived benefit refers to the ways in which individuals or the community stand to benefit from, in this case, collective action. Example findings from this dimension include cost savings from improved community sanitation as a result of improved health and prevention of the need to visit the health clinic or hospital as well as direct incentives provided by local NGOs for attending community meetings concerning sanitation and hygiene.

Household Survey Respondent Demographics

In total, 600 individuals were surveyed, representing 20 unique households in each of 30 village clusters. Four respondents who reported their relationship to the head of household as 'other' and whose sex, therefore, could not be discerned were excluded from the analytical sample. The final sample size was 596, including 410 (69%) women and 186 (31%) men. The majority (84%) of male respondents were the head of their household and half (50%) of female respondents were the spouse of the head of their household.

More than half (53%) of the households surveyed reported owning a latrine and the majority (81%) of households reported having access to a latrine. Of those households that had access to a latrine, 53% accessed that latrine at a family member's house, 35% at a neighbor's house, 2.5% at the temple/pagoda, and 9.1% at some other location. The majority (63%) of the households surveyed were headed by an individual who had a primary school education or lower and about one-fourth (27%) of the households surveyed were classified poor or very poor based on a wealth indicator from the Identification of Poor Households Program of Cambodia's Ministry of Planning (Table 3).

Table 3. Survey respondent demographics and household-level characteristics, by sex

Characteristics	Aggregate		Women		Men	
Number of village clusters	**30**					
Number of households	**596**					
Number of respondents	**596**		**410 (69%)**		**186 (31%)**	
Respondent demographics			**n (%)**			
Relation to head of household						
Self	303	51%	147	34%	156	84%
Spouse	222	37%	205	50%	17	9.1%
Sister/Brother	7	1.2%	6	1.5%	1	0.54%
Daughter/Son	38	6.4%	31	7.6%	7	3.8%
Mother/Father	26	4.4%	21	5.1%	5	2.7%
Household-level characteristics			**n (%)**			
Wealth indicator						
ID Poor 1	74	12%	61	15%	13	7.0%
ID Poor 2	84	14%	58	14%	26	14%
Not ID Poor	438	73%	291	71%	147	79%
Median number of members per household (IQR)	4	4-5	4	4-5	4	3-5
Median age of head of household (IQR)	47	37-56	47	37-56	46	37-56
Head of household's education						
No formal education	114	19%	90	22%	24	13%
Primary	262	44%	177	43%	85	46%
Secondary	149	25%	103	25%	46	25%
High School	66	11%	35	8.5%	31	17%
University	5	0.84%	5	1.2%	0	0
Household latrine ownership						
Yes	317	53%	206	50%	111	60%
No	279	47%	204	50%	75	40%
Latrine access						
Yes	483	81%	343	84%	140	75%
Family member's house	257	53%	183	53%	74	53%
Neighbor's house (not family member)	170	35%	126	37%	44	31%
Temple/pagoda	12	2.5%	7	2.0%	5	3.6%
Other	44	9.1%	27	7.9%	17	12.1%
No	113	19%	67	16%	46	25%

All data are self-reported; No missing data; For *wealth indicator*: classification according to the Identification of Poor Households Program of the Royal Government of Cambodia's Ministry of Planning (ID Poor 1 considered "very poor," ID Poor 2 considered "poor"); For *household latrine ownership*: reported ownership confirmed visually whenever possible.

Univariate Analysis: Item Distributions

Forty-two items were included in the initial CFA for each of the four models. Of the original 42 items, respondents most often responded 'Definitely' or 'Agree to the greatest extent' to the following five items: "Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?" (83%); "If you suddenly had to go away for a day or two, could you count on relatives to take care of your children?" (72%); "How likely is it that people who do not send their children to school will be criticized or sanctioned by others in the community?" (66%); and "People in this community accept me as a member of the community." (61%); "People in this community get to choose their local leaders." (59%). (See Appendix D for distributions of all household survey items).

Of the 42 items, respondents most often responded 'No one,' 'Definitely not' or 'Disagree to the greatest extent' to the following five items: "In the past 6 months, how many people with a personal problem have turned to you for assistance?" (61%); "If you suddenly had to go away for a day or two, could you count on friends to take care of your children?" (50%); "Some households in this community are restricted from receiving NGO/civil society services, such as agricultural assistance." (37%); "Sometimes people need to bribe community leaders in order to get things done. Read response options." (27%); and "Differences between people, such as the amount of land they own, often causes problems in this community." (22%). (See Appendix D for distributions of all household survey items).

Two of the 42 items had univariate skewness values outside of the suggested range of 7 for CFA (Brown, 2015). These items were CA9 "Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?" and CA5 "How likely is it that people who do not send their children to school will be criticized or sanctioned by others in the community?" These items had absolute univariate skewness values <7 when assessed for

responses of only women, only men, and for aggregated responses. The male data revealed one additional item with an absolute skewness value <7; this was netb4 "If you suddenly had to go away for a day or two, could you count on relatives to take care of your children?"

Item Reduction

The WLSMV estimator assumes that the observed categories of the response scale each have an underlying normally distributed continuous variable but does not necessarily assume normality of the categorical response scale itself (Brown, 2015). Given that the WLSMV estimator was used, no action was taken to address non-normality of those items with skewed response distributions (Brown, 2015). Items with factor loadings <0.30 were omitted such that the final CFA for the four models included 27 to 28 of these original 42 items.

Model 1: Female, Qualitative-Based Model

The four-factor model created by the qualitative analysis (i.e. qualitative-based model) produced positive and negative factor loadings and had adequate model fit when applied to data generated from female respondents (RMSEA = 0. 052; CFI = 0.884; TLI = 0.873) (Table 6). Fifteen items with factor loadings <0.30 were omitted. Factor loadings are indicative of the strength of the association between the item and the factor to which it has been assigned. Small factor loadings signify weak patterns in item-factor relationships (Brown, 2015).

Factor 1 included six items dealing with social control including items concerning social order, normative beliefs, and willingness to intervene (factor loadings: $\left|0.418\text{-}0.616\right|$). CE5 ("Most people in this community have similar beliefs about what is right and what is wrong.") is the only item that was included in Factor 1 for women, but not for men.

Factor 2 included nine items about social cohesion including items concerning social equity, community attachment, and solidarity (factor loadings: $\left|0.380\text{-}0.755\right|$). CE11

("Sometimes people need to bribe community leaders in order to get things done.") was the only item that was included in Factor 2 for women, but not for men.

Factor 3 included five items about social capital including items concerning inter-household social networks, community groups, community leadership, and trust (factor loadings: │0.418-0.914│). CA9 ("Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?") was the only item that was included in Factor 3 for women, but not for men.

Factor 4 included seven items about motivational investment including items concerning self-efficacy, agency, and fulfillment of goals/needs (factor loadings: │0.306-0.769│). There are no items that were included in Factor 3 for women, but not for men. (See Table 4 for all factor loadings for the four-factor, qualitative-based model).

Model 2: Male, Qualitative-Based Model

The four-factor model produced positive and negative factor loadings and had adequate model fit when applied to data generated from male respondents (RMSEA = 0. 062; CFI = 0.872; TLI = 0.861) (Table 6). Fourteen items with factor loadings <0.30 were omitted.

Factor 1 included seven items dealing with social control including items concerning social order and willingness to intervene (factor loadings: │0.333-0.652│). Items that were included in Factor 1 for men, but not for women included CA1 "How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?" and CA3 "How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?"

Factor 2 included nine items about social cohesion including items concerning social equity, community attachment, and solidarity (factor loadings: │0.440-0.773│). CA7 ("What proportion of people in this village/community contribute time or money toward common

development goals, such as building a well or repairing a road?") is the only item that was included in Factor 2 for men, but not for women.

Factor 3 included four items about social capital including items concerning inter-household social networks, community groups, community leadership, and trust (factor loadings: $|0.537\text{-}0.848|$). There are no items that were included in Factor 3 for men, but not for women.

Factor 4 included eight items about motivational investment including items concerning self-efficacy, agency, and fulfillment of goals/needs (factor loadings: $|0.386\text{-}0.673|$). CE20 ("This community needs assistance from others outside the community in order to make positive changes.") is the only item that was included in Factor 3 for men, but not for women.

Table 4. Factor loadings for the qualitative-based models, by sex of respondent*

		Females n_W = 410		Males n_M = 186	
Factors and Associated Items	**Item**	**Initial CFA**	**Final CFA**	**Initial CFA**	**Final CFA**
Factor 1: *Social Control*					
How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?	CA1	0.293	-	0.390	0.382
How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?	CA3	0.337	-	0.532	0.525
How likely is it that people who do not send their children to school will be criticized or sanctioned by others in the community?	CA5	0.297	-	0.113	-
People in this community live in harmony with each other most of the time.	CE2	0.581	0.616	0.407	0.406
In this community, you have to be careful, otherwise your neighbors may cheat you.	CE3	-0.432	-0.418	-0.502	-0.469
In this community, conflicts like stealing and fighting often occur.	CE4	-0.036	-	0.084	-
Most people in this community have similar beliefs about what is right and what is wrong.	CE5	0.568	0.595	0.216	-
If the people of this community see crime-like activities, they will do something about it.	CE6	0.444	0.448	0.356	0.333
If there is a big dispute between two persons, other people from the community will help in solving the problem.	CE7	0.017	-	0.090	-
People in this community praise households for installing a latrine. Read response options.	CE9	0.615	0.611	0.654	0.652
If people in this community saw someone openly defecating, they would do or say something about it.	CE28	0.618	0.606	0.615	0.610
Factor 2: *Social Cohesion*					
What proportion of people in this village/community contribute time or money toward common development goals, such as building a well or repairing a road?	CA7	-0.054	-	-0.473	-0.440
Most people in this community have common values, for example, they value hard work.	CE1	0.661	0.641	0.505	0.497
Differences between people, such as the amount of land they own, often cause problems in this community.	CE8	-0.155	-	-0.105	-
When community leaders make decisions, they are pleasing and good for most of the households in this community.	CE10	0.633	0.633	0.616	0.632
Sometimes people need to bribe community leaders in order to get things done.	CE11	0.365	0.380	-0.142	-
During a crisis situation, such as a drought, flood, or a fire, government services are distributed equally by the community to all households in need	CE12	0.394	0.398	0.637	0.638
Some households in this community are restricted from receiving NGO/civil society services, such as agricultural assistance.	CE13	0.101	-	-0.275	-
People in this community accept me as a member of the community.	CE14	0.750	0.755	0.763	0.768
I feel attached to this community and its people.	CE15	0.750	0.758	0.775	0.773
I feel proud to be part of this community.	CE16	0.689	0.698	0.776	0.768
In this community, people prioritize their own family's welfare over community development.	CE26	-0.574	-0.564	-0.647	-0.646
Most people in this community have similar hopes about the future development of the community.	CE27	0.621	0.617	0.639	0.640
Factor 3: *Social Capital*					

Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?	CA9	0.427	0.418	-0.237	-
People in this community can be trusted. Read response options.	CE22	0.709	0.710	0.592	0.620
The leaders of community-based associations respond to this community's concerns.	CE23	0.911	0.914	0.772	0.804
This community's leaders can be trusted.	CE24	0.830	0.832	0.794	0.848
People in this community get to choose their local leaders.	CE25	0.492	0.481	0.475	0.537
If you suddenly needed a small amount of money [enough to pay for expenses for your household for one week], how many people beyond your immediate household could you turn to who would be willing to provide this money?	Netb2	-0.103	-	-0.327	-
If you suddenly had to go away for a day or two, could you count on relatives to take care of your children?	Netb4	0.047	-	-0.213	-
If you suddenly had to go away for a day or two, could you count on friends to take care of your children?	Netb5	0.022	-	-0.072	-
If you suddenly had to go away for a day or two, could you count on neighbors to take care of your children?	Netb6	-0.046	-	-0.286	-
If you suddenly faced a long-term emergency such as the death of a family member or a natural disaster like drought, flood, or a fire, how many people beyond your immediate household could you turn to who would be willing to assist you?	Netb7	-0.142	-	0.003	-
In the past 6 months, how many people with a personal problem had turned to you for assistance?	Netb8	0.098	-	-0.297	-
Factor 4: *Motivational Investment*					
If there was a water supply problem in this village/community how likely is it that people will cooperate to try to solve the problem?	CA8	0.308	0.306	0.409	0.386
I have the capacity to achieve my future aims.	CE17	0.579	0.591	0.455	0.448
I have the ability to contribute to this community's development.	CE18	0.380	0.383	0.654	0.646
People in this community have the capacity to make positive changes by coming together.	CE19	0.583	0.579	0.669	0.673
This community needs assistance from others outside the community in order to make positive changes	CE20	-0.283	-	-0.439	-0.434
People in this community should work together to develop the community.	CE21	0.587	0.576	0.650	0.665
We, as a community, can overcome obstacles that we encounter when working toward a common goal.	CE29	0.799	0.769	0.666	0.672
People in this community are motivated to achieve common development goals, even when those goals seem challenging.	CE30	0.564	0.552	0.594	0.600

Estimation method: WLSMV with sandwich estimator to adjust for non-independence of observations within 30 village clusters.

Model 3: Female, A Priori Model

The *a priori* model utilized a 3-factor solution. This three-factor model produced positive and negative factor loadings and had adequate model fit when applied to data generated from female respondents (RMSEA = 0. 055; CFI = 0.870; TLI = 0.858) (Table 6). Fifteen items with factor loadings <0.30 were omitted.

Factor 1 included seven items dealing with social control including items concerning social order and social response to open defecation, latrine purchase/construction, and crime-like activities (factor loadings: ⎪0.396-0.612⎪). Items that were included in Factor 1 for women, but not for men include CA9 "Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?" and CE5 "Most people in this community have similar beliefs about what is right and what is wrong."

Factor 2 included 13 items about social cohesion including items concerning social capital, social equity, community attachment, and common values (factor loadings: ⎪0.383-0.849⎪). CE11 ("Sometimes people need to bribe community leaders in order to get things done.") is the only item that was included in Factor 2 for women, but not for men.

Factor 3 included seven items about agency/empowerment including items concerning self-efficacy, collective action, and response to obstacles (factor loadings: ⎪0.306-0.770). There are no items that were included in Factor 3 for women, but not for men. (See Table 5 for all factor loadings for the *a priori* model).

Model 4: Male, A Priori Model

This three-factor model produced positive and negative factor loadings and had adequate model fit when applied to data generated from male respondents (RMSEA = 0. 067; CFI = 0.863; TLI = 0.851) (Table 6). Fourteen items with factor loadings <0.30 were omitted.

Factor 1 included eight items dealing with social control including items concerning social order and social response (factor loadings: |0.407-0.697|). Items that were included in Factor 1 for men, but not for women include CA1 "How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?", CA3 "How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?" and CA7 "What proportion of people in this village/community contribute time or money toward common development goals, such as building a well or repairing a road?"

Factor 2 included 12 items about social cohesion including items concerning social capital, social equity, community attachment, and common values (factor loadings: |0.430-0.760|). There were no items that were included in Factor 2 for men, but not for women.

Factor 3 included eight items about agency/empowerment including items concerning self-efficacy, collective action, and response to obstacles (factor loadings: |0.371-0.644|). CE20 ("This community needs assistance from others outside the community in order to make positive changes.") is the only item that was included in Factor 3 for men, but not for women.

Table 5. Factor loadings for the *a prior* model, by sex of respondent*

		Females n_W = 410		Males n_M = 186	
Factors and Associated Items	**Item**	**Initial CFA**	**Final CFA**	**Initial CFA**	**Final CFA**
Factor 1: *Social Control*					
How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?	CA1	0.289	-	0.385	0.407
How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?	CA3	0.333	-	0.525	0.562
How likely is it that people who do not send their children to school will be criticized or sanctioned by others in the community?	CA5	0.294	-	0.108	-
What proportion of people in this village/community contribute time or money toward common development goals, such as building a well or repairing a road?	CA7	-0.057	-	-0.465	-0.458
Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?	CA9	0.401	0.396	-0.207	-
People in this community live in harmony with each other most of the time.	CE2	0.581	0.612	0.405	0.427
In this community, you have to be careful, otherwise your neighbors may cheat you.	CE3	-0.424	-0.407	-0.496	-0.504
In this community, conflicts like stealing and fighting often occur.	CE4	-0.034	-	0.087	-
Most people in this community have similar beliefs about what is right and what is wrong.	CE5	0.563	0.585	0.214	-
If the people of this community see crime-like activities, they will do something about it.	CE6	0.437	0.439	0.352	0.415
If there is a big dispute between two persons, other people from the community will help in solving the problem.	CE7	0.016	-	0.089	-
Differences between people, such as the amount of land they own, often cause problems in this community.	CE8	-0.154	-	-0.091	-
People in this community praise households for installing a latrine.	CE9	0.609	0.601	0.645	0.697
If people in this community saw someone openly defecating, they would do or say something about it.	CE28	0.618	0.600	0.607	0.651
Factor 2: *Social Cohesion*					
Most people in this community have common values, for example, they value hard work. .	CE1	0.650	0.626	0.495	0.483
When community leaders make decisions, they are pleasing and good for most of the households in this community.	CE10	0.622	0.618	0.612	0.623
Sometimes people need to bribe community leaders in order to get things done.	CE11	0.373	0.383	-0.126	-
During a crisis situation, such as a drought, flood, or a fire, government services are distributed equally by the community to all households in need.	CE12	0.384	0.386	0.625	0.623
Some households in this community are restricted from receiving NGO/civil society services, such as agricultural assistance.	CE13	0.112	-	-0.257	-
People in this community accept me as a member of the community.	CE14	0.738	0.738	0.754	0.755
I feel attached to this community and its people.	CE15	0.734	0.738	0.765	0.760
I feel proud to be part of this community.	CE16	0.669	0.674	0.768	0.757
People in this community can be trusted.	CE22	0.664	0.667	0.509	0.522

The leaders of community-based associations respond to this community's concerns.	CE23	0.844	0.849	0.655	0.668
This community's leaders can be trusted.	CE24	0.809	0.813	0.687	0.709
People in this community get to choose their local leaders.	CE25	0.457	0.447	0.400	0.430
In this community, people prioritize their own family's welfare over community development.	CE26	-0.565	-0.552	-0.641	-0.635
Most people in this community have similar hopes about the future development of the community.	CE27	0.608	0.600	0.630	0.613
If you suddenly needed a small amount of money [enough to pay for expenses for your household for one week], how many people beyond your immediate household could you turn to who would be willing to provide this money?	Netb2	-0.098	-	-0.284	-
If you suddenly had to go away for a day or two, could you count on relatives to take care of your children?	Netb4	0.038	-	-0.182	-
If you suddenly had to go away for a day or two, could you count on friends to take care of your children?	Netb5	0.019	-	-0.054	-
If you suddenly had to go away for a day or two, could you count on neighbors to take care of your children?	Netb6	-0.050	-	-0.247	-
If you suddenly faced a long-term emergency such as the death of a family member or a natural disaster like drought, flood, or a fire, how many people beyond your immediate household could you turn to who would be willing to assist you?	Netb7	-0.122	-	0.027	-
In the past 6 months, how many people with a personal problem had turned to you for assistance?	Netb8	0.090	-	-0.242	-
Factor 3: *Agency/Empowerment*					
If there was a water supply problem in this village/community how likely is it that people will cooperate to try to solve the problem?	CA8	0.308	0.306	0.408	0.371
I have the capacity to achieve my future aims.	CE17	0.576	0.588	0.457	0.430
I have the ability to contribute to this community's development.	CE18	0.374	0.378	0.653	0.624
People in this community have the capacity to make positive changes by coming together.	CE19	0.584	0.579	0.670	0.638
This community needs assistance from others outside the community in order to make positive changes.	CE20	-0.280	-	-0.438	-0.417
People in this community should work together to develop the community.	CE21	0.588	0.578	0.650	0.644
We, as a community, can overcome obstacles that we encounter when working toward a common goal.	CE29	0.800	0.770	0.665	0.644
People in this community are motivated to achieve common development goals, even when those goals seem challenging.	CE30	0.566	0.554	0.595	0.580

Estimation method: WLSMV with sandwich estimator to adjust for non-independence of observations within 30 village clusters.

Comparing Model Fit

Table 6 provides the model fit statistics for all four of the proposed models. According to the Kline method, a good absolute model fit is indicated by a non-significant χ^2 or a ratio of χ^2 to degrees of freedom that is less than 3:1 (Kline, 2010). While none of the models have a non-significant χ^2, all four models have χ^2 : df ratios of less than 3:1. Chi-square model fit estimations are sensitive to sample size, which may have been the cause of the small p-values and lack of significance using this method (Bentler & Bonett, 1980). For RMSEA, values of 0.05 or less indicate good model fit and values between 0.05 and 0.08 indicate adequate model fit (Browne & Cudek, 1989). None of the models have RMSEA values less than or equal to 0.05; however, all four models have RMSEA values less than 0.08 and Model 1 has the smallest RMSEA value (0.052). For relative/incremental fit statistics (CFI and TLI) larger values indicate better model fit (Bentler & Bonett, 1980; Hu & Bentler, 1999; Marsh, Hau, & Grayson, 2005). For both the CFI and TLI, values of 0.90 or above indicate adequate relative model fit and values of 0.95 and above indicate good relative model fit (Bentler & Bonett, 1980; Hu & Bentler, 1999; Marsh, Hau, & Grayson, 2005). None of the models have CFI or TLI values greater than or equal to 0.90. Model 1, however, has the largest CFI (0.884) and TLI values (0.873).

Therefore, evaluation of the fit statistics displayed in Table 6 indicates that Model 1 (the qualitative-based model with data generated from female respondents) is the best fitting model. When comparing Model 1 and Model 3, it is clear that the qualitative-based model is a better fit than the *a priori* model for the data generated from female respondents. When comparing Model 2 and Model 4, again, the qualitative-based model is a better fit than the *a priori* model for the data generated from male respondents.

Table 6. Model fit statistics*

Fit Statistic	Model Title: Model 1 Qualitative-based with Females	Model 2 Qualitative-based with Males	Model 3 *A priori* with Females	Model 4 *A priori* with Males
X^2	676.276	643.291	719.975	643.282
degrees of freedom (df)	320	374	321	349
X^2:df ratio	2.113	1.720	2.243	1.843
p	p<0.001	p<0.001	p<0.001	p<0.001
RMSEA	0.052	0.062	0.055	0.067
CFI	0.884	0.872	0.870	0.863
TLI	0.873	0.861	0.858	0.851

Estimation method: WLSMV with sandwich estimator to adjust for non-independence of observations within 30 village clusters.

Factor Scores

For the qualitative-based models, the mean collective efficacy scores for women ranged from 3.76 (Factor 2: Social Cohesion) to 4.31 (Factor 3: Social Capital); the mean collective efficacy scores for men ranged from 2.22 (Factor 2: Social Cohesion) to 4.14 (Factor 3: Social Capital). For the *a priori* models, the mean collective efficacy scores for women ranged from 3.89 (Factor 2: Social Cohesion) to 4.00 (Factor 3: Agency/Empowerment); the mean collective efficacy scores for men ranged from 2.72 (Factor 2: Social Cohesion) to 3.87 (Factor 1: Social Control). Scores were higher for women for all factors in the *a priori* model and for all but Factor 1 (Social Control) in the qualitative-based model.

While small sample sizes may not provide sufficient power for sub-group analyses within each sex-segregated sample, the data did suggest that female respondents who were ID Poor (either ID Poor 1 or ID Poor 2) had significantly higher scores for the social cohesion factor, in both models, than female respondents who were not ID Poor. Although the male sample was small, the findings suggest that male respondents who were ID Poor (either ID Poor 1 or ID Poor 2) had significantly higher scores for the social control factor, only in the qualitative-based model, than male respondents who were not ID Poor. Additionally, female respondents whose households owned latrines had significantly higher scores for the social cohesion and

agency/empowerment factors in the *a priori* model than female respondents whose households did not own latrines. Female respondents whose households owned latrines also had significantly higher scores for the social cohesion and motivational investment factors in the qualitative-based model than female respondents whose households did not own latrines. Male respondent scores were not statistically significantly different by latrine ownership for any factor in either model; however, given the small male sample size, the study was not powered to detect these differences.

Table 7. Factor scores by sex

Sex		A priori Model			Qualitative-based Model			
		Factor 1: Social Control	**Factor 2: Social Cohesion**	**Factor 3: Agency/ Empower -ment**	**Factor 1: Social Control**	**Factor 2: Social Cohesion**	**Factor 3: Social Capital**	**Factor 4: Motivational Investment**
Female		3.959 (0.403)	3.891 (0.440)	4.00 (0.489)	3.821 (0.449)	3.761 (0.428)	4.306 (0.512)	4.001 (0.489)
Male		3.866 (0.405)	2.716 (0.323)	3.651 (0.450)	3.856 (0.425)	2.217 (0.579)	4.141 (0.569)	3.651 (0.450)
Wealth Category								
Female	ID Poor (1 or 2)	3.986 (0.400)	3.960 (0.459)*	4.008 (0.565)	3.846 (0.450)	3.841 (0.434)*	4.346 (0.560)	4.008 (0.565)
	Not ID Poor	3.949 (0.405)	3.863 (0.430)*	3.998 (0.456)	3.810 (0.449)	3.728 (0.422)*	4.289 (0.491)	3.998 (0.456)
Male	ID Poor (1 or 2)	3.958 (0.398)	2.690 (0.368)	3.590 (0.503)	3.978 (0.415)*	2.177 (0.636)	4.128 (0.538)	3.590 (0.503)
	Not ID Poor	3.842 (0.404)	2.722 (0.312)	3.668 (0.435)	3.824 (0.423)*	2.228 (0.565)	4.145 (0.579)	3.668 (0.435)
Latrine Ownership								
Female	Non-owner	3.938 (0.413)	3.845 (0.475)*	3.937 (0.508)*	3.802 (0.458)	3.715 (0.464)*	4.262 (0.542)	3.937 (0.508)*
	Owner	3.981 (0.393)	3.937 (0.398)*	4.065 (0.463)*	3.840 (0.440)	3.806 (0.386)*	4.350 (0.477)	4.065 (0.463)*
Male	Non-owner	3.580 (0.405)	3.881 (0.443)	3.608 (0.465)	3.785 (0.411)	2.182 (0.606)	4.177 (0.584)	3.608 (0.465)
	Owner	3.668 (0.395)	3.854 (0.427)	3.680 (0.439)	3.905 (0.429)	2.241 (0.562)	4.117 (0.561)	3.680 (0.439)

Numbers are mean (SD); *$p<0.05$; There are no missing data.

Discussion

This study followed a concurrent triangulation mixed methods design to develop an inductive collective efficacy framework for the rural Cambodian context and to compare this framework to an existing, *a priori* theory based framework for collective efficacy. Confirmatory factor analysis allowed for comparison of model fit statistics to determine which of these frameworks was the best fit for household survey data collected in four rural provinces of Cambodia. Thus, the results of this study help to identify the set of latent variables or factors that underlie collective efficacy in the rural Cambodian context. Ultimately, these latent variables can be used to model the relationship between factors of collective efficacy and success of sanitation interventions as measured by behavioral outcomes such as latrine coverage and use. Collective efficacy is a particularly salient social construct to examine in relation to sanitation behavior change because improvement in the sanitation of one's environment is an inherently collective process. As outlined in the literature review, successful cooperative sanitation interventions have been shown to confer herd protection against enteric pathogens that transmit disease via the fecal-oral route (Fuller & Eisenberg, 2016). Therefore, examination of collective efficacy is integral to practitioners' understanding of collective action to reduce open defecation and improve community sanitation status.

The published literature indicates that perceptions of collective efficacy and group performance may differ by gender and that men and women may contribute differently to collective action situations (Kocaeksi and Gazioglu, 2014; Kim, 2010). For this reason, the data were sex-segregated to allow for comparison of four distinct models: Model 1 (the inductive, qualitative-based model utilizing data generated from female respondents), Model 2 (the inductive, qualitative-based model utilizing data generated from male respondents), Model 3 (the *a priori* framework utilizing data generated from female respondents), and Model 4 (the *a priori* framework utilizing data generated from male respondents).

Qualitative Findings

The investigator conducted 19 KIIs and 12 FGDs across seven villages in six rural provinces in Cambodia. Modified grounded theory approach was utilized to iteratively collect and analyze the data from these KIIs and FGDs in order to develop a multi-level framework for collective efficacy (Figure 1). This framework includes four domains (social control, social cohesion, social capital, and motivational investment).

Qualitative data provided rich evidence of social control. Participants reported intervening to correct behavior around which the community had strong normative beliefs, but also indicated that a 'mind your own business' mentality and weaker normative beliefs around sanitation may reduce willingness to intervene in sanitation-related behaviors. However, community members' positionality appeared to 'allow' for intervention in some situations. For example, participants stated that it was generally acceptable for elders to criticize or advise others in regard to their sanitation and hygiene behaviors and generally unacceptable for a non-elder to advise others about any behavior for which there is not already a commonly understood community rule, unless the offenders are proximate neighbors or family members or unless the individual is intervening in an interpersonal conflict.

Social cohesion was evidenced in the qualitative data by expressions of belonging and attachment to the community. Many participants reported equitable distribution of resources in their communities, with external aid preferentially distributed to the poorer households in the village, as well as equitable contribution of resources to community development projects, with a sliding scale of contribution allowed for those that were unable to afford the requested donation. In the few instances in which discrimination between groups within the community was reported, this discrimination occurred along political party lines. Additionally, participants expressed that differences in needs according to socioeconomic status or household priorities sometimes constituted barriers to social cohesion.

Evidence of social capital was present in the data at multiple socioecological levels. Intra-village financial assistance existed as a deeply rooted tradition in nearly every village; participants reported feeling an obligation to contribute financially when other community members died, were sick, or experienced an emergency. However, almost all participants also reported that they would not contribute financially to households that could not otherwise afford to build a latrine. Village leadership also played an integral role in mobilizing communities and connecting communities to external resources.

Motivational investment was also found to be an important influencer of collective efficacy. During KIIs and FGDs, participants were asked whether they believed their community had the ability to come together to achieve a communal goal. Participants who did not believe their communities had this ability often reported that they themselves or others in their community did not have the skills or knowledge needed to achieve communal goals; that strict hierarchies limited freedom to initiate collective action; and/or that expectations for material support from external sources contributed to lower levels of community agency and thus, motivation to initiate or participate in collective action. Village chiefs, in particular, frequently reported instances in which community members were not motivated to participate in community programs or development projects until they understood the risks and benefits of the behavior in which they were being asked to engage or the activity in which they were being asked to participate. Qualitative data showed that this kind of understanding could come from NGO training or from witnessing others in the community engaging in the behavior and achieving success or reaping benefits.

There are a few key similarities and differences between this qualitative-based framework and the *a priori* collective efficacy framework. Both frameworks include domains for social control and social cohesion. The *a priroi* framework includes a third domain for agency/empowerment. Agency is also included in the qualitative-based framework as a sub-construct of motivational investment. Additionally, the qualitative-based framework features

social capital as a distinct domain, whereas the *a priori* framework includes social capital as a sub-construct of social cohesion. The implications of these differences are discussed below.

Model Fit

Results demonstrate that all four of the sex-segregated hypothesized models had adequate model fit according to absolute fit statistics, but that comparative fit statistics were poor for all models considered. This indicates the need to further investigate and refine the underlying structure of collective efficacy through exploratory factor analysis. The discussion will, therefore, explore the possible sources of misfit for CFA.

Model 3 and Model 4 were based on the *a priori* three-factor collective efficacy framework. The *a priori* framework did account for some formative work completed prior to the administration of the 50-item CE survey used by the Clasen research group. However, these models were not informed by the qualitative work summarized in this study, and may, therefore, fail to account for some important sub-constructs of collective efficacy as it pertains to the rural Cambodian context. This may have contributed to the relatively low item-factor relationships as demonstrated by the factor loadings in Table 4 and Table 5.

Model 1 and Model 2 are based on findings from the qualitative phase of this study and do, theoretically, account for these additional sub-constructs that are specific to the rural Cambodian context. However, the data used in the CFA come from items adapted from an existing instrument that does not necessarily account for each of the additional sub-constructs identified in the qualitative work. While the existing instrument does account for knowledge sharing, it does not account for other aspects of knowledge. Perceived benefits as well as knowledge of risks or benefits of the given behavior and ‘how to’ or action knowledge were conceptualized as sub-constructs of motivational investment in Model 1 and Model 2 and are not accounted for in the existing instrument. Similarly, solidarity is a sub-construct of social cohesion in these models and consists of common values/beliefs and shared needs/benefits. While some

items in the existing instrument did ask about common values and beliefs, the instrument did not account for the influence of shared needs and benefits of collective action on collective efficacy. Finally, external accountability (e.g. to NGO staff or commune councilors) was identified in the qualitative data as an important facet of social control but was not measured by any item in the existing instrument.

The formative qualitative work used modified grounded theory to develop a conceptual framework of collective efficacy based largely on inductive themes and issues identified by the participants themselves. The models that utilize this inductive conceptual framework, Model 1 and Model 2, include four factors (social control, social cohesion, social capital, and motivational investment), whereas the models that utilize the existing collective efficacy framework, Model 3 and Model 4, include three factors (social capital, social cohesion, and agency/empowerment) (Table 4 and Table 5).

The existing collective efficacy framework conceptualized social capital as a dimension of social cohesion. The qualitative work, however, indicated that social cohesion and social capital played important and seemingly distinct, though perhaps complementary roles in influencing a community's collective efficacy. While all of the factors are interrelated, the qualitative data indicate that the structure of social networks was particularly important in the rural Cambodian context. Therefore, Model 1 and Model 2 parse out social capital from social cohesion and posit that social capital refers to the social infrastructure of a community whereas social cohesion refers to the bonding, attachment, and partiality that exist between the individuals and groups that make up that infrastructure. This parsing out of social capital from social cohesion is contrary to the majority of the published literature (Ansari, 2013; Sampson, Raudenbush, & Earls, 1997). This may indicate the importance of developing context-specific frameworks and utilizing inductive methodologies to conceptualize collective efficacy.

Additionally, Model 1 and Model 2 include a fourth factor, motivational investment, that was not included in Model 3 or Model 4. Motivational investment is inclusive of agency, which is

the third factor in Model 3 and Model 4. The *a priori* models conceptualize agency as inclusive of self-efficacy. Motivational investment in the qualitative-based models consists of agency and self-efficacy in addition to knowledge and perceived benefit (Figure 1). These additional dimensions are not accounted for in the 42 items incorporated in the confirmatory factor analysis. Factor 4 (motivational investment) in Model 1 and Model 2 includes items that tap to agency and self-efficacy but should be considered incomplete as knowledge and perceived benefit are not reflected in these items (Table 4). Again, this indicates the importance of inductively developing collective efficacy frameworks and instruments.

Conversely, all four models include social control, social capital, social cohesion, and agency in some capacity, albeit at different levels within the frameworks. Thus, although the formative qualitative work yielded a framework that was different than the existing framework in key ways, the frameworks do have several similarities. More work is needed to determine which of the domains and dimensions, if any, transcend contexts. The *a priori* framework represents an existing hypothesized collective efficacy framework, which was grounded in theory and existing empirical evidence, but does not reflect any factor solution identified by EFA. Therefore, forthcoming EFA results (using data collected in India and Ethiopia by the Clasen research group) may allow for future efforts in comparing the EFA-based factor solution to the framework indicated by the qualitative research presented in this study. These comparisons may help identify domains and dimensions that do or do not transcend context.

Factor Scores

Of the 596 households included in the analytic sample, 12% were ID Poor 1 and 14% were ID Poor 2 (Table 3). Data from the Identification of Poor Households Program gathered during 2015 indicates that these proportions are, with the exception of Takeo, only somewhat higher than the overall proportion of ID Poor 1 and ID Poor 2 households in study provinces. In Kampong Cham, 7.8% of households were ID Poor 1 in 2015 and 10% were ID Poor 2; in

Kampong Speu, 6.8% were ID Poor 1 and 8.8% were ID Poor 2; in Kandal, 5.7% were ID Poor 1 and 12% were ID Poor 2; and in Takeo, 8.7% were ID Poor 1 and 15% were ID Poor 2 (Identification of Poor Households Programme, 2015).

The peer-reviewed literature suggests that marginalized households may have different perceptions of collective efficacy as compared to the majority of the community (Sampson, Raudenbush, & Earls, 1997; Williams & Collins, 1995). The qualitative data similarly reflect a differential perspective regarding collective efficacy. Some participants stated that differences in socioeconomic status within the community made it difficult for households to engage in collective action either because poorer households were less able to contribute to community development projects or because poor households had different needs than did wealthier or non-poor households. Therefore, it was important to determine whether the collective efficacy scores differed significantly according to wealth category.

While sample sizes were small, calculation of factor scores by wealth category generally showed that women from poor households had higher collective efficacy scores than women from non-poor households, while men from poor households had lower collective efficacy scores than men from non-poor households; however, the samples are likely insufficiently powered for these sub-group analyses. While the results were not statistically significant across all factors, exploration of the overall trend is useful and important to better understand the findings.

The results suggest that collective efficacy scores were higher for women who were ID Poor (either ID Poor 1 or ID Poor 2) than for women who were not ID Poor. This indicates that individuals of lower socioeconomic status (SES), particularly women, may perceive that the community has a higher degree of collective efficacy than individuals of higher SES. This may be due to the fact that ID Poor households are more often targeted for community-based initiatives. Experiences with pro-poor programming were pervasive; FGD and KII participants consistently stated that their community had a tradition of preferentially distributing resources or aid to poor households. Therefore, ID Poor households may have more tangible experiences with benefiting

from the collective action and social safety nets present in their communities. Additionally, both men and women stated that having individuals of better socioeconomic status in the village could benefit all members of the community as well as contribute to the development of the community overall.

> 'We are happy that we have rich people nearby. When we have rich people in the village we don't feel jealous because having them means that the development in our village is good too. It's good for us to live near them too.'
>
> (FGD with women, Kratie)

Thus, ID Poor individuals may have higher collective efficacy scores as a result of benefiting from social safety nets and depending on other households for collective resources.

Although the male sample was small, the findings suggest that scores were higher for men who were Not ID Poor than for men who were ID Poor (either ID Poor 1 or ID Poor 2) with the exception of the scores for social control in both the *a priori* and qualitative-based models. The qualitative data demonstrate that while both men and women noted economic barriers to collective action, men placed more of an emphasis on differences in socioeconomic status and tended to be more discriminatory with regard to SES. Men discussed the need to verify the socioeconomic status or livelihood of their neighbors in order to approve of smaller contributions to community development projects. Men also stated that families of different SES may not have the same needs and may, therefore, find it difficult to mobilize toward a community goal.

Future analyses are required to fully assess the relationship between collective efficacy and intervention uptake. While the sample is likely insufficient for sub-group analyses, statistical tests conducted during the quantitative research phase of this study allowed the investigator to identify whether the findings suggest differences in factor scores by latrine ownership. Among female respondents, scores were higher for individuals whose households owned latrines than for

individuals whose households did not own latrines. Among male respondents, scores were higher for individuals whose households owned latrines than for individuals whose households did not own latrines, with the exception of scores for social cohesion in the *a priori* model and social capital in the qualitative-based model. However, the scores for these factors were not statistically significantly lower for men whose households owned a latrine than for men whose households did not own a latrine. Thus, the overall trend suggests that households that owned latrines had higher collective efficacy scores compared to households that did not own latrines.

Limitations

The findings reflect the perceptions of adults in rural villages of Cambodia that have been triggered by CRSHIP. The findings cannot necessarily be generalized to other populations. However, because the results indicate the need for a formal EFA, the frameworks, as they are presented here, should not yet be utilized by practitioners regardless of the target population or context prior to formal scale development and validation.

Due to the inclusion of items from multiple instruments, the CFA includes items with various response scales. The full collective efficacy instrument developed by the Clasen research group included 50 items. Following a mapping exercise, 20 items were dropped from the collective efficacy instrument that were found to overlap with social capital items already included in Causal Design's instrument. All items included in the final CFA have five-point, Likert-type response scales (Table 1), however, the response options housed within those scales vary. This may slightly limit the utility of factor score interpretations as a score of five, for example, could signify that the respondent may have 'agreed to the greatest extent' with the statement or may have provided the answer 'definitely' in response to being asked about the likelihood of certain situations occurring in their community.

Recommendations for sample size for CFA range from 150 to 300 (Guadagnoli & Velicer, 1988; Comrey & Lee, 1992); others recommend that the ratio of observations to items

included in the CFA should equal at least 5:1 or 10:1 (Comrey & Lee, 1992). The intention was to obtain a sample of approximately 300 male respondents and 300 female respondents; however, with a 42-item instrument and a sample of 410 females and 186 males, the actual sample fell just short of the lower range of a sufficient sample size for the male models. The small sample size for male respondents limits the validity of the results from the male cohort. Additionally, small sample sizes tend to yield high Type I error rates (Hu & Bentler, 1999). During analysis, the initial estimation of Model 4 failed as a result of non-positive definite matrices and the estimation of the refined CFA for Model 4 failed due to the fact that the model was not identified. These failures further indicate that there were issues with the sufficiency of the sample size for the male cohort.

In order to identify the refined model, the investigator fixed the first factor loading to 1 to scale each of the three factors in the model and added an equivalence constraint (Division of Statistics + Scientific Computation, 2012). The resulting model constrains the residual variance of each of the three factors in the model to be equal, thus implying that each of the three factors (social control, social cohesion, and agency/empowerment) are correlated with collective efficacy. This assumption is strongly founded in theory, existing empirical evidence, and qualitative findings from this study. In addition, fixing the first factor loading to 1 sets the regression weights of each item in each factor relative to the first item in the factor (Muthen & Muthen, 2013). These marker indicators were chosen based on their factor loadings and theoretical basis for the strength of their correlation with the latent variable (Muthen & Muthen, 2013). While these constraints are commonplace methodologies and should not significantly alter results, it is recommended that researchers report any issues with model estimation or model identification (Bandalos & Finney, 2010).

Implications and Future Directions

The results show that although all four of the models had adequate model fit according to absolute fit statistics, but that comparative fit statistics were poor for all models considered. Specifically, all four models have adequate model fit according to the Kline method using the ratio of χ^2 to degrees of freedom and according to RMSEA values; however, none of the models have good or adequate fit according to CFI or TLI statistics (Kline, 2010; Bentler & Bonett, 1980; Browne & Cudek, 1989; Hu & Bentler, 1999; Marsh, Hau, & Grayson, 2005). The adequate model fit indicates that the models are plausible, yet likely need further refinement via EFA in order to appropriately identify the underlying structure of collective efficacy as a latent construct (Brown, 2015). When *a priori* specified models result in model misfit, it is recommended that researchers use the data to explore factor structure using EFA (Brown, 2015). Once the factor structure is identified by EFA, the investigator will use multi-level linear and generalized linear models to explore the associations between collective efficacy and various sanitation-related behavioral outcomes (e.g. latrine coverage and utilization).

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Appendix A. Key Informant Interview Guide

BACKGROUND INFORMATION
Date: _____
Village/Commune: _____
Province: _____
Implementing Partner (if known): _____
Date of Triggering Event (if known): _____
CRSHIP Phase: _____

INTRODUCTION
Thank you for agreeing to speak with us today. My name is [Research Assistant/Translator name] and this is my colleague, Allison. We work with WaterAid Cambodia. We are conducting research to learn more about what life is like in your village. We are talking to villages that have participated in the Cambodia Rural Sanitation and Hygiene Improvement Program (CRSHIP). We feel that it is important to speak directly with the people in these villages so that we can learn about their thoughts and experiences. The findings from this study will be used to make recommendations to improve CRSHIP programming.

The discussion will last for about one hour. We want to hear about your thoughts and experiences. There are no right or wrong answers and anything you share will be helpful to our study. I will ask some guiding questions, but please feel free to bring up any additional topics that you find relevant to the discussion.

I would like to take notes and record our conversation. The rest of the research team will have access to the notes and recording. However, the notes and recording will not be shared outside of the research team and everything you tell me today will remain confidential. Your name and [village/commune] will be removed from the documents along with any and all other identifying information. We will delete the recording at the end of the study.

I would like to remind you that this interview is completely voluntary. You are not required to answer any questions that you do not wish to answer or to discuss any topics that you do not wish to discuss. Please let me know if you want to stop recording the discussion at any time. We can also pause the recording at any time if you want to share something that you do not want recorded.

Do you consent to participate in the interview?
[Obtain verbal confirmation]

Is it okay to record the discussion?
If yes: Thank you. I will begin recording now.
If no: That's no problem. I will take notes only.

Do you have any questions before we start?
If yes: [address each question]
If no: [proceed to administration of demographic survey]

QUESTIONS

WARM-UP QUESTIONS
I'd like to start by learning a bit more about you and your work.

1. Tell me about your role as [position held]?
    a. How does this role connect to the leadership and/or governance of [village name]?
    b. Can you tell me about what you do during a typical week as [position held]?

REFLECTION ON CLTS
Next, I'd like to talk about the sanitation and hygiene program implemented by [implementing partner organization name] in this village on [rough triggering date]. This program is called CRSHIP or CLTS. I'd like to take some time to talk about what it was like in your village before the program. Then we will talk about the program itself. Finally, we can talk about what your village is like now, after the program.

1. Tell me about what this village was like before the sanitation and hygiene program?
    a. What was the sanitation situation like in the village?
        i. Did many households have latrines? Why/why not?
    b. How did villagers feel about sanitation before the program?
    c. How did villagers feel about hygiene before the program?
    d. What was daily life like before the program?
        i. What kinds of interactions did people have with each other?
        ii. How did village members address communal problems?
    e. Did the village have exposure to any other community-based programs before this time? Please explain.

2. What sanitation and hygiene program activities took place in your village during this time?

    [Allow participant to discuss the activities they recall on their own. Tick boxes of the activities that participants mention.]

    ☐ Village Mapping
    ☐ Calculation of Amount of Feces
    ☐ Transect Walk
    ☐ Analysis of 'Ways of Infection' and How to Prevent Them
    ☐ Calculation of Health Expenses
    ☐ Village Planning to Achieve ODF Status

3. I'm going to read some sanitation and hygiene activities that you haven't yet mentioned. After each activity, I read, please let me know if you remember this activity taking place in your village during the CLTS/CRSHIP.
    [Read only the activities below that were not ticked in question 2. Tick boxes of the activities that participants now remember engaging in.]

    ☐ <u>Village Mapping:</u>

    Facilitator asks villagers to create a large map of the village. Villagers use objects such as stones to identify public places, such as schools, health centers, and water sources. Villagers use more distinct objects to identify their houses on the map.

The facilitator asks how many people use a latrine. For those who do not use a latrine, the facilitator asks that they identify, on the map, where they defecate using objects such as rice husks or sawdust.

☐ Calculation of Amount of Feces:

First, the facilitator and villagers will determine the average weight of feces. The villagers and facilitator will then calculate the amount of feces one person will produce per day, per week, per month, and per year. Finally, the villagers and facilitator will determine the final amount of feces by calculating the number of members in a family and the number of people in the village.

☐ Transect Walk:

In this activity, the facilitator asks villagers to walk around the village and point out where the regular places for open defecation are. The facilitator may also bring a bottle of clean water and see if any participants are willing to drink the water after he/she has stirred the water with feces.

☐ Analysis of 'Ways of Infection' and How to Prevent Them:

The facilitator asks villagers to draw pictures or write the names of infections that they know about. The facilitator will then lead a discussion about how these infections are transmitted and how infectious material can get from places of open defecation back to humans. Finally, the villagers think of ways they can prevent these infections from occurring.

☐ Calculation of Health Expenses

In this activity, the facilitator will ask villagers to talk about expenses incurred by households when a family member becomes ill because of lack of sanitation.

☐ Village Planning to Achieve ODF Status

Finally, the facilitator will ask the villagers to construct a plan to end open defecation in their village entirely. The villagers identify deadlines for when they will become ODF and activities for sanitation behavior change.

Follow-up Questions:

Are there any other activities or aspects you remember from this sanitation and hygiene program? Please explain.

4. How did the village react to this sanitation and hygiene program?
    a. Did many people participate? Why/Why not?
    b. What kinds of things did people in the village say about the program?

5. Do you know of any villages that reacted [positively/negatively; the opposite of answer to question 4] to this program?
    a. What makes those villages different from your own village?

6. What changed in the village after this time?
    a. How did sanitation change?
        i. Did people start feeling differently about sanitation after the program? Please explain.
    b. How did hygiene change?

i. Did people start feeling differently about hygiene after the program? Please explain.

c. How did daily life change?
   i. How did interactions among villagers change?
   ii. How did the spirit/atmosphere of the village change?
   iii. Did people begin to work together more or less than they did before the program? Please explain.

7. Are there any activities or meetings that the village conducts now that it did not conduct before?
   a. Tell me about these activities.
   b. Tell me about these meetings.

VILLAGE-LEVEL SOCIAL NORMS

Now, I would like us to talk about the beliefs of people in the village around sanitation and hygiene. Think of this village specifically and what tendencies villagers have when it comes to sanitation and hygiene.

1. Where do people in the village normally defecate?
   a. How do people in the village feel about using a latrine to defecate?
      i. Why do you think people feel this way?
   b. How do people in the village feel about openly defecating?
      i. Why do you think people feel this way?

2. What motivates people in your village to have a latrine?
   a. What are the challenges people face in buying or building a latrine?

3. What motivates people in your village to maintain and repair their latrines?
   a. What are the challenges people face in maintaining or repairing their latrines?

4. Does your village have rules regarding sanitation and hygiene practices? Please explain.
   a. What about informal, or unspoken, rules?
   b. What would happen if someone in the village were to go against the sanitation and hygiene rules?
      i. [Ask this question only if the participant answers question 3b by saying that something negative would happen.]
      Who decides what should happen to someone who goes against the rules?
   c. Who monitors sanitation and hygiene practices?

PERCEPTIONS OF COLLECTIVE EFFICACY

Next, I'd like to talk about what your village is like now, what it's like to be a member of your village, the different relationships people have, and how village members work together.

1. Do you believe people in the village have the ability to come together and solve a communal problem? Why/Why Not?
   a. Do you know of any villages that have come together to address a communal problem and have [succeeded/failed in doing so; opposite of answer to question 1]?
      i. What about that village is different from yours?
      ii. Why do you think the village [was/was not] able to solve the problem?

2. How might you be able to contribute to solving a village problem?

   a. Might you be able to contribute knowledge or information? What kind of knowledge or information?
   b. Might you be able to contribute your skills? What kind of skills?
   c. Might you be able to contribute connections with other people or organizations? What kind of connections?

3. How similar are the various households/families in the village?
   a. In what ways are they similar?
   b. In what ways are they different?
   c. What kinds of things do people usually agree about?
   d. What kinds of things do people usually disagree about?

4. Does everyone in the village have the same benefits and opportunities? Why?/Why not?
   a. What kinds of benefits and opportunities do some people have that others do not?
   b. What kinds of benefits and opportunities does almost everyone have in common?
   c. Does everyone in the village receive the same assistance when there is an emergency, such as a drought or a flood? Why?/Why not?

5. Can you tell me about a time a crime was committed in the village?
   a. How did people in the village respond?
   b. How was the issue resolved?

6. How do villagers respond when other households/families in the village have [success/appropriate example of success in this village]?

7. If there were a community development project going on in your village, would you be expected to volunteer your time, labor, or money to contribute to the project? Please explain.
   a. Do the same expectations apply to everyone in the village? Why/Why not?
   b. How would you react if they were asked to contribute their time, labor, or money to contribute to a village development project?
   c. What would happen if someone did not contribute their time, labor, or money to a village development project?
      i. [If 7c involves sanctions/punishments of some kind, ask the question below]
      Who decides what happens to someone who does not contribute?

EXTERNAL INFLUENCES/SYSTEMS

Next, I would like to talk to you about external factors that may influence what life is like in your village, how people work together, and how people make decisions about sanitation and hygiene. We will talk about how the government, the economy, NGOs, and history might impact daily life in the village.

1. Do you feel that villagers trust the people that come into the village to implement sanitation and hygiene programs? Why/Why not?

2. Do you feel that villagers trust government officials who promote sanitation and hygiene in the provinces? Why/Why not?

3. How do government policies affect sanitation and hygiene in the village?
   a. In what ways do government policies facilitate good sanitation and hygiene in the village?

   b. In what ways do government policies act as barriers to good sanitation and hygiene in the village?
   c. How do government policies affect the ability of village members to work together?
      i. Are community groups affected by government policies? Why/why not?

4. Tell me about the economy of the village.
   a. In what ways does the economy facilitate good sanitation and hygiene in the village?
   b. In what ways does the economy act as a barrier to good sanitation and hygiene in the village?
      i. How might the village be able to overcome these barriers?
   c. How does the economy of the village affect decision-making with regards to sanitation and hygiene?
      i. Does the economy of the village affect the ability of village members to work together? Please explain.

5. How do NGOs in the region affect the sanitation and hygiene situation in the village?
   a. In what ways do NGOs facilitate good sanitation and hygiene in the village?
   b. In what ways do NGOs act as a barrier to good sanitation and hygiene in the village?
      i. How might the village be able to overcome these barriers?
   c. How do NGOs affect decision-making with regards to sanitation and hygiene?
   d. How do NGOs affect the village's ability to solve communal problems?

6. Tell me about some of the history of this village.
   a. How does this history impact the village today?
      i. In what ways is the village positively affected by its history?
      ii. In what ways is the village negatively affected by its history?

CONCLUSION

Is there anything else you would like to share today?

If yes: [allow each comment to be shared]

If no: [proceed to conclusion below]

That will conclude our discussion for today. Thank you for participating and for sharing your personal thoughts and experiences. I would like to remind you that all of the information shared here today is confidential. Only the research team will have access to the information shared and your names have not been recorded today.

Do you have any additional questions?

If yes: [address each question]

If no: Thank you again for participating.

Appendix B. Focus Group Discussion Guide

BACKGROUND INFORMATION
Date: _____
Village: _____
Province: _____
Implementing Partner: _____
Date of Triggering Event: _____
CRSHIP Phase: _____

INTRODUCTION
Thank you for agreeing to speak with us today. My name is [Research Assistant/Translator name] and this is my colleague, Allison. We work with WaterAid Cambodia. We are conducting research to learn more about what life is like in your village. We are talking to villages that have participated in the Cambodia Rural Sanitation and Hygiene Improvement Program (CRSHIP). We feel that it is important to speak directly with the people in these villages so that we can learn about their thoughts and experiences. The findings from this study will be used to make recommendations to improve CRSHIP programming.

The discussion will last for about two hours. Please feel free to get up and move around as needed. The restrooms are located [indicate restroom location]. If you need to leave, the exits are located [indicate exit locations].

We want to learn about your thoughts and experiences. There are no right or wrong answers and anything you share will be helpful to our study. I will ask some guiding questions, but please feel free to bring up any additional topics that you find relevant to the discussion. This will be an open discussion, meaning that we will not go around the room to ask each participant each question. Instead, you should feel welcome to join in and provide your own thoughts and experiences when you can. However, everyone's contributions and comments are important to us so it is important that only one person speaks at a time. Additionally, we want to hear as many different perspectives as possible so please feel free to disagree with someone's point of view so long as you are respectful of that individual and their experiences in doing so.

I would like to take notes and record our conversation. The rest of the research team will have access to the notes and recording. However, the notes and recording will not be shared outside of the research team and everything you tell me today will remain confidential. Your name and [village/commune] will be removed from the documents along with any and all other identifying information. We will delete the recording at the end of the study. We also ask that participants do not share what is said here today with anyone outside of our focus group discussion.

I would like to remind everyone that this focus group discussion is completely voluntary. Although we request that you stay for the duration of the discussion, you are free to excuse yourself at any point if you become uncomfortable or need to leave. You are not required to answer any questions that you do not wish to answer or to discuss any topics that you do not wish to discuss. Please let me know if you want to stop recording the discussion at any time. We can also pause the recording at any time if you want to share something that you do not want recorded.

Do you consent to participate in the focus group discussion?
[Obtain verbal confirmation from each participant.]

Is it okay to record the discussion?

If yes: Thank you. I will begin recording now.
If no: That's no problem. I will take notes only.

Does anyone have any questions before we start?

If yes: [address each question]
If no: [proceed to administration of demographic survey]

QUESTIONS

WARM-UP QUESTIONS

I'd like to start by giving everyone an opportunity to introduce themselves to the group. Let's go around the room; please share something positive that happened during your week so far. You do not need to say your name.

Next, I will ask an opening question. For this question, I would like everyone to have the opportunity to say something. One person can begin answering the question. When he/she has finished, the person to his/her left can add something new or different. We will continue this way until everyone has had an opportunity to say something.

2. Describe what it is like to live in your village.
    a. What are some of the positive aspects of living in your village?
    b. What are some of the negative aspects of living in your village?

REFLECTION ON CLTS

Next, I'd like to talk about the sanitation and hygiene program implemented by [implementing partner organization name] in this village on [rough triggering date]. This program is called CRSHIP or CLTS. I'd like to take some time to talk about what it was like in your village before the program. Then we will talk about the program itself. Finally, we can talk about what your village is like now, after the program.

8. Tell me about what this village was like before the sanitation and hygiene program.
    a. What was the sanitation situation like in the village?
        i. Did many households have latrines? Why/why not?
    b. How did villagers feel about sanitation before the program?
    c. How did villagers feel about hygiene before the program?
    d. What was daily life like before the program?
        i. What kinds of interactions did people have with each other?
        ii. How did village members address communal problems?
    e. Did the village have exposure to any other community-based programs before this time? Please explain.

9. What sanitation and hygiene program activities took place in your village during this time?

    [Allow participant to discuss the activities they recall on their own. Tick boxes of the activities that participants mention.]

    a. Who in the village took part in program activities?
        i. Were some people more involved than others? Why/Why not?

    ☐ Village Mapping

☐ Calculation of Amount of Feces
☐ Transect Walk
☐ Analysis of 'Ways of Infection' and How to Prevent Them
☐ Calculation of Health Expenses
☐ Village Planning to Achieve ODF Status

10. I'm going to read some sanitation and hygiene activities that you haven't yet mentioned. After each activity I read, please let me know if you remember this activity taking place in your village during the CLTS/CRSHIP.
[Read only the activities below that were not ticked in question 2. Tick boxes of the activities that participants now remember engaging in.]

☐ Village Mapping:
Facilitator asks villagers to create a large map of the village. Villagers use objects such as stones to identify public places, such as schools, health centers, and water sources. Villagers use more distinct objects to identify their houses on the map.
The facilitator asks how many people use a latrine. For those who do not use a latrine, the facilitator asks that they identify, on the map, where they defecate using objects such as rice husks or sawdust.

☐ Calculation of Amount of Feces:
First, the facilitator and villagers will determine the average weight of feces. The villagers and facilitator will then calculate the amount of feces one person will produce per day, per week, per month, and per year. Finally, the villagers and facilitator will determine the final amount of feces by calculating the number of members in a family and the number of people in the village.

☐ Transect Walk:
In this activity, the facilitator asks villagers to walk around the village and point out where the regular places for open defecation are. The facilitator may also bring a bottle of clean water and see if any participants are willing to drink the water after he/she has stirred the water with feces.

☐ Analysis of 'Ways of Infection' and How to Prevent Them:
The facilitator asks villagers to draw pictures or write the names of infections that they know about. The facilitator will then lead a discussion about how these infections are transmitted and how infectious material can get from places of open defecation back to humans. Finally, the villagers think of ways they can prevent these infections from occurring.

☐ Calculation of Health Expenses
In this activity, the facilitator will ask villagers to talk about expenses incurred by households when a family member becomes ill because of lack of sanitation.

☐ Village Planning to Achieve ODF Status
Finally, the facilitator will ask the villagers to construct a plan to end open defecation in their village entirely. The villagers identify deadlines for when they will become ODF and activities for sanitation behavior change.

Follow-up Questions:
Are there any other activities or aspects you remember from this sanitation and hygiene program? Please explain.

11. How did the village react to this sanitation and hygiene program?
    a. Did many people participate? Why/Why not?
    b. What kinds of things did people in the village say about the program?

12. Do you know of any villages that reacted [positively/negatively; the opposite of answer to question 4] to this program?
    a. What makes those villages different from your own village?

13. What changed in the village after this time?
    a. How did sanitation change?
        i. Did people start feeling differently about sanitation after the program? Please explain.
    b. How did hygiene change?
        i. Did people start feeling differently about hygiene after the program? Please explain.
    c. How did daily life change?
        i. How did interactions among villagers change?
        ii. How did the spirit/atmosphere of the village change?
        iii. Did people begin to work together more or less than they did before the program? Please explain.

14. Are there any activities or meetings that the village conducts now that it did not conduct before?
    a. Tell me about these activities.
    b. Tell me about these meetings.

PERCEPTIONS OF COLLECTIVE EFFICACY
Next, I'd like to talk about what your village is like now, what it's like to be a member of your village, the different relationships people have, and how village members work together.

8. Do you believe people in the village have the ability to come together and solve a communal problem? Why/Why Not?
    b. What characteristics does your village have that would make you answer in this way?
        i. Does this village have external support from NGOs or the government when facing communal problems or addressing communal goals? Please explain.
            - How does the village react to this support?
            - Do you feel that the village requires this kind of support in order to solve communal problems or address communal goals? Why/why not?

9. Do you know of any villages that have come together to address a communal problem and have [succeeded/failed in doing so; opposite of answer to question 1]?
    a. What about that village is different from yours?
    b. Why do you think the village [was/was not] able to solve the problem?

10. How might you or other people in your village be able to contribute to solving a village problem?
    d. Might you or other people in your village be able to contribute knowledge or information? What kind of knowledge or information?
    e. Might you or other people in your village be able to contribute your skills? What kind of skills?
    f. Might you or other people in your village be able to contribute connections with other people or organizations? What kind of connections?
    g. Are people in this village generally happy to contribute their [knowledge, skills, networks/connections] when there is a problem? Why/why not?

11. Does everyone in the village have the same benefits and opportunities? Why?/Why not?
    a. What kinds of benefits and opportunities do some people in your village have that others do not?
    b. What kinds of benefits and opportunities does almost everyone in your village have in common?
    c. Does everyone in the village receive the same assistance when there is an emergency, such as a drought or a flood? Why?/Why not?

12. Can you tell me about a time a crime was committed in the village?
    a. How did people in the village respond?
    b. How was the issue resolved?

13. How do villagers respond when other households/families in the village have [success/appropriate example of success in this village]?

14. Do people in the village trust village leadership? Why/Why not?
    a. Are village leaders responsive to the needs of village members? Please explain.
    b. Do people in the village trust leaders of community groups or organizations? Why/why not?
    c. Do people in the village trust NGOs that work here? Why/why not?

15. If there were a community development project going on in your village, would you be expected to volunteer your time, labor, or money to contribute to the project? Please explain.
    a. Do the same expectations apply to everyone in the village? Why/Why not?
    b. How would people in the village react if they were asked to contribute their time, labor, or money to contribute to a village development project?
    c. What would happen if someone did not contribute their time, labor, or money to a village development project?
        i. [If 8c involves sanctions/punishments of some kind, ask the question below]
        Who decides what happens to someone who does not contribute?

PERCEPTIONS OF LATRINE OWNERSHIP AND USE

Now, I'd like to talk about latrine ownership and latrine use in your village. Think of this village specifically and what tendencies villagers have when it comes to sanitation and hygiene.

1. Where do people in the village normally defecate?
    a. How do people in the village feel about using a latrine to defecate?
        i. Why do you think people feel this way?
    b. How do people in the village feel about openly defecating?

i. Why do you think people feel this way?

2. What motivates people in your village to have a latrine?
    a. What are the challenges people face in buying or building a latrine?

3. What motivates people in your village to maintain and repair their latrines?
    a. What are the challenges people face in maintaining or repairing their latrines?

4. Does your village have rules regarding sanitation and hygiene practices? Please explain.
    a. What about informal, or unspoken, rules?
    b. What would happen if someone in the village were to go against the sanitation and hygiene rules?
        i. Who decides what should happen to someone who goes against the rules?
    c. Who monitors sanitation and hygiene practices?

CONCLUDING ACTIVITY

Now, I would like us to engage in a brief activity. During this activity, I will read statements aloud. After each statement, please think silently about whether you agree, disagree, or feel neutral about the statement. Once you have decided, you can stand up and walk to the area of the room that best aligns with the way you feel.

We have placed "Agree," "Disagree," and "Neutral" signs around the room. Think of this as a spectrum. If you strongly agree, stand by the "Agree" sign. If you somewhat agree, stand between the "Agree" and "Neutral" signs. If you are totally neutral, stand by the "Neutral" sign. If you strongly disagree, stand by the "Disagree" sign. If you somewhat disagree, stand between the "Disagree" and "Neutral" signs.

I will read five statements. After each statement, I will pause to allow you to think about whether you agree, disagree, or are neutral, and to move around the room. After each statement, we will also have a brief discussion about why you agree, disagree, or are neutral.

- People in this village share the same goals.
- People in this village can be trusted.
- People in this village generally feel attached to the village and connected to other village members.
- If my family or me were having a hard time with something, such as health or finances, I could count on other people in the village to help us.
- People in this village prioritize their own family's welfare over community development.
- We, as a village, do a good job of organizing ourselves in order to achieve village goals.
- We, as a village, can overcome obstacles that face us when we are working together to solve a problem.

CONCLUSION

Is there anything else you would like to share today?

If yes: [allow each comment to be shared]
If no: [proceed to conclusion below]

That will conclude our discussion for today. Thank you for participating and for sharing your personal thoughts, feelings, beliefs, and experiences. I would like to remind you that all of the

information shared here today is confidential. Only the research team will have access to the information shared and your names have not been recorded today.

Does anyone have any additional questions?

If yes: [address each question]

If no: Thank you again for participating.

Appendix C. Sampled Villages

Villages Selected for Qualitative Phase			
Province	**District**	**Commune**	**Village**
Kampong Speu	Samraong Tong	Phneay	Sampov Gnor
Kampong Thom	Stoung	Preah Damrei	Seam Peay
Kampot	Chhuk	Krang Sbov	Trapaing Leuk
Kandal	Ong Snoul	Prey Pouch	Promor
Kandal	Ong Snoul	Prey Pouch	Trea
Kratie	Chlong	Preak Saman	Lvea Thom
Takeo	Prey Kabas	Ang Kanh	Banuoy
Villages Selected for Quantitative Household Survey			
Province	**District**	**Commune**	**Village**
Kampong Cham	Batheay	Chealea	Tang Krang
Kampong Cham	Batheay	Ph'av	Tang Boeng
Kampong Cham	Batheay	Tang Krang	Prasat
Kampong Cham	Cheung Prey	Sdeung Chey	Kdoy
Kampong Cham	Cheung Prey	Trapeang Kor	Kandal
Kampong Cham	Kang Meas	Khchau	Varint Ti Pir
Kampong Cham	Kang Meas	Preaek Koy	Anlong Kokir
Kampong Speu	Kong Pisei	Chhong Rouk	Paing Na
Kampong Speu	Kong Pisei	Preah Nipean	Ruessei
Kampong Speu	Kong Pisei	Prey Ngeat	Phnov
Kampong Speu	Odongk	Cheung Roas	Ta Sal
Kampong Speu	Odongk	Khsem Khsant	Ta Ling
Kampong Speu	Odongk	Preah Srae	Ampil Rung
Kampong Speu	Samraong Tong	Roleang Kreul	Spean Tao
Kampong Speu	Samraong Tong	Samrong Tong	Tonle Kantil
Kandal	Angk Snuol	Mkak	Chamkar Chen
Kandal	Angk Snuol	Prey Puoch	Trea
Kandal	Angk Snuol	Samraong Leu	Thmei
Kandal	Khean Svay	Bontey Deak	Preaek Pol
Kandal	Khean Svay	Chheu Teal	Srae Ampil
Kandal	Mukh Kampul	Preaek Dambong	Sameakki
Kandal	Mukh Kampul	Svay Rompea	Kampong Prasat
Takeo	Samraong	Roveang	Prey Chnoul
Takeo	Samraong	Samraong	Prey Totueng
Takeo	Samraong	Trea	Samrong
Takeo	Prey Kabas	Angkhanh	Banuoy
Takeo	Prey Kabas	Pou Rumchak	Kuok Khanh Cheab
Takeo	Prey Kabas	Prey Kabas	Prey Kabas Khor
Takeo	Tramkak	Leay Bour	Tourltbeng
Takeo	Tramkak	Trapeang Thum Khang Cheung	Pou Doh

Appendix D. Item Distribution: Frequency of responses, by sex

Item response	Aggregate N = 596		Women n_W = 410		Men n_M = 186	
CA1. How likely is it that people who do not participate in community activities will be criticized or sanctioned by others in the community?						
Definitely not	99	16.61%	66	16.10%	33	17.74%
Probably not	74	12.42%	49	11.95%	25	13.44%
Uncertain	92	15.44%	67	16.34%	25	13.44%
Probably	178	29.87%	116	28.29%	62	33.33%
Definitely	153	25.67%	112	27.32%	41	22.04%
TOTAL	596, 100%		410, 100%		186, 100%	
CA3. How likely is it that people who do not own a latrine will be criticized or sanctioned by others in the community?						
Definitely not	34	5.70%	30	7.32%	4	2.15%
Probably not	23	3.86%	21	5.12%	2	1.08%
Uncertain	36	6.04%	25	6.10%	11	5.91%
Probably	196	32.89%	118	28.78%	78	41.94%
Definitely	307	51.51%	216	52.68%	91	48.92%
TOTAL	596, 100%		410, 100%		186, 100%	
CA5. How likely is it that people who do not send their children to school will be criticized or sanctioned by others in the community?						
Definitely not	21	3.52%	18	4.39%	3	1.61%
Probably not	8	1.34%	7	1.71%	1	0.54%
Uncertain	21	3.52%	17	4.15%	4	2.15%
Probably	154	25.84%	109	26.59%	45	24.19%
Definitely	392	65.77%	259	63.17%	133	71.51%
TOTAL	596, 100%		410, 100%		186, 100%	
CA7. What proportion of people in this village/community contribute time or money toward common development goals, such as building a well or repairing a road?						
No one	32	5.37%	24	5.85%	8	4.30%
Less than half	103	17.28%	75	18.29%	28	15.05%
About half	68	11.41%	52	12.68%	16	8.60%
More than half	155	26.01%	105	25.61%	50	26.88%
Everyone	238	39.93%	154	37.56%	84	45.16%
TOTAL	596, 100%		410, 100%		186, 100%	
CA8. If there was a water supply problem in this village/community how likely is it that people will cooperate to try to solve the problem?						
Definitely not	15	2.52%	13	3.17%	2	1.08%
Probably not	39	6.54%	24	5.85%	15	8.06%
Uncertain	59	9.90%	36	8.78%	23	12.37%
Probably	215	36.07%	150	36.59%	65	34.95%
Definitely	268	44.97%	187	45.61%	81	43.55%
TOTAL	596, 100%		410, 100%		186, 100%	

CA9. Suppose something unfortunate happened to someone in the village/community such as a serious illness, or the death of a parent. How likely is it that some people in the community would get together to help them?

Definitely not	3	0.50%	3	0.73%	0	0
Probably not	2	0.34%	2	0.49%	0	0
Uncertain	6	1.01%	4	0.98%	2	1.08%
Probably	89	14.93%	60	14.63%	29	15.59%
Definitely	496	83.22%	341	83.17%	155	83.33%
TOTAL	596, 100%		410, 100%		186, 100%	

CE1. Most people in this community have common values, for example, they value hard work.

Disagree to the greatest extent	8	1.34%	4	0.98%	4	2.15%
Somewhat disagree	31	5.20%	24	5.85%	7	3.76%
Neither agree nor disagree	155	26.01%	91	22.20%	64	34.41%
Somewhat agree	168	28.19%	110	26.83%	58	31.18%
Agree to the greatest extent	234	39.26%	181	44.15%	53	28.49%
TOTAL	596, 100%		410, 100%		186, 100%	

CE2. People in this community live in harmony with each other most of the time.

Disagree to the greatest extent	12	12.01%	9	2.20%	3	1.61%
Somewhat disagree	31	5.20%	22	5.37%	9	4.84%
Neither agree nor disagree	131	21.98%	84	20.49%	47	25.27%
Somewhat agree	184	30.87%	119	29.02%	65	34.95%
Agree to the greatest extent	238	39.93%	176	42.93%	62	33.33%
TOTAL	596, 100%		410, 100%		186, 100%	

CE3. In this community, you have to be careful, otherwise your neighbors may cheat you.

Disagree to the greatest extent	80	13.42%	54	13.17%	26	13.98%
Somewhat disagree	85	14.26%	50	12.20%	35	18.82%
Neither agree nor disagree	125	20.97%	79	19.27%	46	24.73%
Somewhat agree	180	30.20%	131	31.95%	49	26.34%
Agree to the greatest extent	126	21.14	96	23.41%	30	16.13%
TOTAL	596, 100%		410, 100%		186, 100%	

CE4. In this community, conflicts like stealing and fighting often occur.

Disagree to the greatest extent	116	19.46%	77	18.78%	39	20.97%
Somewhat disagree	105	17.62%	66	16.10%	39	20.97%
Neither agree nor disagree	157	26.34%	97	23.66%	60	32.26%
Somewhat agree	189	31.71%	142	34.63%	47	25.27%
Agree to the greatest extent	29	4.87%	28	6.83%	1	0.54%
TOTAL	596, 100%		410, 100%		186, 100%	

CE5. Most people in this community have similar beliefs about what is right and what is wrong.

Disagree to the greatest extent	19	3.19%	13	3.17%	6	3.23%
Somewhat disagree	47	7.89%	30	7.32%	17	9.14%
Neither agree nor disagree	233	39.09%	148	36.10%	85	45.70%
Somewhat agree	240	40.27%	174	42.44%	66	35.48%
Agree to the greatest extent	57	9.56%	45	10.98%	12	6.45%
TOTAL	596, 100%		410, 100%		186, 100%	

CE6. If the people of this community see crime-like activities, they will do something about it.

Disagree to the greatest extent	5	0.84%	3	0.73%	2	1.08%
Somewhat disagree	9	1.51%	8	1.95%	1	0.54%
Neither agree nor disagree	74	12.42%	40	9.76%	34	18.28%
Somewhat agree	244	40.94%	172	41.95%	72	38.71%
Agree to the greatest extent	264	44.30%	187	45.61%	77	41.40%
TOTAL	596, 100%		410, 100%		186, 100%	

CE7. If there is a big dispute between two persons, other people from the community will help in solving the problem.

Disagree to the greatest extent	22	3.69%	16	3.90%	6	3.23%
Somewhat disagree	12	2.01%	9	2.20%	3	1.61%
Neither agree nor disagree	96	16.11%	66	16.10%	30	16.13%
Somewhat agree	277	46.48%	190	46.34%	87	46.77%
Agree to the greatest extent	189	31.71%	129	31.46%	60	32.26%
TOTAL	596, 100%		410, 100%		186, 100%	

CE8. Differences between people, such as the amount of land they own, often causes problems in this community.

Disagree to the greatest extent	131	21.98%	81	19.76%	50	26.88%
Somewhat disagree	104	17.45%	67	16.34%	37	19.89%
Neither agree nor disagree	178	29.87%	118	28.78%	60	32.26%
Somewhat agree	150	25.17%	111	27.07%	39	20.97%
Agree to the greatest extent	33	5.54%	33	8.05%	0	0
TOTAL	596, 100%		410, 100%		186, 100%	

CE9. People in this community praise households for installing a latrine.

Disagree to the greatest extent	6	1.01%	6	1.46%	0	0
Somewhat disagree	11	1.85%	8	1.95%	3	1.61%
Neither agree nor disagree	68	11.41%	45	10.98%	23	12.37%
Somewhat agree	257	43.12%	169	41.22%	88	47.31%
Agree to the greatest extent	254	42.62%	182	44.39%	72	38.71%
TOTAL	596, 100%		410, 100%		186, 100%	

CE10. When community leaders make decisions, they are pleasing and good for most of the households in this community.

Disagree to the greatest extent	12	2.01%	9	2.20%	3	1.61%
Somewhat disagree	21	3.52%	16	3.90%	5	2.69%
Neither agree nor disagree	162	27.18%	96	23.41%	66	35.48%
Somewhat agree	216	36.24%	156	38.05%	60	32.26%
Agree to the greatest extent	185	31.04%	133	32.44%	52	27.96%
TOTAL	596, 100%		410, 100%		186, 100%	

CE11. Sometimes people need to bribe community leaders in order to get things done. Read response options.

Disagree to the greatest extent	159	26.68%	110	26.83%	49	26.34%
Somewhat disagree	67	11.24%	36	8.78%	31	16.67%
Neither agree nor disagree	182	30.54%	119	29.02%	63	33.87%
Somewhat agree	150	25.17%	116	28.29%	34	18.28%
Agree to the greatest extent	38	6.38%	29	7.07%	9	4.84%
TOTAL	596, 100%		410, 100%		186, 100%	

CE12. During a crisis situation, such as a drought, flood, or a fire, government services are distributed equally by the community to all households in need.

Disagree to the greatest extent	54	9.06%	36	8.78%	18	9.68%
Somewhat disagree	51	8.56%	30	7.32%	21	11.29%
Neither agree nor disagree	155	26.01%	104	25.37%	51	27.42%
Somewhat agree	209	35.07%	153	37.32%	56	30.11%
Agree to the greatest extent	127	21.31%	87	21.22%	40	21.51%
TOTAL	596, 100%		410, 100%		186, 100%	

CE13. Some households in this community are restricted from receiving NGO/civil society services, such as agricultural assistance.

Disagree to the greatest extent	222	37.25%	144	35.12%	78	41.94%
Somewhat disagree	78	13.09%	50	12.20%	28	15.05%
Neither agree nor disagree	140	23.49%	99	24.15%	41	22.04%
Somewhat agree	129	21.64%	98	23.90%	31	16.67%
Agree to the greatest extent	27	4.53%	19	4.63%	8	4.30%
TOTAL	596, 100%		410, 100%		186, 100%	

CE14. People in this community accept me as a member of the community.

Disagree to the greatest extent	0	0	0	0	0	0
Somewhat disagree	4	0.67%	3	0.73%	1	0.54%
Neither agree nor disagree	45	7.55%	27	6.59%	18	9.68%
Somewhat agree	183	30.70%	119	29.02%	64	34.41%
Agree to the greatest extent	364	61.07%	261	63.66%	103	55.38%
TOTAL	596, 100%		410, 100%		186, 100%	

CE15. I feel attached to this community and its people.

Disagree to the greatest extent	3	0.50%	2	0.49%	1	0.54%
Somewhat disagree	0	0	0	0	0	0
Neither agree nor disagree	70	11.74%	36	8.78%	34	18.28%
Somewhat agree	193	32.28%	141	34.39%	52	27.96%
Agree to the greatest extent	330	55.37%	231	56.34%	99	53.23%
TOTAL	596, 100%		410, 100%		186, 100%	

CE16. I feel proud to be part of this community.

Disagree to the greatest extent	2	0.34%	1	0.24%	1	0.54%
Somewhat disagree	4	0.67%	2	0.49%	2	1.08%
Neither agree nor disagree	87	14.60%	47	11.46%	40	21.51%
Somewhat agree	169	28.36%	124	30.24%	45	24.19%
Agree to the greatest extent	334	56.04%	236	57.56%	98	52.69%
TOTAL	596, 100%		410, 100%		186, 100%	

CE17. I have the capacity to achieve my future aims.

Disagree to the greatest extent	48	8.05%	36	8.78%	12	6.45%
Somewhat disagree	38	6.38%	22	5.37%	16	8.60%
Neither agree nor disagree	149	25.00%	94	22.93%	55	29.57%
Somewhat agree	202	33.89%	146	35.61%	56	30.11%
Agree to the greatest extent	159	26.68%	112	27.32%	47	25.27%
TOTAL	596, 100%		410, 100%		186, 100%	

CE18. I have the ability to contribute to this community's development.

Disagree to the greatest extent	13	2.18%	10	2.44%	3	1.61%
Somewhat disagree	54	9.06%	32	7.80%	22	11.83%
Neither agree nor disagree	171	28.69%	111	27.07%	60	32.26%
Somewhat agree	261	43.79%	192	46.83%	69	37.10%
Agree to the greatest extent	97	16.28%	65	15.85%	32	17.20%
TOTAL	596, 100%		410, 100%		186, 100%	

CE19. People in this community have the capacity to make positive changes by coming together.

Disagree to the greatest extent	2	0.34%	2	0.49%	0	0
Somewhat disagree	10	1.68%	6	1.46%	4	2.15%
Neither agree nor disagree	119	19.97%	75	18.29%	44	23.66%
Somewhat agree	343	57.55%	236	57.56%	107	57.53%
Agree to the greatest extent	122	20.47%	91	22.20%	31	16.67%
TOTAL	596, 100%		410, 100%		186, 100%	

CE20. This community needs assistance from others outside the community in order to make positive changes.

Disagree to the greatest extent	4	0.67%	2	0.49%	2	1.08%
Somewhat disagree	13	2.18%	8	1.95%	5	2.69%
Neither agree nor disagree	73	12.25%	46	11.22%	27	14.52%
Somewhat agree	265	44.46%	177	43.17%	88	47.31%
Agree to the greatest extent	241	40.44%	177	43.17%	64	34.41%
TOTAL	596, 100%		410, 100%		186, 100%	

CE21. People in this community should work together to develop the community.

Disagree to the greatest extent	1	0.17%	0	0	1	0.54%
Somewhat disagree	6	1.01%	2	0.49%	4	2.15%
Neither agree nor disagree	36	6.04%	30	7.32%	6	3.23%
Somewhat agree	249	41.78%	161	39.27%	88	47.31%
Agree to the greatest extent	304	51.01%	217	52.93%	87	46.77%
TOTAL	596, 100%		410, 100%		186, 100%	

CE22. People in this community can be trusted.

Disagree to the greatest extent	2	0.34%	1	0.24%	1	0.54%
Somewhat disagree	5	0.84%	2	0.49%	3	1.61%
Neither agree nor disagree	153	25.67%	104	25.37%	49	26.34%
Somewhat agree	263	44.13%	179	43.66%	84	45.16%
Agree to the greatest extent	173	29.03%	124	30.24%	49	26.34%
TOTAL	596, 100%		410, 100%		186, 100%	

CE23. The leaders of community-based associations respond to this community's concerns.

Disagree to the greatest extent	6	1.01%	4	0.98%	2	1.08%
Somewhat disagree	6	1.01%	5	1.22%	1	0.54%
Neither agree nor disagree	117	19.63%	77	18.78%	40	21.51%
Somewhat agree	262	43.96%	171	41.71%	91	48.92%
Agree to the greatest extent	205	34.40%	153	37.32%	52	27.96%
TOTAL	596, 100%		410, 100%		186, 100%	

CE24. This community's leaders can be trusted.

Disagree to the greatest extent	7	1.17%	6	1.46%	1	0.54%
Somewhat disagree	15	2.52%	8	1.95%	7	3.76%
Neither agree nor disagree	98	16.44%	68	16.59%	30	16.13%
Somewhat agree	266	44.63%	177	43.17%	89	47.85%
Agree to the greatest extent	210	35.23%	151	36.83	59	31.72%
TOTAL	596, 100%		410, 100%		186, 100%	

CE25. People in this community get to choose their local leaders.

Disagree to the greatest extent	3	0.50%	2	0.49%	1	0.54%
Somewhat disagree	4	0.67%	4	0.98%	0	0
Neither agree nor disagree	52	8.72%	33	8.05%	19	10.22%
Somewhat agree	183	30.70%	137	33.41%	46	24.73%
Agree to the greatest extent	354	59.40%	234	57.07%	120	64.52%
TOTAL	596, 100%		410, 100%		186, 100%	

CE26. In this community, people prioritize their own family's welfare over community development.

Disagree to the greatest extent	0	0	0	0	0	0
Somewhat disagree	7	1.17%	2	0.49%	5	2.69%
Neither agree nor disagree	126	21.14%	74	18.05%	52	27.96%
Somewhat agree	171	28.69%	119	29.02%	52	27.96%
Agree to the greatest extent	292	48.99%	215	52.44%	77	41.40%
TOTAL	596, 100%		410, 100%		186, 100%	

CE27. Most people in this community have similar hopes about the future development of the community.

Disagree to the greatest extent	2	0.34%	1	0.24%	1	0.54%
Somewhat disagree	12	2.01%	7	1.71%	5	2.69%
Neither agree nor disagree	151	25.34%	90	21.95%	61	32.80%
Somewhat agree	307	51.51%	224	54.63%	83	44.62%
Agree to the greatest extent	124	20.81%	88	21.46%	36	19.35%
TOTAL	596, 100%		410, 100%		186, 100%	

CE28. If people in this community saw someone openly defecating, they would do or say something about it.

Disagree to the greatest extent	14	2.35%	9	2.20%	5	2.96%
Somewhat disagree	12	2.01%	7	1.71%	5	2.96%
Neither agree nor disagree	85	14.26%	61	14.88%	24	12.90%
Somewhat agree	220	36.91%	141	34.39%	79	42.47%
Agree to the greatest extent	265	44.46%	192	46.83%	73	39.25%
TOTAL	596, 100%		410, 100%		186, 100%	

CE29. We, as a community, can overcome obstacles that we encounter when working toward a common goal.

Disagree to the greatest extent	4	0.67%	1	0.24%	3	1.61%
Somewhat disagree	9	1.51%	4	0.98%	5	2.69%
Neither agree nor disagree	119	19.97%	72	17.56%	47	25.27%
Somewhat agree	326	54.70%	235	57.32%	91	48.92%
Agree to the greatest extent	138	23.15%	98	23.90%	40	21.51%
TOTAL	596, 100%		410, 100%		186, 100%	

CE30. People in this community are motivated to achieve common development goals, even when those goals seem challenging.

Disagree to the greatest extent	9	1.51%	4	0.98%	5	2.69%
Somewhat disagree	14	2.35%	9	2.20%	5	2.69%
Neither agree nor disagree	107	17.95%	61	14.88%	46	24.73%
Somewhat agree	301	50.50%	228	55.61%	73	39.25%
Agree to the greatest extent	165	27.68%	108	26.34%	57	30.65%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb2. If you suddenly needed a small amount of money [enough to pay for expenses for your household for one week], how many people beyond your immediate household could you turn to who would be willing to provide this money?

No one	77	12.92%	59	14.39%	18	9.68%
One or two people	216	36.24%	157	38.29%	59	31.72%
Three or four people	162	27.18%	111	27.07%	51	27.42%
Five or more people	141	23.66%	83	20.24%	58	31.18%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb4. If you suddenly had to go away for a day or two, could you count on relatives to take care of your children?

Definitely not	55	9.23%	46	11.22%	9	4.84%
Probably not	23	3.86%	18	4.39%	5	2.69%
Uncertain	10	1.68%	6	1.46%	4	2.15%
Probably	80	13.42%	56	13.66%	24	12.90%
Definitely	428	71.81%	284	69.27%	144	77.42%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb5. If you suddenly had to go away for a day or two, could you count on friends to take care of your children?

Definitely not	296	49.66%	214	52.20%	82	44.09%
Probably not	119	19.97%	84	20.49%	35	18.82%
Uncertain	86	14.43%	54	13.17%	32	17.20%
Probably	57	9.56%	31	7.56%	26	13.98%
Definitely	38	6.38	27	6.59%	11	5.91%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb6. If you suddenly had to go away for a day or two, could you count on neighbors to take care of your children?

Definitely not	97	16.28%	79	19.27%	18	9.68%
Probably not	41	6.88%	35	8.54%	6	3.23%
Uncertain	53	8.89%	36	8.78%	17	9.14%
Probably	181	30.37%	118	28.78%	63	33.87%
Definitely	224	37.58%	142	34.63%	82	44.09%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb7. If you suddenly faced a long-term emergency such as the death of family member or a natural disaster like drought, flood, or a fire, how many people beyond your immediate household could you turn to who would be willing to assist you?

No one	121	20.30%	88	21.46%	33	17.74%
One or two people	134	22.48%	87	21.22%	47	25.27%
Three or four people	98	16.44%	65	15.85%	33	17.74%
Five or more people	243	40.77%	170	41.46%	73	39.25%
TOTAL	596, 100%		410, 100%		186, 100%	

Netb8. In the past 6 months, how many people with a personal problem have turned to you for assistance?

No one	361	60.57%	258	62.93%	103	55.38%
One or two people	129	21.64%	75	18.29%	54	29.03%
Three or four people	72	12.08%	51	12.44%	21	11.29%
Five or more people	34	5.70%	26	6.34%	8	4.30%
TOTAL	596, 100%		410, 100%		186, 100%	