Hygiene promotion in Haiti: can we rule out negative effects on handwashing behavior?

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Hygiene promotion in Haiti: Can we rule out negative effects on hand washing behavior?

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Abstract

Unsafe water, poor sanitation, and insufficient hygiene are leading causes for high diarrheal mortality rates in developing countries. In emergency situations, such as after natural disasters, the danger of diarrheal diseases becomes even greater. This was the case in Haiti, which was struck by an earthquake in January 2010. The immense devastation further worsened Haiti's level of sanitation and hygiene leading to a cholera outbreak in October 2010. Handwashing with soap is the most effective prevention against diarrheal diseases, including cholera. Therefore, amongst other emergency relief work, numerous relief organizations conducted hand washing promotions all around the country to improve hand washing practice. In spite of these efforts, the epidemic could hardly be kept at bay until today. In the future, aid could be administered more effectively when we gain deeper understanding about which health promotion strategies work best in changing hygiene behavior. In an evaluative field study on hygiene promotion in Haiti, Contzen and Mosler (in preparation) examined the relationships between different promotion activities, behavioral factors, and hand washing behavior. They found that the experience of the promotion types focus groups, stickers, posters, or paintings, hygiene songs, special hygiene days, and home visits was associated with lower hand washing frequencies. Because the findings by Contzen and Mosler were based on correlative data we cannot assume causality. Self-selection effects or the influence of third variables might be responsible for the negative associations. We used an exploratory approach to analyze in-depth the negative associations regarding three aspects. First, we assessed whether the negative associations could be explained by self-selection effects on the basis of socio-demographic characteristics. Second, we tested whether the participants' attitudes towards the promotions accounted for the negative associations. Persons with a critical attitude towards health promotions might have preferably chosen the mentioned promotion types. Third, we looked at interaction effects with promotion types that were positively associated with hand washing, namely material distributions and radio spots, to check whether the negative associations could be explained by interactions with these promotions. Non-parametric statistical techniques were used because of non-normally distributed data. The results did not point to any self-selection effects based on socio-demographic characteristics. Yet, persons who had a very positive attitude towards the promotions were not affected by any negative influence of the mentioned promotion types. Moreover, material distributions had a mitigating effect, because, among persons who experienced material distributions, most of the mentioned promotion types were not negatively associated with hand washing. All in all, as the negative associations could not be fully explained by self-selection or third variables, a causal negative influence of the respective promotion types on hand washing cannot be ruled out. Our findings highlight the importance of future research to veri-

fy which single or combined promotion strategies are effective, which ones are not or even counter-productive, and by which mechanisms they are so.

Contents

List of abbreviations

DALY	Disability adjusted life year
HWWS	Hand washing with soap
IO	Intermon Oxfam
MSPP	Ministère de la Santé et de la Population
NAPT	Negatively associated promotion type
NGO	Non-governmental organization
OGB	Oxfam Great Britain
OQ	Oxfam Quebec
ORS	Oral rehydration salt
PAHO	Pan American Health Organization
PaP	Port-au-Prince
PAPT	Posititvely associated promotion type
SODIS	Solar water disinfection
UNICEF	United Nations Childrens' Fund
WASH	Water, sanitation, and hygiene
WHO	World Health Organization
WHWS	Washed hands with soap

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1. Introduction

1.1. Water, sanitation, and hygiene, and Haiti's troubling conditions

Unsafe water, poor sanitation, and insufficient hygiene together are the fourth leading risk factor for deaths in low-income countries and the second leading risk factor for disability adjusted life years (DALYs[1]; Mathers, Stevens, & Mascarenhas, 2009). Most notably, these factors increase transmission rates of waterborne diseases, especially diarrhea, from which approximately 1.5 million children die every year. Prüss-Üstün, Bos, Gore, and Bartram (2008) pointed out that the improvement of water supply, sanitarian infrastructure, and simple hygiene measures can prevent a conservatively estimated 6.3% of deaths worldwide. One such apparently easy hygiene practice is hand washing with soap (HWWS) at key times. It can reduce diarrheal morbidity rates in developing countries by up to 48% (Cairncross et al., 2010). Moreover, HWWS has not only repeatedly proven to be an effective way to prevent diarrheal diseases in general (Aiello, Coulborn, Perez, & Larson, 2008) but also to prevent cholera infection specifically (Hutin, Luby, & Paquet, 2003; Dubois, Sinkala, Kalluri, Makasa-Chikoya, & Quick, 2006). Nevertheless, many persons fail to practice HWWS regularly or they do not use soap for hand hygiene (e.g. Coombes & Devine, 2010; Curtis, Danquah, & Aunger, 2009; Scott, Curtis, Rabie, & Garbrah-Aido, 2007).

During emergency situations caused by natural disasters, the danger of diarrheal diseases and epidemics increases tremendously in developing countries. Haiti was ravaged by such a calamity on 12 January 2010. A devastating earthquake of a 7.0 magnitude on the Richter scale destroyed Haiti's capital Port-au-Prince (PaP) and caused around 220,000 fatalities. More than 300,000 persons were injured and about 1.5 million lost their homes (Pan American Health Organization [PAHO], 2011). Haiti had already been the poorest country in the western hemisphere with high infant mortality, little sanitarian infrastructure, and sparse drinking-water supply (World Health Organization [WHO], 2010; WHO/UNICEF, 2010). After the earthquake, the level of sanitation deteriorated even further because a significant part of the infrastructure of PaP and its surroundings had been demolished and thousands of camps for displaced persons were hastily built on the rubble. Millions of persons crowding together with little to no sanitary equipment provided ideal conditions for the spread of diseases (Walton & Ivers, 2011). Thus, it was not surprising when Haiti was struck by a cholera epidemic ten months later that could not be kept at bay until today. Cholera is an extremely dangerous type of acute watery diarrhea. It is communicated by contagious food and water and can lead to death through dehydration within hours (WHO, 2012). What is more, the cholera strain identified in Haiti is among the most dangerous because it spreads even more rapidly, survives longer in the environment, and has higher resistance to antibiotics (Walton & Ivers,

[1]Disability adjusted life years (DALYs): The sum of life years lost due to premature mortality in a population and the years lost due to disability (Mathers et al., 2009).

2011). The ministry of public health and population of Haiti (Ministère de la Santé Publique et de la Population [MSPP], 2012) reported more than seven thousand deaths due to cholera between 19 October 2010 and 15 August 2012, whereas actual mortality rates are likely to be much higher than what the official data suggest (Butenop, 2012). The good news is that rates of incidence have considerably decreased since January 2012, though there has been a modest spike of cholera cases since beginning of the rainy season in May (MSPP, 2012).

Catastrophes as the ones in Haiti call for quick, extensive, and profound help. Hundreds of non-governmental organizations (NGOs), among them several affiliates of the international confederacy Oxfam, have administered humanitarian aid to Haiti's population for decades and have intensified their effort after the tragedies in 2010.

However, the strategies relief organizations use to implement thorough hygiene practice among the population are based on intuition and educational constraints, while they lack scientific foundation (Michie et al., 2005). There is some evidence for the overall effectiveness of hygiene promotion on disease reduction (Curtis & Cairncross, 2003; Feachem, 1984; Fewtrell et al., 2005) as well as for long-term effects on health behavior (Cairncross, Shordt, Zacharia, & Govindan, 2005; Hoque, Juncker, Sack, Ali, & Aziz, 1996). However, these studies investigated the effects of entire programs, which included a variety of different intervention formats. More detailed examinations of the specific effectiveness of discrete intervention strategies are scarce (Fewtrell et al., 2005; Michie et al., 2005). It is unclear which specific or combined strategies work best, which ones work less well, and – equally important – why they do.

Moreover, present evidence about the effectiveness of health promotion stems from promotion activities applied in the development sector. Studies on the effectiveness of health promotion when applied in emergency settings are still lacking. Money, time, and lives could be saved when we had more detailed information about which promotion strategies most effectively change peoples' hygiene behavior and implement this knowledge in the planning of future health campaigns.

1.2. Findings by Contzen and Mosler and goals of the present study

Contzen and Mosler (in preparation) addressed the issues of interest outlined above during a field research on the effectiveness of Oxfam's public hygiene promotion and cholera prevention program in post-earthquake Haiti. Oxfam conducted large-scale WASH interventions in numerous camps and neighborhoods throughout Haiti. Thereby, hygiene interventions included the promotion of HWWS at key times along with other hygiene behaviors, such as latrine usage and water treatment. Oxfam promoters and mobilizers applied various different promotion activities for HWWS promotion (hereafter referred to as "promotion types"; see Appendix A for a comprehensive list).

Contzen and Mosler (in preparation) examined the association between HWWS and the different promotion types applied by Oxfam. More precisely, on the basis of the *RANAS model of behavior change* (Mosler, 2012; see section 2.7), they examined which promotion types were related to which psychological factors which, in turn, were associated to the behavior.

The findings by Contzen and Mosler (in preparation) showed that most of the promotion types realized by Oxfam affiliates were positively associated with the HWWS frequencies of the beneficiaries. Those promotion types with the strongest positive associations with both feces and food related HWWS[2] frequency were radio spots and material distributions (in the following simply referred to as PAPTs: *P*ositively *A*ssociated *P*romotions *T*ypes; see Table 1 for a short description).

However, some of the promotion types were, in fact, negatively related to the desired behavior. More precisely, three out of 16 different promotion types were negatively associated with feces related HWWS and five were negatively associated with food related HWWS (in the following, these promotion types are referred to as NAPTs: *N*egatively *A*ssociated *P*romotions *T*ypes). The promotion types negatively associated with feces related HWWS frequency were focus groups, hygiene songs, and stickers, posters, or paintings. The ones negatively associated with food related HWWS frequency were as above, plus special hygiene days and home visits. A short description of each promotion type and how it was put into practice is given in Table 1.

The findings about negative associations between some promotion types and the target behavior highlight the need for scientific verification of differential effects of hygiene promotion strategies. Also, the negative associations were rather unexpected. They raised many questions and warrant further examination. Hence, the present study and the need to analyze the negative associations in more detail arose from the results by Contzen and Mosler (in preparation). Analyses are based on the same data.

The data were collected at one single time point and no random allocation of persons to different promotion types had been accomplished. Consequently, we must emphasize that no causal conclusions can be drawn from the negative correlations between the NAPTs and the HWWS frequencies found by Contzen and Mosler (in preparation). Moreover, one has to bear in mind that third variables might be accountable for the observed associations. Nevertheless, the encountered negative associations are far from being intelligible. It seems that – if one would tentatively assume causality – some promotion types brought about just the op-

[2]Two different kinds of HWWS were distinguished: Feces related HWWS, concerning HWWS after contact with feces, and food related HWWS, meaning HWWS before contact with food (see section 3.3 for more details). By applying this differentiation, Contzen and Mosler (in preparation) were in line with the practice of other studies on HWWS as a person's customs to wash hands might differ considerably between both sets of key times (Aunger et al., 2010).

posite of what they were supposed to. Thus, the overall aim of the present study was to bring clarity to the nature of the negative associations, that is, to examine whether the respective promotion types were “truly” related to lower HWWS frequencies or whether these associations were attributable to other variables that were likewise negatively associated with HWWS.

In fact, it must be taken into account that the beneficiaries were mostly free to decide whether they wanted to participate in a promotion activity or not. Therefore, based on the assumption that it was primarily a specific subgroup of persons that was attracted by a certain promotion type, any encountered findings would be confounded by what is called the self-selection effect (Gravatter & Forzano, 2009). This means that one cannot be sure whether the HWWS frequencies were actually associated with the characteristics of the promotion type or whether they were rather associated with the specific characteristics of this group of persons. Associations with socio-demographic variables can either indicate such self-selection effects or they can reveal whether the negative associations held true exclusively for persons of a specific region or only for those of a specific Oxfam affiliate, for example. From this came our first two concrete research questions: (1) was the experience of NAPTs associated with any socio-demographic variables? and (2) if so, were the lower HWWS frequencies of NAPT participants a result of the associations with the socio-demographic variables?

Moreover, Contzen and Mosler (in preparation) found that the beneficiaries had a more negative attitude towards the NAPTs than towards other promotion types. On the one hand, the NAPTs might have been indeed less popular among the beneficiaries. On the other hand, it could be assumed that persons, who were rather critical of the promotion activities, were rather critical towards frequent HWWS as well, and that they were the ones, who preferably engaged in the NAPTs. According to that, (3) did NAPT participants have a rather negative attitude towards the promotion activities in general compared to other participants? and (4) if so, were then the lower HWWS frequencies of the NAPT participants due to this rather negative attitude? Furthermore, (5) was there a relationship between the attitude towards the respective NAPTs and the HWWS frequencies among the NAPT participants?

Beyond that, we were interested in whether the participation in PAPTs had a mitigating effect on the relationship between the NAPTs and the HWWS frequencies. Hence, the final research question read: (6) were there interaction effects between the experiences of NAPTs and PAPTs regarding the HWWS frequencies?

Before we address these questions in detail, a brief and non-exhaustive overview on behavior change theories and their validation in empirical evidence is given. Thereafter, we outline the sample characteristics, design, materials, and procedure of the field study, which equates to the study by Contzen and Mosler (in preparation). The statistical methods used

for answering our research questions are explained and results are reported. Subsequently, we discuss the results and some critical aspects of the methods applied. The paper closes with links to findings of related studies and implications for future research.

Table 1

Negatively and Positively Associated Promotion Types

Promotion type	Description
Focus group	Meetings (weekly, monthly, or less often) with about 10-20 residents of a camp or a neighborhood. Main topics: appointment of volunteers for cleaning work, discussion of current issues and problems in the community, e.g. latrine pollution or water supply, assessment of knowledge, attitudes, and behavior of the dwellers, and gaining feedback about promotion activities.
Stickers, posters, paintings	Stickers, flyers, and pamphlets distributed during promotion activities and posters, banners, charts, and paintings installed at public places, e.g. next to public latrines, water sources, and hand washing stations. Main purposes: reminders of hygiene behavior and education, e.g. illustrations of how to wash hands with soap properly, how to use oral rehydration salts (ORS), or how to disinfect water (see Appendix B for examples of stickers, posters, and paintings).
Hygiene song	All kinds of songs about cholera, diarrhea, hand washing, and hygiene. Sang at practically all promotions activities, as well as in schools and kindergartens and distributed via megaphones and the radio. Some provided by health promotion staff, others written by persons of the camp or the neighborhood.
Special hygiene day	Special events similar to fairs with many different activities revolving around hygiene topics, e.g. quiz games, painting contests, theaters, and dances. Took place around one to three times per community. Some addressed a specific population, e.g. the “women’s day”, or concentrated on specific hygiene topics, e.g. the “day of water” or the “global hand washing day”.

Table 1 continues

Table 1 continued

Promotion type	Description
Home visit	Face-to-face promotion by Oxfam mobilizers equipped with education material, e.g. picture cards or pamphlets. Mainly held in a participatory educational format. Primarily addressed to head of household. Sometimes accompanied by distribution of flyers, chlorine, ORS, soap, etc. Goals: Hygiene education, clarifying (remaining) questions. Side effect: obtaining information about current problems in the community.
Radio spot	First-step channel to reach as many persons as quickly as possible. Educational advertising about hygiene behavior and cholera prevention.
Material distribution	Mass distributions of equipment, e.g. soaps, portable hand washing stations, buckets, water filters, chlorine, and ORS to a target group. Combined with explanations and demonstrations of how to use the materials correctly.

2. Theory and research on behavior change and hygiene promotion

A number of theories have tried to explain why people behave the way they do and to clarify the mechanisms of behavioral change. In what follows, we briefly review some frequently applied theories that are relevant for the realm of health behavior and we present a recent comprehensive model of health behavior change in developing countries by Mosler (2012).

2.1. The health belief model

One of the earliest theories that addressed health behavior in depth is the *health belief model* by Rosenstock (1966). Yet, the model has not become less important as its assumptions are widely accepted among researches on health behavior change even today. As a major contribution, Rosenstock emphasized the importance of considering a person's subjective perceptions and convictions rather than regarding objective situational circumstances alone when trying to explain health behavior. More concretely, he stated that prior to other conditions for engaging in a health behavior, a general motivation has to exist, that is, the individual has to show a certain concern about a particular health issue. Given that the health issue is salient to the individual, preventive behavior can basically be explained by four dimensions: (1) *perceived susceptibility*, that is, a person's feeling of vulnerability to a certain

disease; (2) *perceived severity*, that is, a person's evaluation of the disease as sufficiently serious; (3) *perceived benefits*, that is, a person's rating of the preventive behavior as effective in preventing the disease; and (4) *perceived barriers*, meaning the subjective costs of engaging in the health action, which should not override the benefits (Rosenstock, 1966). Additionally, internal or external stimuli, so called cues to action, are required for a person to actually initiate the behavior.

Later, under the influence of the *social learning theory* of Bandura (1977; see section 2.4), the model was extended by the concept of *self-efficacy* as a further dimension (Rosenstock, Strecher, & Becker, 1988). To date, the health belief model has proven its applicability in the explanation and prediction of health behavior in a variety of different contexts, such as dietary behavior (Deshpande, Basil, & Basil, 2009), osteoporosis prevention (Hazavehei, Taghdisi, & Saisi, 2007) and contraception (Brown, Ottney, & Nguyen, 2010), to name but a few.

2.2. The protection motivation theory

The *protection motivation theory* was originally developed to comprehend the effects of fear-arousing communication on attitude change (Rogers, 1975). It was later expanded to more general contexts of persuasive communications (Rogers, 1983; as cited in Boer & Seydel, 1996). Most notably, the theory puts emphasis on cognitive processes that act as mediators between environmental components of fear arousal on the one side and behavioral change on the other side (Rogers, 1975). After the original theory had been submitted to a number of modifications (Maddux & Rogers, 1983; Tanner, Hunt, & Eppright, 1991), Boer and Seydel (1996) explained the model as follows. Protection motivation basically depends on two different appraisal processes, that is, two mediating cognitive processes that will result in either maladaptive or adaptive responses to a given health threat: *Threat appraisal*, meaning the assessment of the health risks that are accompanied by a behavior, and *coping appraisal*, that is, the evaluation of one's capacity to master a health threat. Maladaptive behaviors are coping strategies that reduce fear without decreasing the actual health threat (Rippetoe & Rogers, 1987). The threat appraisal arises from the cognitive evaluation of the *perceived severity* of a threat and from the evaluation of the *vulnerability* to it. Yet, both have to be contrasted with the advantages of the maladaptive behavior. The coping appraisal results from the assessment of *response efficacy*, meaning the expectancy that an adaptive behavior is effective in reducing or eliminating the threatening stimulus, as well as from the assessment of *self-efficacy*, that is, the expectancy that one is capable in performing successfully the adaptive behavior (Bandura, 1997). Both, in turn, have to be balanced against the costs of the adaptive behavior. All in all, if both threat appraisal and coping appraisal are high, the protection motivation against a health threat is supposed to be high, too, and the

likelihood to engage in a health behavior increases. Protection motivation thereby is, in itself, an intermediate variable that activates, maintains, and directs the health behavior (Boer & Seydel, 1996).

Because of the complexity of the model, empirical evidence exists for single variables instead of for the theory as a whole (Schwarzer, 2004). For a meta-analysis, see Floyd, Prentice-Dunn, and Rogers (2000). In low-income countries, the model was mainly used in the context of HIV prevention. For example, Boer and Mashamba (2005) demonstrated the importance of response efficacy regarding condom use intention among adolescents in South Africa. Moreover, HIV-prevention programs that were based on the protection motivation theory were conducted in Vietnam (Kaljee et al., 2005) and the Bahamas (Gong et al., 2009).

2.3. The theory of reasoned action and the theory of planned behavior

The *theory of reasoned action* by Ajzen and Fishbein (1980) postulates two central factors in the explanation of behavior: the *subjective norm*, that is, a person's perception of what important others might think one should do, and the *attitude towards a behavior*. Ajzen and Fishbein (1980) developed the theory in order to comprehend an apparent attitude-behavior gap claimed by social scientists of that time (Manstead, 2011). They emphasized that the two postulated behavioral determinants firstly create a person's intention to act, and that, under regular circumstances, the behavioral intention is closely related to the realization of the behavior itself. Moreover, Ajzen and Fishbein's major contribution to the understanding of human behavior was the notion that most if not all behaviors are embedded in a social environment and that social influences therefore are essential when attempting to explain behavior. Thus, the subjective norm has to be considered alongside with the attitude towards a behavior. Also, as its name implies, the theory is built on the assumption that people base their behavioral decisions on rational reflections (Fishbein, 1980).

The theory of reasoned action is mainly restricted to behaviors that are under volitional control, though (Ajzen, 1985). However, external or internal factors hindering a person from engaging in a behavior might exist. For that reason, Ajzen (1985) later added *perceived behavioral control* as a third factor to the theory, which influences the behavior both directly and indirectly via the behavioral intention. The extended model was renamed to the *theory of planned behavior*. Perceived behavioral control, in turn, is closely related to Bandura's concept of self-efficacy (Ajzen, 1985, 1991).

The theory of planned behavior has been of great relevance in social psychology research and could prove its applicability in the prediction of a variety of health behaviors (for a meta-analysis see McEachan, Conner, Taylor, & Lawton, 2011). Yet, regarding HWWS, the theory has primarily been tested among health care workers (e.g. Alp et al., 2011; O'Boyle,

Henly, & Larson, 2001) or among populations in high-income countries (e.g. Miller, Yardley, & Little, 2012; Shapiro, Porticella, Jiang, & Gravani, 2010).

2.4. The social cognitive theory

Bandura's already mentioned concept of self-efficacy also plays an important role in his influential *social cognitive theory*, a revised version of the originally named *social learning theory* (Bandura, 1977, 1986). According to the social cognitive theory, behavior has to be considered as one part of a reciprocal causation model in which personal factors, environmental factors, and behavior are all continuously interacting (Bandura, 1986). One core assumption of Bandura's theory is that individuals do not learn only from their own experiences but also from the observation of how other persons behave and which consequences follow to their behaviors.

Bandura (2004) also addressed in detail the role of social-cognitive factors regarding health behavior. Among the central factors influencing health behavior is firstly a person's *knowledge* about health risks and available preventive measures, which is a precondition for further processes. Moreover, the belief of *personal efficacy* to initiate and successfully preserve a health behavior influences the behavior both directly and indirectly via motivations, goals, and other behavior-determining factors. Among the latter rank *outcome expectancies* that include beliefs about physical consequences of a behavior as well as beliefs about the reactions of the social environment. Finally, health behavior depends on perceived *facilitators* and *impediments* that can be either personal obstacles or socio-structural conditions. In comparison to the theories presented above, the social cognitive theory is of a more general nature, but it stresses the role of social factors and the fundamental effects of perceived self-efficacy (Bandura, 2004). Self-efficacy beliefs have repeatedly proved to be a crucial factor in various health-related behaviors, although research that focuses on self-efficacy concerning hand hygiene in particular, is less frequent (e.g. AbuSabha & Achterberg, 1997; Holden, 1991; Strecher, DeVellis, Becker, & Rosenstock, 1986).

2.5. The transtheoretical model of change

A frequently applied theory that distinguishes between different temporal stages of behavior change is the *transtheoretical model of change* (Prochaska & DiClemente, 1983). It was originally developed for the study of smoking cessation but has later been adapted to a variety of different health behaviors (Prochaska & Velicer, 1997). The model posits that behavior change is an ongoing process that can be partitioned into five *stages of change*: precontemplation, contemplation, preparation, action, and maintenance. In addition, ten *processes of change* are formulated that help individuals to proceed from one stage to another.

For example, among them are consciousness raising, self-reevaluation, helping relationships, and reinforcement management. A *decisional balance* between pros and cons of the behavior change and *self-efficacy beliefs* are further concepts of the theory. The transtheoretical model has been validated regarding numerous different health behaviors. For example, it is has been abundantly used as a guideline for exercise interventions (Hutchison, Breckon, & Johnston, 2009; Spencer, Adams, Malone, Roy, & Yost, 2006) and for understanding dietary behavior change (Di Noia & Prochaska, 2010). Moreover, it was successfully utilized for identifying user groups of different stages of change regarding solar water disinfection (SODIS) in Zimbabwe (Kraemer & Mosler, 2010a).

2.6. The health action process approach

Similarly, the *health action process approach* considers behavior change as a progress between distinct phases (Schwarzer, 1999). Other than the transtheoretical model, however, the stages of change are not distinguished on a temporal dimension, but rather between different phases of a self-regulatory process within the individual. According to this theory, health behavior change occurs along two distinct phases. Firstly, the intention to perform a behavior is formed during a *motivational phase*. In this phase, *outcome expectancies* and *risk perceptions* influence the creation of an intention. Secondly, the *volitional phase* follows, which fills the often neglected gap between the behavioral intention and the active initiation and maintenance of a behavior. In the volitional phase, *action planning* and *coping planning* mediate the transition from intention to action. Perceived self-efficacy plays an important role in each phase, too, with varying functions, though. Depending on the phase, either *action*, *maintenance*, or *recovery self-efficacy* is of relevance (Schwarzer, 2008). During the first phase of the behavior change process, action self-efficacy helps persons to develop the motivation to initiate a new behavior. In the volitional phase, maintenance self-efficacy is instrumental, as it refers to beliefs about being able to tackle barriers which might complicate the preservation of the behavior. Also recovery self-efficacy is essential in this phase because it reflects the confidence to revert to the favorable behavior after a setback or failure. The model has shown to be useful in predicting a range of different health behaviors (Schwarzer, 2008).

2.7. The RANAS model of behavior change

It was shown that plenty of well-established theories about health behavior exist. Yet, application of theories is sparse in health behavior research. A review by Painter, Borba, Hynes, Mays, and Glanz (2008) revealed that only a third of published health behavior studies made use of theories and even fewer strictly adhered to and actually tested the concepts

of the models used. Moreover, among the studies using health behavior theory, intervention studies made up only a small proportion (Noar & Zimmerman, 2005). Although there is a broad consensus that public health promotion interventions are most effective if they are grounded on behavioral theories (Craig et al., 2008; Glanz & Bishop, 2010), an often criticized gap between theory and practice still exists (e.g. Kok, Schaalma, Ruiter, Van Empelen, & Brug, 2004; Michie et al., 2005). This might not least be due to the fact that most theories are confined to describe determinants that predict behavior while omitting to translate their assumptions into guidelines for health promotion interventions (Bandura, 2004; Glanz & Bishop, 2010). It was further pointed out that even available evidence-based intervention approaches are too rarely implemented in public health campaigns (Brownson, Fielding, & Maylahn, 2009; Kerner, Rimer, & Emmons, 2005).

Aside from that, the theories presented above have been mostly validated among middle class populations of western high-income countries (McMichael, Waters, & Volmink, 2005). McMichael et al. also alerted that health issues, which are particularly of relevance in developing countries – such as sanitation and hygiene – are clearly underrepresented in current public health research. In contrast, those researchers that have addressed hygiene behavior in developing countries point out that existing health behavior theories lack factors that are relevant in this context, such as emotional, habitual, and cultural issues (e.g. Curtis et al., 2009; Scott et al., 2007), or that they are insufficient for describing hand washing behavior (Coombes & Devine, 2010).

Mosler (2012) presented an evidence- and theory-based conceptual model along with a guideline for behavior change interventions in low-income countries. Hence, the model takes the aforementioned considerations into account. It was primarily developed for interventions in the water and sanitation sector, but the model can be adapted straightforwardly for applications in other domains. According to Mosler's behavior change model, behavior depends basically on five blocks of factors, which have been derived from established health behavior theories and empirical evidence: *Risk*, *attitudinal, normative*, *ability*, and *self-regulation factors* (RANAS). In addition to the five factors blocks, Mosler presented corresponding intervention techniques.

The general factor blocks comprise various more specific behavioral factors. Risk factors include *perceived vulnerability and severity* of a health threat, which can be found in the health belief model, the protection motivation theory, and the health action process approach (see sections 2.1, 2.2, and 2.6). Besides, at least some *factual knowledge* about a given health threat must be present to elicit risk perceptions, which has been stated in the social cognitive theory, among others (see section 2.4; see also Albarracín et al., 2005). Risk perceptions can be increased by providing information about health threats, their incidence and

probability of occurrence. For recent intervention studies see Bassett and Ginis (2011) and Steckelberg, Hülfenhaus, Haastert, and Mühlhauser (2011).

Attitudinal factors refer to the individual's evaluation of a behavior as positive or negative. They can be divided into *instrumental beliefs*, that is, the beliefs about the costs that have to be invested in a behavior, and *affective beliefs*, which refer to the emotions that accompany a behavior (Mosler, 2012). Attitudinal factors are, in one form or another, part of any theory presented above. While instrumental beliefs can be equated with outcome expectancies stated in most theories, affective beliefs have rarely been mentioned explicitly. Interventions suggested to influence attitudinal factors are persuasive arguments and peripheral cues with regard to the two routes of persuasion of the elaboration likelihood model (Petty & Cacioppo, 1986; see also Kraemer & Mosler, 2010b).

Furthermore, norm factors are stated explicitly in the theory of planned behavior, the social cognitive theory, and the transtheoretical model (see sections 2.3 – 2.5). Norm factors include *descriptive*, *injunctive*, and *personal norms*. Descriptive norms are perceptions of what other persons most usually do, and injunctive norms concern the beliefs about what others think one should do (Cialdini et al., 2006). Personal norms, in turn, refer to the expectations that one has of oneself (Schwartz, 1977). Consequently, the differential types of norms can be addressed separately through normative interventions, such as encouraging public commitments to a behavior to strengthen descriptive norms or pointing out favorable injunctive norms (Cialdini et al., 2006; Mosler, 2012; for a review and intervention studies see Curtis et al., 2009; DeBar et al., 2011; Nyer & Dellande, 2010).

Besides, ability factors have to be taken into account. On the one hand, they include *action knowledge*, that is, basic knowledge about which activities are effective in health prevention (Frick, Kaiser, & Wilson, 2004). On the other hand, *self-efficacy* beliefs are fundamental for a person to take action (see section 2.4). In addition to Bandura's (1997) concept of personal efficacy, *maintenance self-efficacy* and *recovery self-efficacy*, which have been formulated by Schwarzer (2008; see section 2.6), foster sustainable health behavior. Ability factors can be strengthened by providing materials, other kinds of support, and teaching particular skills and coping plans to handle problems and recover from setbacks (Molser, 2012).

Finally, self-regulation or self-management factors have to be considered. Just as the health action process approach regards behavior change as a self-regulatory process (Schwarzer, 1999; 2008), these factors are relevant for the implementation and maintenance of a behavior in the face of upcoming obstacles (Gollwitzer & Sheeran, 2006). Also Bandura (2004) emphasized the role of self-management skills regarding health behavior. Mosler (2012) ranks *action control* and *planning*, *coping planning*, *remembering*, and *commitment* among the self-regulation factors. Whereas planning occurs before the initiation of a behavior, action control is performed all along a behavior is carried out by evaluating it with refer-

ence to a behavioral standard (Schwarzer, 2008). Furthermore, a behavior will not be performed unless the person remembers it and is committed to it (Tobias, 2009). Interventions suggested to foster self-regulation factors are, for example, stimulus control, daily routine planning, contingency management, and prompts (Mosler, 2012; Tobias, 2009; for intervention studies see Schüz, Wiedemann, Mallach, & Scholz, 2009; Suresh, Jones, Newton, & Asimakopoulou, 2012).

The behavioral factors postulated in the RANAS model have been validated by several studies in the prediction of safe water consumption and SODIS in various developing countries (Graf, Meierhofer, Wegelin, & Mosler, 2008; Heri & Mosler, 2008; Kraemer & Mosler, 2010b; Mosler, Blöchinger & Inauen, 2010). Moreover, the model has been applied in the study by Contzen and Mosler (in preparation) to explain the relationship between different promotion types and HWWS in Haiti. Hence, having made a short detour on health behavior theory and research, we return to the focus of the present paper by describing the methodology of our study in the following sections.

3. Method

3.1. Data collection sites and sample

Data were collected at 20 sites, including camps and neighborhoods. The sites were located in urban and peri-urban regions of PaP and in rural regions of the areas Leogane, Gressier, Petit Goave, and Grand Goave, all of which were situated in the department Ouest in Haiti. In each of the sites, one of three Oxfam affiliates conducted hygiene promotion and cholera prevention. The Oxfam affiliates were Oxfam Great Britain (OGB), Oxfam Quebec (OQ), and Intermon Oxfam (IO). Promotion activities continued or had already been completed during data collection. With regard to achieving approximately equal numbers of sites per type of site (camp, neighborhood), region type (urban, peri-urban, rural), and affiliate (OGB, OQ, IO), the sites were randomly selected from all of the sites in the department Ouest in which Oxfam has conducted public health promotion and cholera prevention.

The households were selected by the random route method (Hoffmeyer-Zlotnik, 2003). Thereby, every third household in a given street was selected and the person that was responsible for preparing food and childcare was interviewed. If the respective person was not at home or not willing to participate, the interviewer continued three households further. Altogether, 811 persons were interviewed.

3.2. Data collection design

We conducted a cross-sectional field survey in May and June 2011. Although a greater ecological validity is a clear advantage of research in natural settings compared to experi-

ments in psychological laboratories (Visser, Krosnick, & Lavrakas, 2000), one loses the possibility to manipulate single variables in a controlled setting where the impact of confounding variables can be reduced (Coolican, 1999). Instead, in a cross-sectional design, the data is correlational. This means that one examines whether associations between certain features can be determined and how strong these associations were, but no clear differentiation between dependent and independent variables is made (Coolican, 1999). Notably, in cross-sectional surveys as ours, no causal inferences about the directions of the associations can be drawn and noise by confounding variables is inevitable.

3.3. Materials, procedure, and measures

For accomplishment of the interviews, we recruited a team of nine local, experienced interviewers (5 women, 4 men) and trained them in interview techniques and the application of our questionnaire. In addition, each interviewer conducted two trial interviews under supervision in the field. One interview lasted about 40 to 60 minutes.

The interviews were performed in a structured format. We prepared an English version of the questionnaire which was translated into local Creole language and back-translated to English. See Appendix C for the English version of the questionnaire. Translations of delicate terms, such as defecation, were agreed on with local staff to ensure acceptance among the interviewees. After a pretest in the field, the questionnaire was further adapted for better acceptance and comprehension.

The variables measured in the questionnaire comprised socio-demographic characteristics, HWWS frequency, experience of promotion types, and attitude towards the promotion types. Among the socio-demographic variables were age, gender, type of the Oxfam affiliate, area in the department Ouest of Haiti, quarter in PaP, region type, type of the site, literacy, having children under the age of 12, having babies, occupation, educational level, religion, and voodoo practice.

HWWS frequency was assessed by the question: “In general, how often do you wash your hands with soap at the following times?” followed by asking about hand washing for each key juncture separately. Answers were given on a 5-point likert scale from 0 = *almost never* to 4 = *almost always*. We subsumed the interviewees’ answers for three feces related key times – after defecation, after wiping a child`s bottom, and after other kinds of contact with feces – into one variable of “mean feces related HWWS frequency” (in the following simply referred to as “feces related HWWS frequency”). Likewise, the variable “mean food related HWWS frequency” (in the following referred to as “food related HWWS frequency”) was generated by the average HWWS frequency at four food related key times: Before eating, before feeding a child, before cooking, cutting, or preparing food, and before handling drinking water.

We asked the experience of promotion types as follows: “Since the earthquake, have you gained information about hygiene, handwashing, cholera, or diarrhea from the following sources?” and subsequently named each promotion type one after another. Knowing a promotion song was asked slightly different by the question: “Do you know a song about handwashing, hygiene, cholera, or diarrhea?” See Appendix A for all collected promotion types and numbers of persons who experienced them.

When an interviewee reported to have experienced a promotion type his/her attitude towards it was assessed by the question: “Did you like it?” Answers were given on a 5-point likert scale from 0 = *not at all* to 4 = *very much*. The attitude towards the song was not assessed. We generated the variable “average attitude towards the promotions” by the mean of the interviewees’ attitudes towards each experienced promotion type.

Finally, the questionnaire included items on the behavioral factors of the RANAS model (see section 2.7). As the RANAS factors were not part of the analyses of the present study, these items are not specified here.

3.4. Statistics

Data analysis was carried out using the statistical package SPSS 19. Our data did not meet the assumptions of parametric statistical methods (see Appendix D). Hence, we used nonparametric techniques only. Two-tailed significance levels were considered throughout the analysis because of the exploratory approach of the study. As the likelihood of type I errors – the likelihood of falsely detecting an effect when, actually, there is none – increases when performing multiple tests on a variable, Bonferroni adjustments of the significance level were undertaken where necessary (Bland & Altman, 1995). Thereby, the $p < .05$ level for statistical significance was divided by the number of tests performed on the respective variable.

To address question (1) whether NAPT participation was associated with any sociodemographic variables, we used Pearson chi-square tests for discrete variables and Mann-Whitney tests for the continuous variable “age”. The Pearson chi-square test of independence (Fisher, 1922; Pearson, 1900) is an apparently simple method to assess the relationship between two categorical variables. It tests whether the observed frequencies in the cells of a contingency table coincide with the expected frequencies, meaning the frequencies that would be expected if there were no relationship between the variables (Howell, 2002). If there is a significant difference between the observed cell frequencies and the expected ones, it can be assumed that the variables are not independent from each other. The chi-square test does not make any assumptions about population distributions (Howell, 2002). Only two requirements have to be met before computing a chi-square test (Marascuilo & Busk, 1987): First, measurements have to be independent from each other. Second, not

more than 20% of the cells in a contingency table should have expected frequencies that are less than five and no expected cell frequency should be below one. If the second assumption was violated in one of the present analyses, either data of two or more categories of the respective variable were collapsed in a sensible manner, or persons of the categories with the lowest marginal frequencies were excluded from the analysis. To express direction and intensity of significant associations, odds ratios are reported for 2 x 2 contingency tables. Odds ratios are not affected by sample size or unequal marginal frequencies, which makes them a valuable effect size (Howell, 2002). In addition, for the sake of better comprehension of the nature of the associations, the respective highest standardized residuals of the contingency tables are reported, as these residuals demonstrate the cells with the highest differences between observed and expected frequencies. However, only standardized residuals higher than 1.96 are reported, because these indicate a relevant deviation from the expected frequency (Field, 2009).

Mann-Whitney tests are the nonparametric equivalents to independent t-tests (Siegel & Castellan, 1988). The calculations of Mann-Whitney tests are not based on the raw data but on the ranked positions of the data. In this way, Mann-Whitney tests do not assume normally distributed data or homogeneity of variances (Field, 2009). The basic procedure of Mann-Whitney tests is as follows: First, the scores of the total sample are given ranks from the lowest to the highest, that is, the lowest score gets rank 1, the second lowest score gets rank 2, etc. Assuming that the two groups differ from each other, the lowest ranks will be predominantly in one group, the highest ranks mainly in the other, and the sums of ranks will differ significantly between the two groups. Thus, the Mann-Whitney test looks at differences in the sum of ranks between the two groups (Field, 2009).

Question (2) whether the lower HWWS frequencies of NAPT participants were due to any associations found with socio-demographic characteristics was answered in two steps. First, considering only the socio-demographic variables found to be relevant, we compared the HWWS frequencies of participants of different levels of the socio-demographic characteristics via Mann-Whitney and Kruskal-Wallis tests and, in a second step, only those variables were assessed, that were found to be significantly associated with the HWWS frequencies. Mann-Whitney tests were applied for variables with two categories and Kruskal-Wallis tests for variables with more than two categories. Kruskal-Wallis tests are the nonparametric counterparts to analyses of variance and, similar to Mann-Whitney tests, they perform calculations on the ranks of the raw data (Siegel & Castellan, 1988). Consequently, Kruskal-Wallis tests do not assume normally distributed data or homogeneity of variances. A significant result of the Kruskal-Wallis test indicates that there is a difference in the sum of ranks between the groups, but it does not show precisely which groups differ from each other. Therefore, in case a Kruskal-Wallis test yielded a significant result, we conducted additional post-hoc

Mann-Whitney tests considering adjusted *p*-values to find out which specific categories significantly differed in HWWS frequency (Field, 2009).

Secondly, to decide, whether reduced HWWS frequencies were due to the influence of the respective socio-demographic variable or due to NAPT participation, that is, to assess whether the differences in HWWS frequency could be explained by self-selection effects, we had to capture each association and the interaction between them in one single model. By transformation of continuous variables into discrete ones, loglinear analyses can be used as a nonparametric technique to test higher-order interactions even for variables that do not meet distributional assumptions (Tabachnick & Fidell, 2007). To do so, we transformed the continuous variables "feces related HWWS" and "food related HWWS" into dichotomous ones and performed exploratory hierarchical NAPT x Socio-demographic variable x dichotomous HWWS loglinear analyses. This method of data reduction has already been applied in several studies on survey data (e.g. Ahrens, Campbell, Ternier-Thames, Wasco, & Sefl, 2007; Fairclough, Boddy, Hackett, & Stratton, 2009). Similar to chi-square tests, loglinear analyses examine patterns of differences between observed and expected cell frequencies, but they perform computations on the natural logarithms of the cell frequencies (Green, 1988). The loglinear analysis is a model testing technique, that is, it aims to find the most parsimonious model that still fits the data reasonably well. In a hierarchical fashion, the highest-order interaction is tested first, if it is not significant it is removed from the model and the next highest-order interactions are tested. An interaction is deemed to be significant if its deletion from the model would make a significant difference to the fit of the model, that is, the deletion of the interaction would lead to a model which would not fit the data well (Tabachnik & Fidell, 2007). SPSS stops the computations at the smallest model that still retains the significant interaction or interactions. This model is called the final model. Contrary to other common statistic tests, results of loglinear analyses are supposed to be non-significant. More precisely, the likelihood ratio of the final model is supposed to be non-significant, because a significant likelihood ratio would indicate that the model does not explain the data pattern well, meaning that the frequencies expected by this model significantly differ from the observed frequencies. Accordingly, only if the highest-order interaction is significant, the saturated model remains the final model. The saturated model is the model that retains all effects and always fits the data perfectly, as shown by a likelihood ratio of $\chi^2(0) = 0.00$ and a significance value of $p = 1.00$ (Marascuilo & Busk, 1987; Green, 1988).

When a three-way interaction turns out to be significant, lower-order interactions are not of concern anymore, because they are said to be confounded with the higher-order interaction (Marascuilo & Busk, 1987). In this case, in order to interpret the interaction, we subsequently performed chi-square tests for different levels of the respective socio-demographic variable (Field, 2009). Thereby, we were able to examine whether the association between

the respective NAPT experience and the HWWS frequency were more or less strong at certain levels of the respective socio-demographic variable or emerged exclusively at certain levels.

To answer question (3) whether NAPT participants, compared to other participants, had a rather negative attitude towards the promotion activities in general, again, Mann-Whitney tests were performed. Where significant results appeared, question (4) whether the lower HWWS frequencies of the NAPT participants were due to this rather negative attitude, a two-step analysis was performed analogously to the way question (2) was approached. Again, the variable for attitude was collapsed into a dichotomous one for this purpose.

To assess question (5) whether there was a relationship between the HWWS frequencies and the attitude towards the particular NAPTs among the NAPT participants, Pearson-chi-square tests were again the method of choice. However, this time, the attitude variables could not be transformed into dichotomous ones because of their sharply pointed distributional shape (see Appendix E). Therefore, the five-leveled variables were treated as categorical ones and the contingency tables were interpreted appropriately.

Question (6) whether there were interactions between the associations of NAPTs and PAPTs regarding the HWWS frequencies was once more answered using hierarchical log-linear analyses.

In the following sections, results on socio-demographic characteristics of the sample and HWWS frequencies are presented first, followed by the results concerning each research question in sequence. The research questions are assessed regarding feces and food related HWWS frequency and the NAPTs focus group, stickers, posters, or paintings, and hygiene song. Moreover, regarding food related HWWS frequency, two additional NAPTs had to be taken into account, namely special hygiene day and home visit.

4. Results

4.1. Socio-demographic characteristics and HWWS

The age of the interviewees ranged between 15 and 90 years, with a mean age of M = 34.68 years (SD = 12.90). The majority of the respondents were female (87.9%) and 12.1% were male. Females were overrepresented in the sample as it was mainly women who were the primary caretakers in the households. Slightly more than one third of the participants (35.9%) belonged to sites in which the Oxfam affiliate OGB conducted public health promotion, 27.7% belonged to sites where OQ conducted promotion activities, and 36.4% lived in sites in which IO did public health promotion. More participants lived in camps (55.0%) than in neighborhoods (45.0%). In most of the households lived children under the age of 12 (62.9%). Notably, almost one third of the interviewees were unemployed (32.6%) and only

3.7% were in formal employment. The educational level in the sample varied, too, as 23.8% did not attend school at all, 24.2% attended primary school but left without a certificate, 10.7% finished primary school, 29.1% left secondary school without a certificate, and only 7.7% graduated from secondary school. About half of the interviewees were Protestants (49.3%), 38.2% were Catholics, 3.9% belonged to another religion, and the remaining 9.5% had no religious affiliation. Only 9.9% of the participants confirmed practicing voodoo, while 88.7% said they did not practice voodoo. The percentage of persons practicing voodoo was lower in our sample than official numbers suggest: The Central Intelligence Agency (2012) noted that about half of the Haitian population practices voodoo.

For a detailed list of socio-demographic characteristics and percentages and numbers of persons per level see Table 2.

Table 2

Socio-Demographic Variables With Percentages and Numbers of Persons per Level

Variable	Levels	Percentage	*n*
Gender	Male	12.1%	98
	Female	87.0%	713
Affiliate	OGB	35.9%	291
	OQ	27.7%	225
	IO	36.4%	295
Area	PaP	65.1%	528
	Leogane	13.3%	108
	Gressier	4.7%	38
	Grand Goave	5.4%	44
	Petit Goave	11.5%	93
Quarter in PaP[a]	Delmas	38.3%	202
	Carrefour	6.1%	32
	Croix-de Bouquets	14.2%	75
	Carrefour Feuille	25.4%	134
	Centre Ville	8.0%	42
	Martissant	8.1%	43
Region type	Urban	35.3%	288
	Peri-urban	29.6%	240
	Rural	34.9%	283
Type of site	Camp	55.0%	446
	Neighborhood	45.0%	365

Table 2 continues

Table 2 continued

Variable	Levels	Percentage	*n*
Literacy	Can neither read nor write	33.4%	271
	Can read only	2.0%	16
	Can write only	2.2%	18
	Can both read and write	60.7%	492
Children under 12[b]	No	36.6%	297
	Yes	62.9%	510
Babies[c]	No	66.1%	536
	Yes	32.3%	262
Occupation	Unemployed	32.6%	264
	Housewife/man	18.0%	146
	Agriculture	1.6%	13
	Informal employment	22.9%	186
	Formal employment	3.7%	30
	Independent work	11.8%	96
	Studies	7.3%	59
	Retired	0.4%	3
Education	No school attendance at all	23.8%	193
	Kindergarten	0.7%	6
	Primary school - not finished	24.2%	196
	Primary school - certificate	10.7%	87
	Secondary school - not finished	29.1%	236
	Secondary school - reto[d]	5.1%	41
	Secondary school - filo[e]	2.6%	21
	Professional school	1.0%	8
	University	1.7%	14
Religion	Roman catholic	38.25	310
	Protestant	49.3%	400
	Other	3.0%	24
	None	9.5%	77
Voodoo	No	88.7%	719
	Yes	9.9%	80

Note. N = 811.

[a]Here, valid percentages are given, that is, the percentages of participants who lived in PaP (*n* = 528). [b]The variable "children under 12" indicates whether children under 12 years of age were living in the interviewee's household. [c]The variable "babies" indicates whether babies were living in the interviewee's household. [d]Reto is the first certificate level of secondary school in Haiti (ten school years). [e]Filo is the second certificate level of secondary school in Haiti (eleven school years).

Both feces and food related HWWS frequencies reported by the participants were quite high, though the former was slightly higher than the latter (M = 3.57, SD = 0.56, and M = 3.05, SD = 0.82, respectively; see Appendix D for distributional characteristics of both feces and food related HWWS frequency).

In the following analyses concerning questions (1) whether NAPT participation was associated with any socio-demographic characteristics, and question (2) if so, whether the lower HWWS frequencies of NAPT participants could be traced back to these relationships, associations with the 13 categorical socio-demographic variables presented in Table 2 and with the beneficiaries' age were tested.

4.2. Socio-demographic characteristics, NAPTs, and HWWS

4.2.1. Socio-demographic characteristics, focus group, and HWWS

4.2.1.1. Socio-demographic characteristics, focus group, and feces related HWWS

From a total sample of N = 811 participants, 40.1% (n = 325) participated in one or several focus groups, 59.6% (n = 483) did not participate in any focus group, and 0.4% (n = 3) indicated they did not remember. Data from the latter were regarded as missing (likewise for all following analyses). To answer question (1), Pearson chi-square tests were performed to detect associations between focus group participation and the 13 categorical variables presented in Table 2 and a Mann-Whitney test was used to compare the focus group participants' age with that of non-participants. Results were considered significant at an adjusted level of $p < .0036$. To answer research question (2) in case of significant associations with socio-demographic variables, Mann-Whitney and Kruskal-Wallis tests were performed to look for differences in feces related HWWS frequency between persons with different categories of these critical variables. When feces related HWWS frequency varied significantly between the categories, we conducted hierarchical loglinear analyses to analyze the three-way interaction between focus group participation, the critical socio-demographic variable, and feces related HWWS frequency.

Among the tested variables, affiliate, quarter in PaP, region type, type of site, and children under the age of 12 were significantly associated with participation in focus groups (see Table 3). More detailed results and all additional analyses are presented separately for each variable.

Affiliate, focus group, and feces related HWWS

Concerning the significant association with the affiliate, there were roughly as many focus group participants as expected among persons belonging to OGB and to IO, but there were more focus group participants among persons from OQ than would have been expected by

chance, z = 2.58. A Kruskal-Wallis test revealed that persons of different affiliates significantly varied in feces related HWWS frequency (see Table 4). To break down this effect, two additional post-hoc Mann-Whitney tests were conducted to compare persons from OQ with persons from OGB and IO, respectively. Results showed that persons from OQ washed hands with soap (WHWS) significantly more often after contact with feces than persons from OGB, whereas persons from IO did not differ significantly from persons from OQ (see Table 4).

Table 3

Associations Between Focus Group and Socio-Demographic Characteristics

Variable	*N*	*df*	χ^2	p[a]	99% CI	V[b]	φ[b]
Gender	808	1	1.51	.228			
Affiliate	808	2	16.34	.000*	[.000, .000]	.14	
Area	808	4	8.75	.072	[.065, .079]		
Quarter in PaP	527	5	55.86	.000*	[.000, .000]	.33	
Region type	808	2	15.88	.000*	[.000, .000]	.14	
Type of site	808	1	19.50	.000*			–.16
Literacy	794	3	8.80	.030	[.026, .035]		
Children under 12	804	1	14.47	.000*			.13
Babies	795	1	0.43	.538			
Occupation	794	7	4.62	.711	[.699, .723]		
Education[c]	793	7	8.42	.300	[.288, .312]		
Religion	808	3	7.98	.047	[.041, .052]		
Voodoo	796	1	0.00	1.00			
	N	*U*	*z*	p[a]		r[b]	
Age	779	71950	–0.32	.759	[.748, .770]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant.

[c]Persons who attended kindergarten only (*n* = 6) are excluded.

*Statistical significance assumed at $p < .0036$.

Table 4

Feces Related HWWS Dependent on Socio-Demographic Characteristics

Variable	*H (df)*	*U*	*z*	*p*[a]	99% CI	*r*[b]	*Mdn*[b]	
Affiliate	10.82 (2)			.004*	[.002, .006]			
- OQ vs. OGB		27868	–3.09	.002[+]	[.001, .003]	–.13	OGB	OQ
							3.67	4.00
- OQ vs. IO		31746	–0.92	.359	[.347, .371]			
Quarter in PaP	6.91 (5)			.237	[.226, .247]			
Region type	3.38 (2)			.178	[.168, .187]			
Type of site		75714	–1.83	.069	[.063, .076]			
Literacy	4.44 (3)			.223	[.212, .234]			
Children under 12		60895	–4.96	.000*	[.000, .000]	–.17	No	Yes
							4.00	3.67
Occupation[c]	19.88 (6)			.002*	[.001, .003]			
- Housewives/-men vs. all other		44049	–1.39	.162	[.152, .171]			
Education[d]	13.47 (7)			.059	[.053, .065]			
Age[e]	9.68 (6)			.136	[.127, .145]			

Note. CI = confidence interval.

[a]*P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI. [b]Effect sizes and medians are only reported if result was significant. [c]Retired persons (*n* = 3) are excluded. [d]Persons who attended kindergarten only (*n* = 6) are excluded. [e]Data has been grouped into seven age categories: 15-19 years (*n* = 67), 20-24 years (*n* = 115), 25-29 years (*n* = 141), 30-34 years (*n* = 120), 35-39 years (*n* = 100), 40-49 years (*n* = 126), 50-90 years (*n* = 113).

*Statistical significance assumed at $p < .0056$. [+]Statistical significance assumed at $p < .0025$.

To conclude, interviewees from OQ were more likely to participate in focus groups, but, at the same time, their feces related HWWS frequencies were higher than those of persons from the other affiliates. Having proved this, one can conclude that the negative association between focus group participation and feces related HWWS frequency could not be explained by a negative effect of the Oxfam affiliate. If the negative association between focus group participation and feces related HWWS frequency had been due to an influence of the affiliate, persons from OQ would have had to WHWS less often after contact with feces than persons from other affiliates – which is not the case. If this had been the case, focus group participation might have been negatively associated with feces related HWWS frequency

simply because persons from OQ experienced focus groups relatively more often than persons from other affiliates and WHWS less often.

Nevertheless, additional analyses that went beyond our specific research questions were performed to further explore the data pattern. We tested the three-way interaction to determine whether there were differences in strength and direction of the association between focus group participation and feces related HWWS frequency between persons of different affiliates.

In order to test the three-way interaction between focus group participation, affiliate, and feces related HWWS frequency, the continuous feces related HWWS variable was transformed into a discrete one. Feces related HWWS frequency was partitioned into two groups with the levels 0 = *rather low* and 1 = *very high* by a median split (*Mdn* = 3.67). The label names were chosen this way because the actual range of persons having a *rather low* frequency (*n* = 298) was from 0.00 to 3.50 on the continuous scale (*Max* = 4.00), that is, persons with a quite high feces related HWWS frequency were included in this level. Persons having a *very high* frequency (*n* = 513) ranged from 3.67 to 4.00 on the continuous scale.

An exploratory three-way frequency analysis was performed to develop a hierarchical 2 x 3 x 2 (Focus group [no, yes] x Affiliate [OGB, OQ, IO] x Feces related HWWS [rather low, very high]) loglinear model. Stepwise selection by tentative deletion of the respective highest effects produced a final model that included all possible two-way interactions while the three-way interaction was not included because its removal made no significant change to the fit of the model. The final model had a likelihood ratio of $\chi^2(2, N = 808) = 3.70$, $p = .157$, indicating a good fit between the observed frequencies and the frequencies expected by this model. The highest-order interaction was not significant, that is, the association between focus group participation and feces related HWWS frequency was independent from the type of the affiliate. The Focus group x Feces related HWWS interaction was significant, $\chi^2(1) = 21.70$, $p < .001$, replicating the result from Contzen and Mosler (in preparation). The Affiliate x Feces related HWWS interaction, $\chi^2(2) = 10.19$, $p = .006$, and the Focus group x Affiliate interaction $\chi^2(1) = 19.24$, $p < .001$, were significant, too, replicating the result of the Kruskal-Wallis test shown in Tables 4 and the result of the chi-square test shown in Table 3, respectively.

Quarter in PaP, focus group, and feces related HWWS

Concerning the quarter in PaP, there were more focus group participants than expected in Delmas, $z = 3.12$, and fewer than expected in Carrefour Feuille, $z = –3.91$, whereas no large deviations from the expected frequencies were apparent for the remaining neighborhoods. Yet, a Kruskal-Wallis test showed that interviewees of different quarters in PaP did not differ significantly in feces related HWWS frequency (see Table 4). Consequently, the

association between focus group participation and quarter in PaP could not explain the negative association between focus group participation and feces related HWWS frequency.

Region type, focus group, and feces related HWWS

The significant association between focus group participation and region type was mainly due to the fact that there were fewer focus group participants in urban areas than what would have been expected by chance, $z = –2.46$. However, no significant differences in feces related HWWS frequency could be found between persons of urban, peri-urban, and rural regions (see Table 4), meaning that the negative association between focus group participation and feces related HWWS frequency was not due to an effect of the region type.

Type of site, focus group, and feces related HWWS

Regarding the type of the site, the odds of participation in focus groups was 1.91 times higher in camps, $z = 2.29$, than in neighborhoods, $z = –2.54$. A Mann-Whitney test depicted no significant differences in feces related HWWS frequency between persons living in camps and those living in neighborhoods, though (see Table 4). Hence, the negative association between focus group participation and feces related HWWS frequency could not be explained by the association between focus group participation and the type of site.

Children under the age of 12, focus group, and feces related HWWS

The odds of focus group participation among persons who had children under 12 years of age was 1.79 times higher than among persons without children, $z = –2.34$. What is more, persons in whose household children under the age of 12 were living WHWS significantly less often after contact with feces than persons without children (see Table 4). Hence, it could be assumed that the negative association between focus group participation and feces related HWWS frequency was due to a self-selection effect on part of persons who had children under the age of 12 because they were more likely to participate in focus groups and, at the same time, WHWS less often after contact with feces than persons without children. Further analysis was necessary to determine whether the lower feces related HWWS frequency was due to focus group participation or due to the fact that most focus group participants had children under the age of 12. More concretely, we checked whether the significant negative association between focus group participation and feces related HWWS frequency dissolved when we looked at persons with children and those without children separately – which would imply a self-selection effect – or whether it held true even if we controlled for the variable children under the age of 12 – which would negate a self-selection effect. To do so, we conducted a hierarchical 2 x 2 x 2 (Focus group [no, yes] x Children under 12 [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis. The final model had a likelihood

ratio of $\chi^2(1, N = 804) = 1.67$, $p = .196$. All two-way interactions were retained in the final model, but not the three-way interaction. Consequently, the negative association between focus group participation and feces related HWWS frequency, $\chi^2(1) = 13.86$, $p < .001$, that was found by Contzen and Mosler (in preparation), persisted whether or not children under the age of 12 were living in the households. The interaction between children under the age of 12 and feces related HWWS frequency was significant, too, $\chi^2(1) = 17.23$, $p < .001$, replicating the result of the Mann-Whitney test seen in Table 4. And last but not least, also the Focus group x Children under the age of 12 was significant, $\chi^2(1) = 10.31$, $p = .001$, replicating the result of the chi-square test shown in Table 3.

4.2.1.2. Socio-demographic characteristics, focus group, and food related HWWS

As already demonstrated, participation in focus groups was significantly associated with the socio-demographic variables affiliate, quarter in PaP, region type, type of site, and children under the age of 12 (see Table 3 and section 4.2.1.1) To find out whether the lower food related HWWS frequency of focus group participants were a result of the associations with these socio-demographic variables, we first looked for associations between food related HWWS frequency and the socio-demographic variables. The tests depicted significant results for affiliate, type of site, and children under the age of 12, but not for quarter in PaP and region type (see Table 5).

Affiliate, focus group, and food related HWWS

With regard to the effect of the affiliate on food related HWWS, post-hoc Mann-Whitney tests revealed that persons from OQ did not differ in food related HWWS frequency from persons from OGB, but WHWS significantly more often than persons from IO (see Table 5). It can be concluded that the negative association between participating in focus groups and food related HWWS frequency could not be due to an effect of the affiliate because, on the one hand, persons who belonged to OQ were more likely to participate in focus groups, but, on the other hand, they WHWS before contact with food *more* often – rather than *less* often – than persons from other affiliates.

Nevertheless, additional analysis beyond our specific research questions was performed to further explore the data pattern and to check whether there were differences between the affiliates concerning the negative association between focus group participation and food related HWWS frequency. We conducted a hierarchical 2 x 3 x 2 (Focus group [no, yes] x Affiliate [OGB, OQ, IO] x Food related HWWS [rather low, very high]) loglinear analysis. For this purpose, analogously to the data on feces related HWWS frequency (see section 4.2.1.1), data on food related HWWS had been collapsed by a median split into two groups (*Mdn* = 3.25), creating a dichotomous variable with the levels 0 = *rather low frequency* and 1

= *very high frequency*. In the low-frequency group (ranging from 0.25 to 3.00 on the continuous scale), were *n* = 361 persons, while the HWWS frequencies of *n* = 450 persons were on the median or above.

Table 5

Food Related HWWS Dependent on Socio-Demographic Characteristics

Variable	*H (df)*	*U*	*z*	*p*[a]	99% CI	*r*[b]	*Mdn*[b]	
Affiliate	14.65 (2)			.001*	[.000, .001]			
- OQ vs. OGB		28656	–2.45	.013	[.010, .016]			
- OQ vs. IO		26597	–3.91	.000[+]	[.000, .001]	–.17	OQ	IO
							3.33	3.25
- OGB vs. IO		40475	–1.20	.230	[.220, .241]			
Quarter in PaP	9.22 (5)			.096	[.089, .104]			
Region type	9.21 (2)			.010	[.008, .013]			
Type of site		70395	–3.34	.001*	[.000, .001]	–.12	Camp	Neighb.
							3.25	3.00
Literacy	8.21 (3)			.041	[.036, .046]			
Children under 12		64715	–3.48	.001*	[.000, .001]	–.12	no	yes
							3.25	3.25
Occupation[c]	15.61 (6)			.016	[.012, .019]			
Education[d]	5.69 (7)			.576	[.563, .588]			
Age[e]	7.88 (6)			.244	[.233, .255]			

Note. CI = confidence interval; neighb. = neighborhood.

[a]*P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI. [b]Effect sizes and medians are only reported if result was significant. [c]Retired persons (*n* = 3) are excluded. [d]Persons who attended kindergarten only (*n* = 6) are excluded. [e]Data has been grouped into seven age categories: 15-19 years (*n* = 67), 20-24 years (*n* = 115), 25-29 years (*n* = 141), 30-34 years (*n* = 120), 35-39 years (*n* = 100), 40-49 years (*n* = 126), 50-90 years (*n* = 113).

*Statistical significance assumed at $p < .0056$. [+]Statistical significance assumed at $p < .0019$.

The loglinear analysis produced a final model that retained all effects, $\chi^2(0, N = 808) = 0.00$, $p = 1.00$, meaning that the three-way interaction was significant, $\chi^2(2) = 9.04$, $p = .011$. In order to interpret this result, we accomplished three separate 2 x 2 (Focus group [no, yes] x Food related HWWS [rather low, very high]) chi-square tests for persons from OGB, OQ, and IO, respectively. The association between focus group participation and food related

HWWS frequency was significant among persons from OQ, $\chi^2(1, N = 225) = 5.39$, $p = .023$, $\varphi = -.16$, and from IO, $\chi^2(1, N = 292) = 9.86$, $p = .002$, $\varphi = -.18$, but not among persons from OGB, $\chi^2(1, N = 291) = 0.67$, $p = .458$ (see also Figure 1). With regard to the odds ratios this means that focus group participants among OQ/IO were 1.95/2.15 times more likely than non-participants to have reduced food related HWWS frequencies, but the odds were not increased among focus group participants from OGB. The affiliates OQ and IO might have conducted focus groups differently than OGB, resulting in a negative effect on food related HWWS frequency only among focus group participants from OQ and IO. Alternatively, self-selection effects might have occurred only among the OQ and the IO subsample. That is, a subgroup of persons from OQ and IO with rather low food related HWWS frequencies might have preferentially participated in focus groups. Thus, it was further analyzed whether the negative association between focus group participation and food related HWWS frequency came from effects of any socio-demographic variables within the OQ and the IO subsample, in particular.

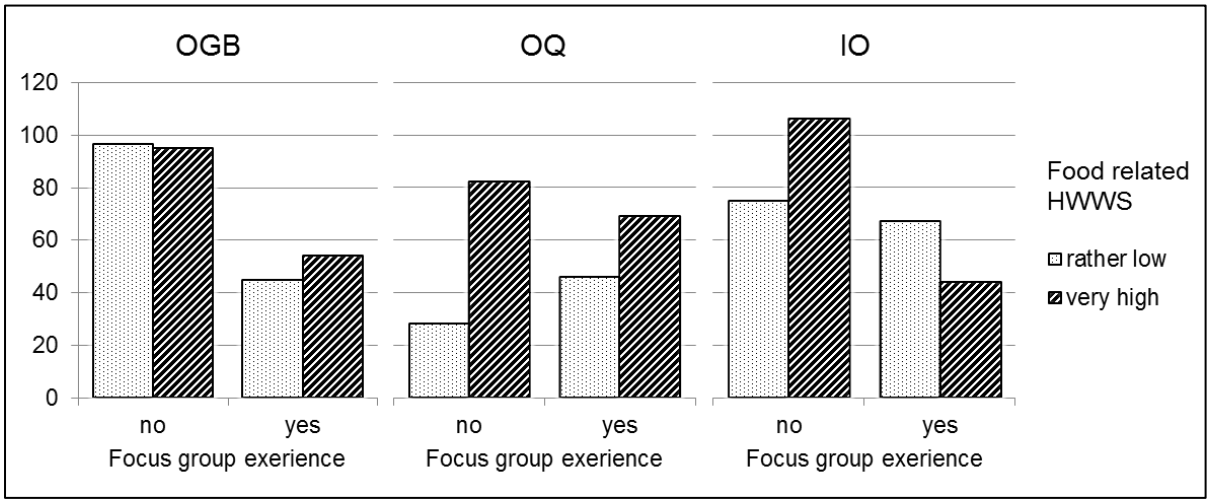

Figure 1. Numbers of persons with rather low and very high food related HWWS frequency depending on focus group experience among persons of different affiliates.

Among $N = 225$ interviewees from OQ, 51.1% ($n = 115$) participated in focus groups and 48.9% ($n = 110$) did not participate in any focus group. Associations between focus group participation and 12 socio-demographic variables were analyzed for the OQ subsample. Because Delmas was the only quarter in PaP among the data collection sites from OQ, the variable quarter in PaP was not included in the analyses. Statistical significance of the results was assumed at $p < .0042$. From Table 6 can be seen that no significant association emerged between OQ-focus-group participation and any socio-demographic variable. Thus, the negative association between participating in focus groups and food related HWWS fre-

quency among persons from OQ could not be explained by any interactions with socio-demographic variables.

Table 6

Associations Between Focus Group and Socio-Demographic Characteristics Within OQ

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	225	1	1.82	.196			
Area	225	1	1.51	.255			
Region type	225	2	1.67	.444	[.431, .457]		
Type of site	225	1	0.91	.370			
Literacy[c]	218	1	3.18	.093			
Children under 12	223	1	6.75	.014			
Babies	221	1	1.57	.239			
Occupation[d]	210	4	2.11	.725	[.714, .737]		
Education[e]	220	5	5.79	.340	[.328, .353]		
Religion	225	3	2.97	.409	[.397, .422]		
Voodoo	220	1	0.46	.616			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	215	5428	–0.76	.444	[.432, .457]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could only read or only write (*n* = 5) are excluded. [d]Persons engaged in agriculture (*n* = 6) and studies (*n* = 8) are excluded. [e]Persons of the levels kindergarten (*n* = 2), secondary school - filo (*n* = 1), and professional school (*n* = 2) are excluded.

Among *N* = 295 interviewees from IO, 37.6% (*n* = 111) participated in focus groups, 61.4% (*n* = 181) did not participate in any focus group, and 1.0% (*n* = 3) could not remember. Associations between focus group participation and the 13 remaining socio-demographic variables were analyzed with regard to $p < .0038$. There were significant associations between focus group participation and the variables area and region type (see Table 7). The standardized residuals revealed that differences between expected and observed cell frequencies were mainly in the areas PaP and Leogane. In PaP, fewer persons than expected participated in focus groups, $z = –2.29$, and more persons than expected participated in Leogane, $z = 2.66$, whereas in all other areas, there were roughly as many focus group participants as expected. We conducted a Kruskal-Wallis test to compare food related HWWS fre-

quencies between persons of different areas in the IO subsample. Yet, as shown in Table 8, food related HWWS frequency was not dependent on the area among persons from IO, meaning that the negative association between focus group participation and food related HWWS frequency in the IO subsample could not be traced back to an effect of the area.

Since there were no peri-urban regions among the IO-sites, all urban regions were located in PaP, and for rural regions it was already shown that particularly the area of Leogane contributed to the association, the significant association between focus group participation and region type in the IO subsample could be completely explained by the association with the area.

Table 7

Associations Between Focus Group and Socio-Demographic Characteristics Within IO

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	292	1	0.07	.841			
Area	292	4	21.67	.000*	[.000, .000]	.27	
Quarter in PaP	84	1	0.07	1.00			
Region type	292	1	11.86	.001*			.20
Type of site	292	1	0.02	.904			
Literacy[c]	286	2	0.68	.721	[.709, .732]		
Children under 12	292	1	8.43	.004			
Babies	286	1	7.44	.007			
Occupation[d]	276	5	8.77	.123	[.115, .132]		
Education[e]	279	5	0.94	.970	[.965, .974]		
Religion[f]	288	2	4.23	.117	[.109, .125]		
Voodoo	287	1	0.14	.726			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	283	8986	–0.59	.559	[.546, .571]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could either read or write only are collapsed into one group. [d]Persons engaged in agriculture (*n* = 5) and being retired (*n* = 2) are excluded. [e]Persons of the levels kindergarten (*n* = 1), professional school (*n* = 2), and university (*n* = 6) are excluded. [f]Persons who had another religion besides protestant or catholic (*n* = 4) are excluded.

*Statistical significance assumed at *p* < .0038.

Table 8

Food Related HWWS Dependent on Socio-Demographic Characteristics Within IO

Variable	*H (df)*	*U*	*z*	*p*[a]	99% CI	*r*[b]	*Mdn*[b]	
Area	6.67 (4)			.147	[.138, .156]			
Children under 12		8296	–2.52	.012*	[.009, .014]	–1.5	no	yes
							3.25	3.00
Babies		8225	–1.49	.138	[.129, .146]			

Note. CI = confidence interval.

[a]*P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI. [b]Effect sizes and medians are only reported if result was significant.

*Statistical significance assumed at $p < .017$.

As no indications could be found for self-selection effects among interviewees from OQ and IO, in the following, we return to the associations between socio-demographic variables, focus group participation, and food related HWWS frequency in the total sample.

Type of site, focus group, and food related HWWS

Regarding the association between focus group participation and type of site, it was already mentioned in section 4.2.1.1 that persons who lived in camps were more likely to participate in focus groups than would have been expected by chance (see also Table 3). Besides, persons in camps WHWS more often before contact with food than persons in neighborhoods (see Table 5). Such being the case, the association between participating in focus groups and type of site could not be held accountable for the negative association between focus group participation and food related HWWS frequency. If the type of site explained the negative association between focus group participation and food related HWWS frequency, we would have expected persons living in camps to WHWS *less* often – rather than *more* often – than persons in neighborhoods.

Still, we conducted further exploratory analyses beyond our research questions. We analyzed the three-way interaction between focus group participation, type of site, and food related HWWS frequency to find out more about the pattern in the data and to check whether the association between focus group participation and food related HWWS frequency differed between persons in camps and in neighborhoods. A hierarchical 2 x 2 x 2 (Focus group [no, yes] x Type of site [camp, neighborhood] x Food related HWWS [rather low, very high]) loglinear analysis created a final model that retained all two-way interactions, but not the three-way interaction, $\chi^2(1, N = 808) = 0.02$, $p = .892$. The Type of site x Food related HWWS interaction was significant, $\chi^2(1) = 12.91$, $p < .001$, replicating the result of the Mann-Whitney test shown in Table 5. Also, the Focus group x Food related HWWS interaction was

significant, $\chi^2(1) = 6.62$, $p = .010$, replicating the result found by Contzen and Mosler (in preparation), as well as the Focus group x Type of site interaction, $\chi^2(1) = 22.22$, $p < .001$, replicating the result of the chi-square test shown in Table 3. The fact that the three-way interaction was not significant implies that focus group participation was negatively associated with food related HWWS frequency regardless of the type of site the participants lived in.

Children under the age of 12, focus group, and food related HWWS

Furthermore, as already outlined in section 4.2.1.1, interviewees who had children under the age of 12 were more likely to participate in focus groups than interviewees who did not (see also Table 3). At the same time, persons with children under the age of 12 WHWS less often before contact with food (average rank of 382) than persons without children (average rank of 441), even though medians of both groups did not differ (see Table 5). In order to find out whether focus group participation was negatively associated with food related HWWS frequency for the simple reason that those persons participating in focus groups, namely, persons who had children under the age of 12, WHWS before contact with food less often than others, we analyzed the three-way interaction between the variables focus group participation, children under the age of 12, and food related HWWS frequency. A hierarchical 2 x 2 x 2 (Focus group [no, yes] x Children under the age of 12 [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis was performed, resulting in a final model that retained two of three possible two-way interactions and had a likelihood ratio of $\chi^2(2, N = 804) = 2.87$, $p = .238$. The three-way interaction was not significant, $\chi^2(1) = 0.19$, $p = .666$, but the Children under the age of 12 x Food related HWWS interaction, $\chi^2(1) = 6.45$, $p = .011$, and the Focus group x Children under the age of 12 interaction, $\chi^2(1) = 14.68$, $p < .001$, were both significant, replicating the result of the Mann-Whitney test shown in Table 5 and the result of the chi-square test shown Table 3, respectively. The Focus group x Food related HWWS interaction, $\chi^2(1) = 2.68$, $p = .101$, was not significant, contrary to the results of Contzen and Mosler (in preparation). This was possibly caused by the loss in detail the data of the food related HWWS variable had undergone by the median split.

All in all, the results depicted that the negative association between focus group participation and food related HWWS frequency could not be explained by any self-selection effect based on socio-demographic variables.

4.2.2. Socio-demographic characteristics, stickers, posters, paintings, and HWWS

4.2.2.1. Socio-demographic characteristics, stickers, posters, paintings, and feces related HWWS

From the total sample of *N* = 811 interviewees, approximately three quarters (76.2%, *n* = 618) experienced hygiene promotion via stickers, posters, or paintings, 23.7% (*n* = 192) did not note any stickers, posters, or paintings, and 0.1% (*n* = 1) could not remember. Associations between the experience of stickers, posters, or paintings and the 14 socio-demographic variables were tested. Pearson chi-square tests revealed that the variables affiliate, quarter in PaP, occupation, and education were significantly related to the experience of stickers, posters, or paintings (see Table 9). Each of the associations and additional analyses are described in more detail in the following.

Affiliate, stickers, posters, or paintings, and feces related HWWS

Similar to focus group participation, the significant association between experiencing stickers, posters, or paintings and affiliate was mainly due to the association with OQ. Among persons from OQ, *fewer persons* than would have been expected by chance *did not* experience any stickers, posters, or paintings, $z = -2.48$, whereas the frequencies among persons from OGB and IO did not differ significantly from the expected ones. As already mentioned in section 4.2.1.1, persons from OQ WHWS more often after contact with feces than persons from OGB and did not differ from persons from IO (see also Table 4). From the fact that persons from OQ were more likely to experience hygiene promotion via stickers, posters, or paintings and, at the same time, they WHWS after contact with feces *more* often – rather than *less* often – than other persons it can be concluded that the negative association between the experience of stickers, posters, or paintings and feces related HWWS frequency could not be explained by an effect of the affiliate.

Still, we conducted additional analysis beyond our specific research questions. To find out more about the data pattern and to check whether the negative association between the experience of stickers, posters, or paintings and feces related HWWS frequency varied between persons of different affiliates, we tested the three-way interaction between the experience of sticker, posters, or paintings, affiliate, and feces related HWWS frequency. We conducted a hierarchical 2 x 3 x 2 (Stickers, posters, paintings [no, yes] x Affiliate [OGB, OQ, IO] x Feces related HWWS [rather low, very high]) loglinear analysis. The analysis resulted in a final model which retained all two-way, but not the three-way interaction, $\chi^2(2, N = 810) = 0.76$, $p = .683$. The Stickers, posters, paintings x Feces related HWWS interaction was significant, $\chi^2(1) = 26.50$, $p < .001$, replicating the result found by Contzen and Mosler (in preparation), as well as the Affiliate x Feces related HWWS interaction, $\chi^2(2) = 10.87$, $p = .004$, replicating the result of the Kruskal-Wallis test shown in Table 4, and the Stickers, posters, paint-

ings x Affiliate interaction, $\chi^2(2) = 16.34$, $p < .001$, replicating the result of the chi-square test shown in Table 9. However, as the three-way interaction was not significant, these effects had to be considered as independent from each other.

Table 9

Associations Between Stickers, Posters, Paintings and Socio-Demographic Characteristics

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	810	1	1.15	.313			
Affiliate	810	2	12.55	.001*	[.000, .002]	.12	
Area	810	4	14.85	.006	[.004, .008]		
Quarter in PaP	528	5	22.82	.000*	[.000, .001]	.21	
Region type	810	2	1.75	.420	[.407, .432]		
Type of site	810	1	7.71	.006			
Literacy[c]	796	2	9.69	.007	[.005, .009]		
Children under 12	806	1	1.89	.197			
Babies	797	1	0.47	.537			
Occupation[d]	793	6	21.98	.001*	[.000, .002]	.17	
Education[e]	895	7	24.98	.001*	[.000, .002]	.18	
Religion	810	3	7.58	.057	[.051, .063]		
Voodoo	798	1	0.06	.890			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	781	48922	–2.24	.024	[.020, .028]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could either read or write only are collapsed into one group. [d]Retired persons (*n* = 3) are excluded. [e]Persons who attended kindergarten only (*n* = 6) are excluded.

*Statistical significance assumed at $p < .0036$.

Quarter in PaP, stickers, posters, or paintings, and feces related HWWS

Concerning the relationship between the experience of stickers, posters, or paintings and the quarter in PaP, the standardized residuals revealed that in Carrefour Feuille more persons than expected *did not* experience any stickers, posters, or paintings, $z = 3.48$. From Table 4 can be seen that there were no differences in feces related HWWS frequency between persons of different quarters in PaP (see also section 4.2.1.1). Consequently, the

negative association between experiencing stickers, posters, or paintings and feces related HWWS frequency was not due to an effect of the quarter in PaP.

Occupation, stickers, posters, or paintings, and feces related HWWS

Furthermore, the association between the interviewees' occupation and the experience of stickers, posters, or paintings was driven by the effect that there were more persons than expected who *did not* note any stickers, posters, or paintings among housewives/-men, z = 2.88. Put differently, the odds of having experienced stickers, posters, or paintings were 2.05 times higher when having any other job than housewife or houseman. Moreover, an overall effect of occupation on feces related HWWS frequency was found (see Table 4). However, as the association between occupation and experiencing stickers, posters, or paintings was driven by the effect of housewives/-men, we compared feces related HWWS frequency between housewives/-men and persons of any other occupation by a Mann-Whitney-test. Hereby, no significant result emerged (see Table 4). As housewives/-men were less likely to experience stickers, posters, or paintings and did not WHWS more often after contact with feces than persons of other occupations, an occupational effect did not explain the negative association between experiencing stickers, posters, or paintings and feces related HWWS frequency.

Education, stickers, posters, or paintings and feces related HWWS

Besides, there were more persons than expected who *did not* experience stickers, posters, or paintings among interviewees whose educational level was primary school only, z = 2.39, while among those who started, but did not finish secondary school, the number of persons who *did not* experience stickers, posters, or paintings was lower than expected, z = –2.42. Yet, persons of different educational levels did not differ significantly in feces related HWWS frequency (see Table 4), meaning that the negative association between experiencing stickers, posters, or paintings and feces related HWWS frequency could not be explained by an effect of the beneficiaries' educational level.

All in all, we did not find any effects of socio-demographic variables that could have explained the negative association between experiencing stickers, posters, or paintings and feces related HWWS frequency.

4.2.2.2. Socio-demographic characteristics, stickers, posters, paintings, and food related HWWS

As presented in section 4.2.2.1, the experience of hygiene promotion by means of stickers, posters, or paintings was significantly associated with the socio-demographic variables affiliate, quarter in PaP, occupation, and education (see also Table 9). To check whether the

negative association between experiencing stickers, posters, or paintings and food related HWWS frequency was due to an effect of any of these variables, we looked for associations between these variables and food related HWWS frequency drawing on the results presented in section 4.2.1.2.

Quarter in Pap, occupation, and education, stickers, posters, or paintings, and feces related HWWS

As outlined in section 4.2.1.2, persons of different quarters in PaP, different occupations, and different educational levels did not differ in food related HWWS frequency (see Table 5). Accordingly, the negative association between the experience of sticker, posters, or paintings and food related HWWS frequency could not be explained by effects of any of these variables.

Affiliate, stickers, posters, or paintings, and food related HWWS

Section 4.2.1.2, showed that persons from OQ WHWS more often before contact with food than persons from IO while their food related HWWS frequency did not differ from that of the OGB subsample (see Table 5). Accordingly, on the one hand, persons from OQ were more likely to experience stickers, posters, or paintings than would have been expected by chance (see section 4.2.2.1). On the other hand, persons from OQ also WHWS more often before contact with food than others (see Table 5). This means that the negative association between experiencing stickers, posters, or paintings and food related HWWS frequency could not be due to an effect of the affiliate.

Nevertheless, we conducted further exploratory analyses beyond our specific research questions. To find out whether the three affiliates differed in the negative association between the experience of stickers, posters, or paintings and food related HWWS frequency, we tested the three-way interaction between affiliate, experiencing stickers, posters, or paintings, and food related HWWS frequency. A hierarchical 2 x 3 x 2 (Stickers, posters, paintings [no, yes] x Affiliate [OGB, OQ, IO] x Food related HWWS [rather low, very high]) loglinear analysis was undertaken. The final model had a likelihood ratio of $\chi^2(2, N = 810) = 1.61$, $p = .448$, and retained all two-way but not the three-way interaction between the variables. Therefore, the association between stickers, posters, or paintings and food related HWWS frequency seemed to persist among persons from all three affiliates. The Stickers, posters, paintings x Food related HWWS interaction, $\chi^2(1) = 6.84$, $p = .009$, the Affiliate x Food related HWWS interaction, $\chi^2(2) = 19.42$, $p < .001$, and the Stickers, posters, paintings x Affiliate interaction, $\chi^2(2) = 15.58$, $p < .001$, all were significant, replicating the finding by Contzen and Mosler (in preparation), the result of the Kruskal-Wallis test depicted in Table 5, and the result of the chi-square test shown in Table 9, respectively.

To conclude, we did not find indications for self-selection effects on the negative association between the experience of stickers, posters, or paintings and food related HWWS frequency.

4.2.3. Socio-demographic characteristics, song, and HWWS

4.2.3.1. Socio-demographic characteristics, song, and feces related HWWS

A bit less than half of the sample (45.9%, *n* = 372) knew a song about hygiene, hand washing, cholera, or diarrhea, 45.3% (*n* = 367) did not know any hygiene song, and data of 8.9% (*n* = 72) were missing or they indicated to not remember. Associations between knowing a hygiene song and the 14 socio-demographic variables were analyzed analogously to the sections above. Results showed that the variables quarter in PaP, type of site, literacy, children under the age of 12, and the interviewees' age were significantly associated with knowing a hygiene song (see Table 10).

Quarter in PaP, song, and feces related HWWS

Regarding the quarter in PaP, fewer persons than expected who *did not* know a hygiene song lived in the quarter Delmas, $z = -2.24$, meaning that the odds of knowing a hygiene song were 2.12 times higher in Delmas than in any other quarter. However, as already stated (section 4.2.1.1 and 4.2.2.1), there were no differences in feces related HWWS frequency between persons of different quarters in PaP (see also Table 4). Consequently, the negative association between knowing a hygiene song and feces related HWWS could not be explained by the association between the quarter in PaP and knowing a hygiene song.

Type of site, song, and feces related HWWS

Furthermore, persons who knew a hygiene song were 1.66 times more likely to live in camps rather than in neighborhoods, $z = -1.77$. As mentioned in section 4.2.1.1, no differences in feces related HWWS frequency could be found between persons living in camps and those living in neighborhoods (see also Table 4), meaning that there was no effect of the type of site that could have explained the negative association between knowing a hygiene song and feces related HWWS frequency.

Literacy, song, and feces related HWWS

Moreover, more persons than expected who *did not* know any hygiene song could neither read nor write, $z = 2.18$, but there were no differences in feces related HWWS frequency between persons who could neither read nor write, those who could read only, those who could write only, and those who could both read and write (see Table 4). Hence, the literacy

level of the interviewees did not account for the negative association between knowing a hygiene song and feces related HWWS frequency.

Table 10

Associations Between Song and Socio-Demographic Characteristics

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	739	1	0.58	.488			
Affiliate	739	2	3.11	.209	[.119, .219]		
Area	739	4	3.80	.434	[.422, .447]		
Quarter in PaP	481	5	25.08	.000*	[.000, .000]	.23	
Region type	739	2	3.11	.210	[.200, .221]		
Type of site	739	1	11.68	.001*			–.13
Literacy	726	3	20.39	.000*	[.000, .000]	.17	
Children under 12	735	1	19.69	.000*			.16
Babies	726	1	4.12	.048			
Occupation	727	7	14.38	.041	[.036, .046]		
Education[c]	727	7	12.85	.075	[.068, .081]		
Religion	739	3	4.90	.177	[.167, .187]		
Voodoo	727	1	5.43	.021			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	712	54786	–3.12	.002*	[.001, .003]	–.12	

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant.

[c]Persons who attended kindergarten only (*n* = 4) are excluded.

*Statistical significance assumed at *p* < .0036.

Children under the age of 12, song, and feces related HWWS

In addition, more persons than expected who *did not* know any hygiene song had no children under the age of 12, *z* = 2.54. This represents the effect that persons who knew a hygiene song were 2.00 times more likely to have children under the age of 12 than persons who did not know such a song. Beyond that, as already reported in section 4.2.1.1, persons who had children under the age of 12 WHWS less often after contact with feces than persons without children (see also Table 4). As persons who had children under the age of 12 both WHWS less often after contact with feces and were more likely to know a hygiene song than

persons without children, it was conceivable that the negative association between knowing a hygiene song and feces related HWWS frequency could be explained by a self-selection effect. Thus, further analyses focused on the interaction between knowing a hygiene song, having children under the age of 12, and feces related HWWS frequency. A hierarchical 2 x 2 x 2 (Song [no, yes] x Children under 12 [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis was performed. The final model had a likelihood-ratio of $\chi^2(1, N = 735) = 0.52$, $p = .473$, and retained all two-way interactions but not the three-way interaction. The Song x Feces related HWWS interaction was significant, $\chi^2(1) = 16.38$, $p < .001$, replicating the result of Contzen and Mosler (in preparation). The Children under the age of 12 x Feces related HWWS interaction was significant, too, $\chi^2(1) = 14.35$, $p < .001$, replicating the result of the Mann-Whitney test shown in Table 4, as well as the Song x Children under the age of 12 interaction, $\chi^2(1) = 14.32$, $p < .001$, replicating the result of the chi-square test shown in Table 10. Yet, the fact that the highest-order interaction was not significant indicated that knowing a hygiene song was negatively associated with feces related HWWS frequency whether or not children under the age of 12 were living in the beneficiaries' households.

Age, song, and feces related HWWS

Finally, persons who knew a hygiene song were younger (*Mdn* = 31) than those who did not know any hygiene song (*Mdn* = 34). However, as persons of different ages did not differ in feces related HWWS frequency (see Table 4), the negative association between knowing a hygiene song and feces related HWWS frequency could not be explained by an effect of the participants' age.

Consequently, we found no evidence for the possibility that the negative association between knowing a hygiene song and feces related HWWS frequency was due to a self-selection effect.

4.2.3.2. Socio-demographic characteristics, song, and food related HWWS

As already mentioned in section 4.2.3.1, knowing a hygiene song was significantly associated with the variables quarter in PaP, type of site, literacy, children under the age of 12, and age (see also Table 10). Hence, drawing on the results of section 4.2.1.2, associations between these variables and food related HWWS frequency were analyzed. The results showed that the type of the site and having children under the age of 12 were significantly associated with the interviewees' food related HWWS frequency, whereas the variables quarter in PaP, literacy, and age were not (see Table 5).

Type of site, song, and food related HWWS

Concerning the type of the site, knowing a hygiene song was more common in camps than in neighborhoods, as already outlined in section 4.2.3.1 (see also Table 10). As mentioned in section 4.2.1.2, food related HWWS was more frequent in camps than in neighborhoods, too (see also Table 5). This being the case, we can conclude that there was no effect of the type of site that could have explained the negative association between knowing a hygiene song and food related HWWS frequency. If the type of the site accounted for the negative association between knowing a hygiene song and food related HWWS frequency we would have expected – contrary to our findings – *lower* food related HWWS frequency in camps than in neighborhoods.

Nevertheless, we were interested in the three-way interaction between knowing a hygiene song, the type of the site, and food related HWWS frequency and conducted further analyses beyond our research questions to find out more about possible differences between camps and neighborhoods regarding the negative association between knowing a hygiene song and food related HWWS frequency. A hierarchical 2 x 2 x 2 (Song [no, yes] x Type of site [camp, neighborhood] x Food related HWWS [rather low, very high]) loglinear analysis was performed. The final model retained all effects, $\chi^2(0, N = 739) = 0.00$, $p = 1.00$, which implies that the three-way interaction was significant, $\chi^2(2) = 5.36$, $p = .021$. Subsequently, 2 x 2 (Song [no, yes] x Food related HWWS [rather low, very high]) chi-square tests were accomplished for persons living in camps and those living in neighborhoods, respectively, to further analyze the three-way interaction. Results suggested that knowing a hygiene song was negatively associated with food related HWWS frequency only within neighborhoods, $\chi^2(1, N = 338) = 5.72$, $p = .021$, $\varphi = –.13$, but not in camps, $\chi^2(1, N = 401) = 0.68$, $p = .415$, which can be seen also from Figure 2. In neighborhoods, the odds of having a rather low food related HWWS frequency among persons who knew a hygiene song was 1.70 times higher compared to persons who did not know any hygiene song, whereas in camps no such association existed. Presumably, either the hygiene song had a different effect on persons in neighborhoods than in camps, or, as we tested later, self-selection effects that might have caused the negative association between knowing a hygiene song and food related HWWS frequency occurred only among persons in neighborhoods. Therefore, below, only persons living in neighborhoods were analyzed regarding underlying effects of socio-demographic characteristics on the negative association between knowing a hygiene song and food related HWWS frequency.

Among a total of $N = 365$ interviewees living in neighborhoods, 40.3% ($n = 147$) knew a hygiene song, 52.3% ($n = 191$) did not know any hygiene song, and 7.4% ($n = 27$) could not remember or their data were missing. Analyses on the associations between knowing a hygiene song and the 13 remaining socio-demographic variables were performed with respect

to $p < .0038$ for the neighborhood subsample. Paralleling the results of the total sample population (see Table 10), literacy was significantly related to knowing a hygiene song among persons living in neighborhoods (see Table 11). Persons in neighborhoods who were able to both read and write were 2.15 times more likely to know a hygiene song than persons who could read or write only or who could neither read nor write, $z = –1.65$. Consequently, the effect of literacy on food related HWWS frequency within neighborhoods was analyzed. Results showed that persons of different levels of literacy did not vary significantly in food related HWWS frequency, $H(2) = 2.37$, $p = .301$, 99% CIs [.289, .313], meaning that an effect of the ability to read and write could not be accountable for the negative association between knowing a hygiene song and food related HWWS frequency among persons living in neighborhoods[3].

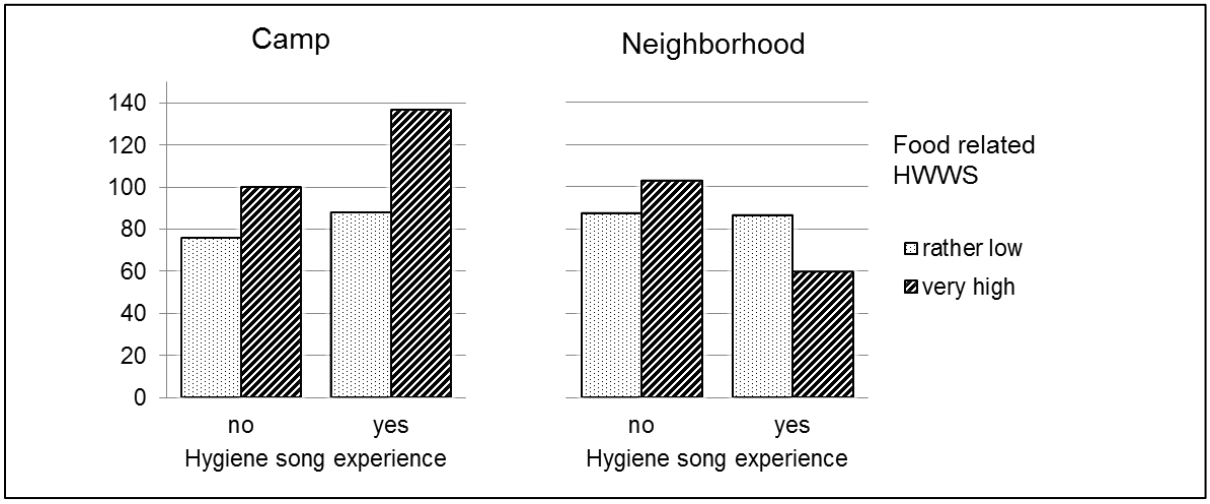

Figure 2. Numbers of persons with rather low and very high food related HWWS frequency depending on hygiene song experience among persons in camps and in neighborhoods.

Moreover, also like in the total sample, persons within neighborhoods who knew a hygiene song were significantly younger, *Mdn* = 30, than persons who did not, *Mdn* = 37 (see Table 11). Accordingly, a Kruskal-Wallis test was performed to compare the food related HWWS frequency between persons of different age groups in the neighborhood subsample[4]. However, no significant effect emerged, $H(6) = 4.96$, $p = .553$, 99% CIs [.540, .566]. Consequently, there was no effect of the interviewees' age that could have explained the negative association between knowing a hygiene song and food related frequency in the neighborhood subsample.

[3]As in the neighborhood subsample two tests were conducted on the variable food related HWWS frequency – one concerning the effect of literacy, one concerning the effect of age – results of these two tests were considered significant at $p < .025$.
[4]Data has been grouped into seven age categories: 15-19 years ($n = 26$), 20-24 years ($n = 49$), 25-29 years ($n = 57$), 30-34 years ($n = 52$), 35-39 years ($n = 40$), 40-49 years ($n = 64$), 50-90 years ($n = 61$).

Table 11

Associations Between Song and Socio-Demographic Characteristics Within Neighborhoods

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	338	1	1.35	.283			
Affiliate	338	2	0.51	.761	[.750, .772]		
Area	338	5	2.56	.634	[.622, .646]		
Quarter in PaP	175	1	0.02	1.00			
Region type	338	2	0.37	.839	[.829, .848]		
Literacy[c]	329	2	10.90	.002*	[.001, .004]	.18	
Children under 12	335	1	8.89	.004			
Babies	330	1	1.27	.291			
Occupation[d]	329	6	14.78	.020	[.017, .024]		
Education[e]	329	6	10.71	.097	[.089, .105]		
Religion	338	3	2.10	.545	[.532, .557]		
Voodoo	334	1	0.34	.598			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	322	9481	–3.96	.000*	[.000, .000]	–.22	

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could either read or write only are collapsed into one group. [d]Retired persons (*n* = 3) are excluded. [e]Persons of the levels kindergarten (*n* = 1) and professional school (*n* = 5) are exluded. *Statistical significance assumed at *p* < .0038.

In the following, we return to the associations between socio-demographic characteristics, knowing a hygiene song, and food related HWWS frequency regarding the total sample.

Children under the age of 12, song, and food related HWWS

As already outlined in section 4.2.3.1, interviewees in whose households children under the age of 12 were living were more likely to know a hygiene song than persons without children (see also Table 10). Additionally, interviewees who had children under the age of 12 WHWS less often before contact with food than those who had no children (see section 4.2.1.2 and Table 5). This pattern of results could point to a self-selection effect as an explanation for the negative association between knowing a hygiene song and food related HWWS frequency, because the negative association between knowing a hygiene song and food related HWWS frequency might be due to the negative association between having

children under the age of 12 and food related HWWS frequency. Hence, we analyzed the three-way interaction between these variables, to check whether the association between knowing a promotion song and food related HWWS frequency still persisted when we controlled for the variable having children under the age of 12.

A hierarchical 2 x 2 x 2 (Song [no, yes] x Children under 12 [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis generated a final model that retained two of three possible two-way interactions, $\chi^2(2, N = 735) = 1.19$, $p = .553$. The three-way interaction was not significant, $\chi^2(1) = 1.12$, $p = .290$, nor was the Song x Food related HWWS interaction, $\chi^2(1) = 0.07$, $p = .797$, contrasting the results found by Contzen and Mosler (in preparation). The latter not being significant in our model may be explained by the reduction in detail the food related HWWS variable had suffered through its transformation into a dichotomous variable. The Children under the age of 12 x Food related HWWS interaction was significant, $\chi^2(1) = 3.92$, $p = .048$, replicating the result of the Mann-Whitney test shown in Table 5, as well as the Song x Children under the age of 12 interaction, $\chi^2(1) = 19.80$, $p < .001$, replicating the result of the chi-square test shown in Table 10. More importantly, the three-way interaction not being significant indicated that the negative association between knowing a hygiene song and food related HWWS frequency persisted whether or not children under the age of 12 were living in the beneficiaries' households.

To sum up, there were no effects of socio-demographic characteristics on the negative association between knowing a hygiene song and food related HWWS frequency.

4.2.4. Socio-demographic characteristics, special hygiene day, and food related HWWS

From the total sample of $N = 811$ interviewees, 41.3% ($n = 335$) participated in special hygiene days, 58.0% ($n = 470$) did not experience any special hygiene day, and 0.7% ($n = 6$) could not remember or their data were missing. Associations between special hygiene day participation and the 14 socio-demographic variables were examined analogously to the sections above. Results showed that the variables affiliate, quarter in PaP, and type of site were significantly associated with the experience of special hygiene days (see Table 12).

Affiliate, special hygiene day, and food related HWWS

With regard to the standardized residuals, this means that persons from OGB participated less often in special hygiene days than what would have been expected by chance, $z = -2.12$, while persons from OQ participated more often than expected, $z = 3.03$. Among persons from IO, the observed frequencies hardly differed from the expected ones. Moreover, Table 5 shows that persons from OQ WHWS significantly more often before contact with food than persons from IO. As interviewees from OQ were more likely to participate in spe-

cial hygiene days, and, at the same time, WHWS before contact with food *more* often – rather than *less* often – than others, the association between affiliate and food related HWWS frequency could not serve as an explanation for the negative association between the experience of special hygiene days and food related HWWS frequency.

Table 12

Associations Between Special Hygiene Day and Socio-Demographic Characteristics

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	805	1	0.03	.913			
Affiliate	805	2	23.94	.000*	[.000, .000]	.17	
Area	805	4	3.13	.537	[.524, .550]		
Quarter in PaP	524	5	79.71	.000*	[.000, .000]	.39	
Region type	805	2	1.49	.478	[.465, .491]		
Type of site	805	1	41.93	.000*			–.23
Literacy	791	3	7.76	.053	[.047, .059]		
Children under 12	801	1	3.51	.063			
Babies	792	1	5.69	.018			
Occupation	791	7	7.25	.414	[.402, .427]		
Education[c]	790	7	7.47	.379	[.367, .392]		
Religion	805	3	1.53	.681	[.669, .693]		
Voodoo	793	1	0.25	.634			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	776	72374	–0.32	.752	[.740, .763]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant.

[c]Persons who attended kindergarten only (*n* = 6) are excluded.

*Statistical significance assumed at *p* < .0036.

Nevertheless, additional exploratory analyses that went beyond our research questions were conducted. To further explore possible differences between the affiliates regarding the association between special hygiene day experience and food related HWWS frequency, we analyzed the three-way interaction of these variables. A hierarchical 2 x 3 x 2 (Special hygiene day [no, yes] x Affiliate [OGB, OQ, IO] x Food related HWWS [rather low, very high]) loglinear analysis was performed. All effects were retained in the final model, $\chi^2(0, N = 805)$

= 0.00, p = 1.00, which means that the three-way interaction was significant, $\chi^2(2) = 12.42$, p = .002. To break down this effect, we conducted separate 2 x 2 (Special hygiene day [no, yes] x Food related HWWS [rather low, very high]) chi-square tests for each affiliate. Thereby, it became apparent that the negative association between the experience of special hygiene days and food related HWWS frequency was significant among persons from OQ, $\chi^2(1, N = 223) = 5.92$, p = .016, φ = –.16, and from IO, $\chi^2(1, N = 293) = 13.52$, p < .001, φ = –.22, but not among persons from OGB, $\chi^2(1, N = 289) = 1.16$, p = .319 (see also Figure 3). With regard to the odds ratios, this means that among interviewees from OQ, special hygiene day participants were 2.04 times more likely two have a rather low food related HWWS frequency than non-participants, and among interviewees from IO, special hygiene day participants were 2.44 more likely to have a rather low food related HWWS frequency than non-participants. In the OGB subsample, however, special hygiene day participants were not more likely to have a rather low food related HWWS frequency than non-participants. It might be that the three affiliates conducted special hygiene days in different ways, so that only special hygiene days from OQ and from IO had a negative effect on the food related HWWS frequency of the participants. Alternatively, self-selection effects might have occurred only among the OQ and the IO subsample, meaning that a specific subgroup of persons from OQ and IO which WHWS less often before contact with food than others was over-represented at the special hygiene days. Therefore, both interviewees from OQ and from IO were further examined on associations between socio-demographic variables, special hygiene day participation, and food related HWWS frequency.

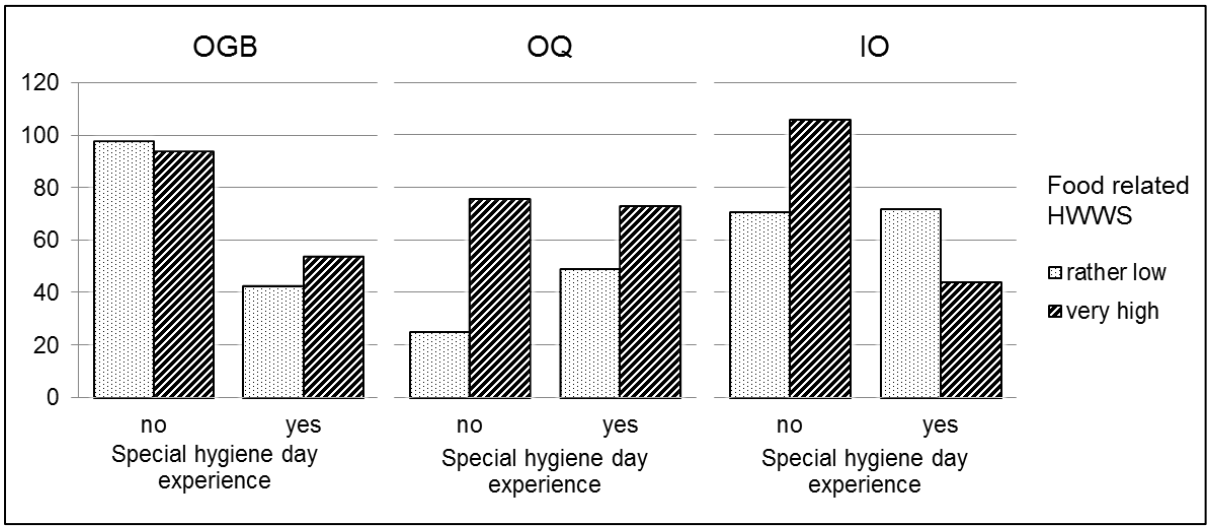

Figure 3. Numbers of persons with rather low and very high food related HWWS frequency depending on special hygiene day experience among persons of different affiliates.

First, among *N* = 225 persons from OQ, a little more than half of the interviewees (54.2%, *n* = 122) participated in special hygiene days, 44.9% (*n* = 101) did not participate, and data from 0.9% (*n* = 2) were missing. Analogously to the analyses concerning the total sample, associations between special hygiene day participation and 12 socio-demographic variables were analyzed for the OQ subsample. The variable quarter in PaP was excluded because there was only one quarter in PaP among the OQ sites. Chi-square tests showed significant associations between special hygiene day participation and the variables area, region type, and type of site (see Table 13).

Table 13

Associations Between Special Hygiene Day and Socio-Demographic Characteristics Within OQ

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	223	1	0.36	.579			
Area	223	1	12.71	.001*			–.24
Region type	223	2	16.07	.000*	[.000, .000]	.27	
Type of site	223	1	10.78	.001*			–.22
Literacy[c]	216	1	2.00	.203			
Children under 12	221	1	0.51	.493			
Babies	219	1	0.00	1.00			
Occupation[d]	208	4	4.99	.295	[.283, .307]		
Education[e]	218	5	4.56	.488	[.475, .501]		
Religion	223	3	0.69	.883	[.874, .891]		
Voodoo	218	1	0.01	1.00			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	213	4943	–1.48	.138			

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could only read or only write (*n* = 5) are excluded. [d]Persons engaged in agriculture (*n* = 6) and studies (*n* = 8) are excluded. [e]Persons of the levels kindergarten (*n* = 2), secondary school - filo (*n* = 1), and professional school (*n* = 2) are excluded.

*Statistical significance assumed at *p* < .0042.

The data collection sites of OQ were located only in the areas PaP and Leogane, and those in PaP only in the quarter of Delmas. In Leogane, more interviewees from OQ than

expected *did not* participate in any special hygiene day, $z = 2.17$, which was represented by the effect that special hygiene day participation was 2.83 times more likely in PaP (Delmas) than in Leogane for the OQ subsample. Hence, to examine whether the association between the area and special hygiene day participation was accountable for the negative association between special hygiene day participation and food related HWWS frequency among persons from OQ, we checked whether the area had an effect on food related HWWS frequency. Yet, a Mann-Whitney test showed that food related HWWS frequency did not differ between persons in PaP and those in Leogane, $U = 5286$, $z = –0.58$, $p = .559$, 99% CIs [.546, .572] for the OQ subsample[5].

Concerning the association between special hygiene day participation and region type in the OQ subsample, the standardized residuals revealed that there were less persons that *did not* participate in special hygiene days in urban regions than would have been expected by chance, $z = –2.01$, while in rural regions, more persons than expected *did not* participate in special hygiene days, $z = 2.17$. The latter effect coincided with the abovementioned effect of the area of Leogane, because all OQ sites that were located in rural regions were in Leogane. A Kruskal-Wallis test depicted no significant differences in food related HWWS frequency between persons living in different region types in the OQ subsample, $H(2) = 0.72$, $p = .702$, 99% CIs [.690, .714]. Thus, the negative association between participating in special hygiene days and food related HWWS frequency in the OQ subsample was not due to an effect of the region type.

Moreover, among persons from OQ living in neighborhoods, more than expected *did not* participate in special hygiene days, $z = 2.08$. So, the odds in favor of special hygiene day participation when living in camps rather than in neighborhoods were 2.74 among persons from OQ. Yet, this effect may be explained by the association with the area, because all of the interviewees from OQ who lived in PaP resided in camps, while in Leogane, only 12 interviewees resided in camps and the rest in neighborhoods. Likewise, a Mann-Whitney test revealed that food related HWWS frequency did not differ between persons living in camps and those living in neighborhoods, $U = 4610$, $z = –0.91$, $p = .362$, 99% CIs [.349, .374] for the OQ subsample. Hence, the negative association between special hygiene day participation and food related HWWS frequency in the OQ subsample could not be explained by any effects of socio-demographic variables.

Second, the IO subsample was analyzed for associations between socio-demographic variables, special hygiene day participation, and food related HWWS frequency analogously. From $N = 295$ interviewees from IO, 39.3% ($n = 116$) participated in special hygiene days, 60.0% ($n = 177$) did not participate, and 0.7% ($n = 2$) could not remember. Among the 13

[5]As in the OQ subsample three tests were conducted on the variable food related HWWS frequency – one concerning the effect of area, one concerning the effect of region type, and one concerning the effect of type of site – results of these three tests were considered significant at $p < .017$.

remaining socio-demographic variables tested, only the variable having a baby in the household was significantly related with participating in special hygiene days in the IO subsample (see Table 14).

Table 14

Associations Between Special Hygiene Day and Socio-Demographic Characteristics Within IO

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	293	1	0.00	1.00			
Area	293	4	13.60	.010	[.007, .012]		
Quarter in PaP	84	1	0.14	.808			
Region type	293	1	7.34	.008			
Type of site	293	1	0.64	.468			
Literacy[c]	287	2	1.07	.598	[.586, .611]		
Children under 12	293	1	2.68	.107			
Babies	287	1	14.79	.000*			.23
Occupation[d]	277	5	2.43	.791	[.780, .801]		
Education[e]	280	5	3.08	.700	[.688, .712]		
Religion[f]	289	2	1.06	.588	[.575, .600]		
Voodoo	288	1	0.30	.601			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	284	9208	–0.75	.442	[.430, .455]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could either read or write only are collapsed into one group. [d]Persons engaged in agriculture (*n* = 5) and being retired (*n* = 2) are excluded. [e]Persons of the levels kindergarten (*n* = 1), professional school (*n* = 2), and university (*n* = 6) are excluded. [f]Persons who had another religion besides protestant or catholic (*n* = 4) are excluded.

*Statistical significance assumed at *p* < .0038.

Interviewees from IO who had babies participated more often than expected in special hygiene days, *z* = 2.43. Or, put differently, they were 2.76 times more likely to participate in special hygiene days than interviewees from IO without babies. We conducted a Mann-Whitney test to compare the food related HWWS frequencies between persons from IO who had a baby in the household and those who did not. However, no significant result emerged

(see Table 8). Thus, the negative association between special hygiene day participation and food related HWWS frequency among the IO subsample could not be explained by any associations with socio-demographic characteristics.

Consequently, we return to the associations between socio-demographic characteristics, special hygiene day participation, and food related HWWS frequency in the total sample.

Quarter in PaP, special hygiene day, and food related HWWS

Concerning the quarters in PaP, significant differences between observed and expected frequencies became apparent in Delmas, where more persons than expected participated in special hygiene days, $z = 4.46$, and in Carrefour Feuille, where less persons than expected participated, $z = -4.68$. However, the negative association between special hygiene day participation and food related HWWS frequency could not be due to an effect of the quarter in PaP, because there were no significant differences in food related HWWS frequency between persons of different quarters in PaP (see Table 5).

Type of site, special hygiene day, and food related HWWS

Furthermore, there were less special hygiene day participants than expected in neighborhoods, $z = -3.67$, – in other words, the odds of participating in special hygiene days were 2.61 times higher in camps than in neighborhoods. In addition, Table 5 shows that persons in camps WHWS more often before contact with food than persons in neighborhoods. As persons in camps, on the one hand, participated more often in special hygiene days than persons in neighborhoods, and, on the other hand, WHWS *more* often – rather than *less* often – before contact with food, an effect of the type of site could not be accountable for the negative association between special hygiene day participation and food related HWWS frequency.

Nonetheless, additional exploratory analyses beyond our specific research questions were conducted here. We tested the three-way interaction between the type of site, special hygiene day participation, and food related HWWS frequency to find out more about the pattern of the data. A hierarchical 2 x 2 x 2 (Special hygiene day [no, yes] x Type of site [camp, neighborhood] x Food related HWWS [rather low, very high]) loglinear analysis was undertaken. The final model had a likelihood ratio of $\chi^2(2, N = 805) = 0.03$, $p = .875$, and included all two-way interactions but not the three-way interaction. From this follows that the negative association between special hygiene day participation and food related HWWS frequency existed independently from the association with the type of the site. The Special hygiene day x Food related HWWS interaction was significant, $\chi^2(1) = 9.23$, $p = .002$, replicating the result found by Contzen and Mosler (in preparation). The Type of site x Food related HWWS interaction was significant, too, $\chi^2(1) = 15.86$, $p < .001$, replicating the result of the Mann-Whitney

test shown in Table 5, and the Special hygiene day x Type of site interaction was also significant, $\chi^2(1) = 47.16$, $p < .001$, replicating the result of the chi-square test shown in Table 12.

In summary, there were no findings that indicated any self-selection effects that could be held accountable for the negative association between special hygiene day participation and food related HWWS frequency.

Table 15

Associations Between Home Visit and Socio-Demographic Characteristics

Variable	*N*	*df*	χ^2	*p*[a]	99% CI	*V*[b]	φ[b]
Gender	801	1	0.38	.566			
Affiliate	801	2	25.34	.000*	[.000, .000]	.18	
Area	801	4	3.91	.414	[.401, .426]		
Quarter in PaP	520	5	88.08	.000*	[.000, .000]	.41	
Region type	801	2	2.33	.322	[.310, .334]		
Type of site	801	1	39.40	.000*			–.22
Literacy	787	3	2.46	.480	[.467, .493]		
Children under 12	797	1	6.14	.016			
Babies	788	1	0.20	.688			
Occupation	787	7	3.65	.830	[.821, .840]		
Education[c]	788	7	12.34	.087	[.079, .094]		
Religion	801	3	4.77	.188	[.178, .198]		
Voodoo	789	1	0.06	.899			
	N	*U*	*z*	*p*[a]		*r*[b]	
Age	773	65091	–0.42	.678	[.666, .690]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant.

[c]Persons who attended kindergarten only (*n* = 5) are excluded.

*Statistical significance assumed at $p < .0036$.

4.2.5. Socio-demographic characteristics, home visit, and food related HWWS

With 65.8% (*n* = 534), almost two-thirds of the sample received home visits from health promotion staff, 32.9% (*n* = 267) did not receive any home visits, and 1.2% (*n* = 10) could not remember or their data were missing. In accordance with the sections above, associations between the experience of home visits and the 14 socio-demographic variables were tested.

The experience of home visits was significantly associated with the variables affiliate, quarter in PaP, and type of site (see Table 15).

Affiliate, home visit, and food related HWWS

Concerning the relationship with the affiliate, a closer look at the standardized residuals revealed that among persons from OGB, more interviewees than expected *did not* experience any home visits, $z = 3.27$, whereas among persons from OQ, *less* than expected *did not* receive any home visits, $z = –1.98$, and among persons from IO, the observed frequencies did not differ significantly from those expected. As shown in Table 5, interviewees from OGB did not differ significantly in food related HWWS frequency from persons from OQ or IO, whereas interviewees from OQ WHWS significantly more often before contact with food than those from IO. Having shown this, we can conclude that an effect of the affiliate could not explain the negative association between the experience of home visits and food related HWWS frequency, because persons from OQ, who were more likely to experience home visits, WHWS *more* often – rather than *less* often – before contact with food than others.

Still, we were interested in differences between the affiliates regarding the strength and direction of the association between the experience of home visits and food related HWWS frequency and conducted additional exploratory analyses that went beyond our research questions. We tested the three-way interaction between these variables by means of a hierarchical 2 x 3 x 2 (Home visit [no, yes] x Affiliate [OGB, OQ, IO] x Food related HWWS [rather low, very high]) loglinear analysis. A final model was produced that retained all effects, $\chi^2(0, N = 801) = 0.00$, $p = 1.00$, indicating that the three-way interaction was significant, $\chi^2(2) = 9.05$, $p = .011$. To break down this effect, separate 2 x 2 (Home visit [no, yes] x Food related HWWS [rather low, very high]) chi-square tests were conducted for each affiliate. The association between home visit experience and food related HWWS frequency was significant among persons from IO, $\chi^2(1, N = 291) = 10.75$, $p = .001$, $\varphi = –.19$, but not among persons from OGB, $\chi^2(1, N = 288) = 0.03$, $p = .906$, or among persons from OQ, $\chi^2(1, N = 222) = 0.43$, $p = .625$. As can be seen also in Figure 4, within the IO subsample, the odds of having a rather low food related HWWS frequency when experiencing home visits was 2.41 times higher than when not experiencing any home visits. Apparently, only home visits conducted by health promotion staff from IO were negatively associated with food related HWWS frequency. One could presume that IO conducted home visits different than the other affiliates and that therefore, only home visits from IO had a negative effect on the beneficiaries' food related HWWS frequency. Alternatively, beneficiaries who received home visits from IO might have differed from the beneficiaries who received home visits from OQ and OGB in some socio-demographic characteristics that explained the negative association between home visit experience and food related HWWS frequency among persons from IO. Thus, in

the following, we looked for associations between socio-demographic variables, the experience of home visits, and food related HWWS frequency among the IO subsample.

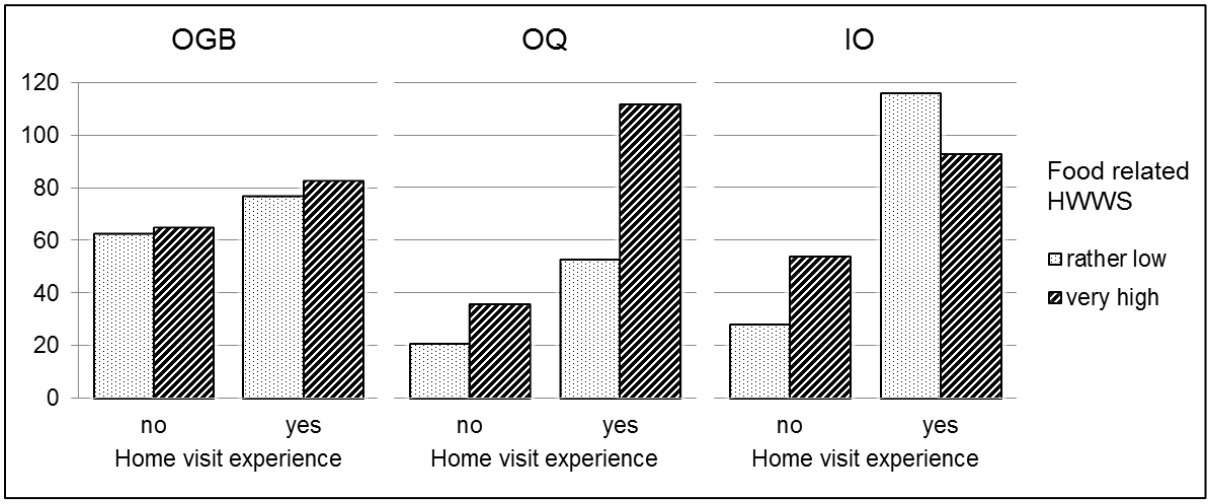

Figure 4. Numbers of persons with rather low and very high food related HWWS frequency depending on home visit experience among persons from different affiliates.

From a total of *N* = 295 interviewees from IO, 70.8% (*n* = 209) received home visits from health mobilizers, 27.8% (*n* = 82) did not receive any home visits, and 1.4% (*n* = 4) could not remember if so. Among the associations between home visit experience and the 13 remaining socio-demographic variables within the IO subsample, the association with the variable children under the age of 12 turned out to be significant (see Table 16). More persons from IO without children than expected *did not* receive any home visits, *z* = 2.04. Put more simply, those who had children under the age of 12 were 2.22 times more likely to experience home visits than those who had no children. By a look at Table 8 it becomes clear that among persons from IO, those who had children under the age of 12 WHWS significantly less often before contact with food than persons without children. So far, we do not know whether persons from IO who experienced home visits WHWS less often before contact with food because of the home visit experience or because they had more often children under the age of 12. Thus, a 2 x 2 x 2 (Home visit [no, yes] x Children under 12 [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis was undertaken for the IO subsample. The final model had a likelihood ratio of $\chi^2(2, N = 291) = 1.26$, $p = .533$, and retained two of the three possible two-way interactions. The three-way interaction was not significant, $\chi^2(1) = 0.20$, $p = .655$, nor was the Children under the age of 12 x Food related HWWS interaction significant, $\chi^2(1) = 1.06$, $p = .303$. Thus, although the effect of having children under the age of 12 was significant for the continuous variable of food related HWWS frequency among persons from IO (see Table 8), it was not for the dichotomous one. The Home visit x Food related HWWS interaction was significant, $\chi^2(1) = 10.89$, $p = .001$, as well as the Home visit x

Children under the age of 12 interaction, $\chi^2(1) = 8.90$, $p = .003$, replicating the result of the chi-square test shown in Table 16. In any case, from that fact that the three-way interaction was not significant one can conclude that, among the IO subsample, the experience of home visits was negatively associated with food related HWWS frequency whether or not the persons had children under the age of 12.

Table 16

Associations Between Home Visit and Socio-Demographic Characteristics Within IO

Variable	*N*	*df*	χ^2	p^a	99% CI	V^b	φ[b]
Gender	291	1	2.32	.176			
Area	291	4	4.13	.398	[.386, .411]		
Quarter in PaP	83	1	0.49	.497			
Region type	291	1	1.77	.196			
Type of site	291	1	0.03	.896			
Literacy[c]	285	2	1.12	.580	[.567, .593]		
Children under 12	291	1	9.08	.003*			.18
Babies	285	1	3.80	.070			
Occupation[d]	275	5	7.07	.211	[.200, .222]		
Education[e]	279	5	11.73	.038	[.033, .043]		
Religion[f]	287	2	2.38	.325	[.313, .337]		
Voodoo	286	1	0.28	.698			
	N	*U*	*z*	p^a		r^b	
Age	282	7846	–0.38	.707	[.695, .718]		

Note. CI = confidence interval.

[a]*df* > 1: *P*-values are approximated by Monte Carlo method based on 10,000 sampled tables; reported with 99% CI; *df* = 1: Exact method is used. [b]Effect sizes are reported only if result was significant. [c]Persons who could either read or write only are collapsed into one group. [d]Persons engaged in agriculture (*n* = 5) and being retired (*n* = 2) are excluded. [e]Persons of the levels kindergarten (*n* = 1), professional school (*n* = 2), and university (*n* = 6) are excluded. [f]Persons who had another religion besides protestant or catholic (*n* = 4) are excluded.

*Statistical significance assumed at $p < .0038$.

All in all, the negative association between experiencing home visits and food related HWWS frequency among persons from IO could not be explained by any effects of socio-demographic variables. Thus, in the following, we return to the associations between socio-

demographic characteristics, home visit experience, and food related HWWS frequency for the total sample.

Quarter in PaP, home visit, and food related HWWS

As shown in Table 15, the experience of home visits was significantly associated with the quarter in PaP. This can be mainly explained by the effect that in Delmas, fewer persons than expected, z = –3.80, and in Carrefour Feuille, more persons than expected, z = 6.24, *did not* receive any home visits, while no significant differences between observed and expected frequencies were found regarding other quarters. Yet, as the quarter in PaP was not associated with food related HWWS frequency (see Table 5), the negative association between home visit experience and food related HWWS frequency could not be due to the association between home visit experience and the quarter in PaP.

Type of site, home visit, and food related HWWS

Besides, the type of the site was significantly associated with the experience of home visits (see Table 15). More persons than expected *did not* received any home visits in neighborhoods, z = 3.80, and less than expected *did not* receive any home visits in camps, z = –3.44. Put another way, the odds ratio of experiencing home visits in camps rather than in neighborhoods was 2.60. As outlined in the sections above and shown in Table 5, persons in camps WHWS more often before contact with food than persons in neighborhoods. On these grounds, the association between the type of site and food related HWWS frequency could not explain the negative association between home visit experience and food related HWWS frequency, because those persons, who were more likely to experience home visits, that is, persons living in camps, were at the same time the ones who WHWS *more* often – rather than *less* often – before contact with food than persons who were less likely to experience home visits, that is, persons living in neighborhoods.

Nevertheless, beyond our research questions, we analyzed the three-way interaction between the type of site, home visit experience, and food related HWWS frequency to examine whether the association between home visit experience and food related HWWS frequency differed between persons in camps and persons in neighborhoods. A hierarchical 2 x 2 x 2 (Home visit [no, yes] x Type of site [camp, neighborhood] x Food related HWWS [rather low, very high]) loglinear analysis produced a final model with a likelihood ratio of $\chi^2(2, N = 801) = 3.73$, p = .155, and retained two of three possible two-way interactions. The three way interaction was not significant, $\chi^2(1) = 0.05$, p = .832. Also, the Home visit x Food related HWWS interaction was not significant, $\chi^2(1) = 3.68$, p = .055, contrary to the results of Contzen and Mosler (in preparation). This may be explained by the transformation of the HWWS variable into a dichotomous one, which had simplified the data pattern. The Type of site x Food relat-

ed HWWS interaction was significant, $\chi^2(1) = 11.43$, $p = .001$, just as the Home visit x Type of site interaction, $\chi^2(1) = 39.48$, $p < .001$, replicating the result of the Mann-Whitney test shown in Table 5 and the result of the chi-square test shown in Table 15, respectively.

All in all, we did not find any effects of socio-demographic characteristics that could have explained the negative association between experiencing home visits and food related HWWS frequency.

After we tested whether effects socio-demographic characteristics accounted for the negative associations between NAPT experience and HWWS frequency, we explored if the attitude towards the promotions affected the negative associations between NAPT experience and HWWS frequency.

4.3. Attitude towards the promotions, NAPTs, and HWWS

4.3.1. Average attitude, NAPTs, and HWWS

In the following sections, we address questions (3) whether, compared to other persons, NAPT participants had a rather negative attitude towards the promotion activities in general and (4) if so, whether the lower HWWS frequencies of the NAPT participants were due to this rather negative attitude.

Descriptive analysis showed that the average attitude towards the promotions was quite positive among the total sample population ($M = 3.06$, $SD = 0.39$). For distributional characteristics of the attitude see Appendix D.

4.3.1.1. Average attitude, focus group, and HWWS

Focus group participants were compared with non-participants regarding the average attitude towards all promotion activities. The participants' attitude towards focus groups has not been included in the variable for average attitude because only focus group participants had evaluated this promotion type. We conducted a Mann-Whitney test demonstrating that, with an average rank of 377, focus group participants had a less positive attitude than non-participants, with an average rank of 420, $U = 69642$, $z = –2.70$, $p = .008$, $r = –.10$. Medians of both groups did not vary, though ($Mdn = 3.00$, respectively). Consequently, it was tested whether significant differences in feces and food related HWWS frequency emerged between persons of different attitude levels towards the promotion types.

4.3.1.1.1. Average attitude, focus group, and feces related HWWS

In order to look for differences in feces related HWWS frequency between persons of different attitude levels towards the promotion types, data of the average attitude (here, including the attitude towards focus groups) were first divided on the median ($Mdn = 3.00$) into two

categories (0 = *rather negative attitude* and 1 = *very positive attitude*), thereby creating a dichotomous variable for average attitude. With 58.6% (*n* = 475), a bit more than half of the interviewees had a rather negative attitude, 41.1% (*n* = 333) had a very positive one, and data of 0.4% (*n* = 3) were missing. Yet, it has to be kept in mind that persons labeled to have a rather negative attitude ranged from 1.75 to 3.00 on the continuous scale with a maximum value of 4.00, thus, persons with a quite positive attitude were included in this level. A Mann-Whitney test was performed to compare feces related HWWS frequencies between persons of different attitude levels towards the promotion activities. Results indicated that interviewees having a rather negative attitude towards the promotion types WHWS significantly less often after contact with feces (*Mdn* = 3.67) than those having a very positive attitude (*Mdn* = 4.00), $U = 62861$, $z = -5.30$, $p < .001$, $r = -.19$.

In sum, both participation in focus groups and a rather negative attitude towards the promotion types were negatively associated with feces related HWWS frequency. Moreover, focus group participants were more likely than non-participants to have a rather negative average attitude. This being the case, we tested the three-way interaction of these variables to find out whether the lower feces related HWWS frequencies of focus group participants were a result of the focus group participants' rather negative attitude towards the promotion activities in general. A hierarchical 2 x 2 x 2 (Focus group [no, yes] x Attitude [rather negative, very positive] x Feces related HWWS [rather low, very high]) loglinear analysis was conducted. So as not to bias the distribution of the average attitude in the direction of focus group participants, the dichotomous variable for attitude was created by a median split of the variable "average attitude towards the promotion types except focus group" (*Mdn* = 3.00), which has been already applied for the abovementioned Mann-Whitney test comparing the average attitude between focus group participants and non-participants (see section 4.3.1.1).

The final model had a likelihood ratio of $\chi^2(2, N = 805) = 4.36$, $p = .113$, and retained two of three possible two-way interactions. The three-way interaction was not significant, $\chi^2(1) = 2.94$, $p = .086$, nor was the Focus group x Attitude interaction, $\chi^2(1) = 1.42$, $p = .233$. In contrast to the findings of the Mann-Whitney test reported in section 4.3.1.1, the difference in average attitude dependent on focus group participation, therefore, was not supported by the model. This may be a consequence of the data reduction caused by the median split of the attitude variable. The Focus group x Feces related HWWS interaction was significant, $\chi^2(1) = 18.66$, $p < .001$, replicating the result found by Contzen and Mosler (in preparation), as well as the Attitude x Feces related HWWS interaction, $\chi^2(1) = 21.07$, $p < .001$, corresponding to the result of the Mann-Whitney test presented above comparing the feces related HWWS frequency between persons of different attitude levels towards the promotion types. Both associations have to be considered as being independent from each other because the three-way interaction was not significant.

4.3.1.1.2. Average attitude, focus group, and food related HWWS

In section 4.3.1.1 it was depicted that focus group participants had a less positive average attitude towards the promotion types in general (excluding the attitude towards focus groups) than non-participants. Analogously to the analyses regarding feces related HWWS, we compared the food related HWWS frequencies between persons of different attitude levels towards the promotion activities (see section 4.3.1.1.1 for characteristics of the dichotomous attitude variable). A Mann-Whitney test showed that persons with a rather negative attitude towards the promotions WHWS less often before contact with food (*Mdn* = 3.00) than persons with a very positive attitude (*Mdn* = 3.25), $U = 59377$, $z = -6.08$, $p < .001$, $r = -.21$. To test whether the negative association between participating in focus groups and food related HWWS frequency interacted with the average attitude of the interviewees, a hierarchical 2 x 2 x 2 (Focus group [no, yes] x Attitude [rather negative, very positive] x Food related HWWS [rather low, very high]) loglinear analysis was accomplished[6]. The saturated model remained the final model, because all effects were retained, $\chi^2(0, N = 805) = 0.00$, $p = 1.00$. The three-way interaction was significant, $\chi^2(1) = 4.97$, $p = .026$. To break down this effect, two separate 2 x 2 (Focus group [no, yes] x Food related HWWS [rather low, very high]) chi-square tests were performed for persons having a rather negative attitude and those having a very positive attitude. The results suggested that the negative association between focus group participation and food related HWWS frequency was significant among persons who had a rather negative average attitude towards the promotions, $\chi^2(1, N = 481) = 9.28$, $p = .003$, $\varphi = -.14$, but not among those having a very positive average attitude, $\chi^2(1, N = 324) = 0.20$, $p = .719$. Among persons having a rather negative attitude, the odds in favor of a rather low food related HWWS frequency when participating in focus groups was 1.78. This pattern of results is illustrated in Figure 5. As, among persons with a rather negative attitude towards the promotions, focus group experience was still related to lower food related HWWS, that the negative association between focus group experience and food related HWWS frequency could not be traced back to a self-selection effect on the part of persons having rather negative attitude.

4.3.1.2. Average attitude, stickers, posters, paintings, and HWWS

Analogously to the analyses regarding the average attitude towards the promotion activities and focus group participation, we compared the average attitude towards the promotion types – excluding the attitude towards stickers, posters, or paintings – between interviewees who experienced hygiene promotion by stickers, posters, or paintings and those who did not.

[6]Here, the dichotomous attitude variable was created by a median split of the data of average attitude towards the promotion types excluding focus group (*Mdn* = 3.00), so as not to bias its distribution in favor of the focus group participants' attitude.

No significant difference concerning the average attitude was identified, U = 55717, z = –0.93, p = .357. Hence, further analyses on associations with the HWWS frequencies were unnecessary.

Figure 5. Numbers of persons with rather low and very high food related HWWS frequency depending on focus group experience among persons with rather negative and those with very positive attitude.

4.3.1.3. Average attitude, song, and HWWS

Likewise, the average attitude towards the promotion types (this time without any exclusion, because the attitude towards the hygiene song has not been assessed) was compared between persons who knew a hygiene song and those who did not. A significant difference was found, U = 55456, z = –4.41, p < .001, r = –.16. Although the medians of both groups coincided (*Mdn* = 3.00, respectively), persons who knew a hygiene song had an average rank of 336, while persons who did not know any promotion song had an average rank of 402, indicating that the former had a less positive attitude towards the promotions than the latter. Moreover, it has been revealed that persons having a rather negative attitude WHWS less often both after contact with feces and before contact with food than persons with a very positive attitude (see sections 4.3.1.1.1 and 4.3.1.1.2). To check whether the negative associations between knowing a hygiene song and the feces and food related HWWS frequencies interacted with the interviewees' average attitude towards the promotion types, in the following sections, we tested the three-way interactions between the average attitude, knowing a hygiene song, and the HWWS frequencies.

4.3.1.3.1. Average attitude, song, and feces related HWWS

A hierarchical 2 x 2 x 2 (Song [no, yes] x Attitude [rather negative, very positive] x Feces related HWWS [rather low, very high]) loglinear analysis was performed to test the three-way interaction between the average attitude, knowing a hygiene song, and feces related HWWS frequency. The final model had a likelihood ratio of $\chi^2(2, N = 736) = 4.28$, $p = .118$, and retained two of three possible two-way interactions. To be more precise, the Song x Feces related HWWS interaction, $\chi^2(1) = 22.25$, $p < .001$, and the Attitude x Feces related HWWS interaction, $\chi^2(1) = 20.39$, $p < .001$, were both retained in the final model, replicating the result of Contzen and Mosler (in preparation) and the one depicted in section 4.3.1.1.1, respectively. The Song x Attitude interaction was not significant, $\chi^2(1) = 2.60$, $p = .107$, that is, the result of the Mann-Whitney test given in section 4.3.1.3 could not be supported in this model. This was probably due to the data reduction of the average attitude variable caused by the median split. More importantly, the three-way interaction was not significant, $\chi^2(1) = 1.69$, $p = .194$, indicating that the association between knowing a promotion song and feces related HWWS frequency was not influenced by the interviewees' average attitude towards the promotion activities in general.

4.3.1.3.2. Average attitude, song, and food related HWWS

To examine the interaction between the average attitude, knowing a hygiene song, and food related HWWS frequency, a hierarchical 2 x 2 x 2 (Song [no, yes] x Attitude [rather negative, very positive] x Food related HWWS [rather low, very high]) loglinear analysis was performed. The final model retained all effects, $\chi^2(0, N = 736) = 0.00$, $p = 1.00$, indicating that the three-way interaction was significant, $\chi^2(1) = 13.42$, $p < .001$. Hereafter, we conducted two 2 x 2 (Song [no, yes] x Food related HWWS [rather low, very high]) chi-square tests separately for persons of both levels of the average attitude. In doing so, it became clear that there was a significant association between knowing a hygiene song and food related HWWS frequency at both levels of the average attitude – in opposite directions, though. As can be seen from Figure 6, among persons having a rather negative attitude towards the promotions, knowing a hygiene song was negatively associated with food related HWWS frequency, $\chi^2(1, N = 432) = 5.50$, $p = .020$, $\varphi = -.11$. In contrast, among persons who had a very positive attitude, knowing a hygiene song was positively associated with food related HWWS frequency, $\chi^2(1, N = 304) = 7.81$, $p = .007$, $\varphi = .16$. To be more concrete, the odds in favor of a rather low food related HWWS frequency when knowing a hygiene song was 1.58 for persons having a rather negative attitude, but 0.50 for persons having a very positive attitude. Yet, the results did not point to a self-selection effect, because knowing a song was still

associated with lower food related HWWS frequency when controlling for the average attitude towards the promotions.

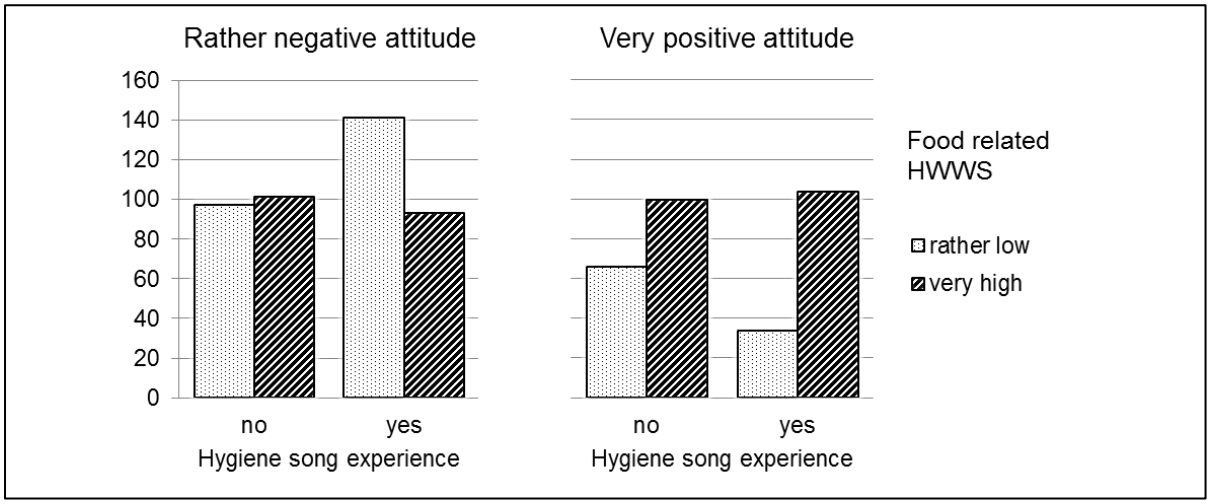

Figure 6. Numbers of persons with rather low and very high food related HWWS frequency depending on hygiene song experience among persons with rather negative and those with very positive attitude.

4.3.1.4. Average attitude, special hygiene day, and food related HWWS

We conducted a Mann-Whitney test to analyze the association of special hygiene day participation with the interviewees' average attitude towards the promotions (excluding the attitude towards special hygiene days). Results revealed that interviewees who participated in special hygiene days had an average rank of 370, meaning a less positive average attitude towards the promotions than non-participants, who had an average rank of 424, U = 67570, z = –3.43, p = .001, r = –.12. Medians of both groups did not differ, though (*Mdn* = 3.00, respectively). As mentioned in section 4.3.1.1.2, interviewees who had a rather negative attitude towards the promotion types WHWS less often before contact with food than interviewees who had a very positive attitude. Consequently, we examined the three-way interaction between the average attitude, special hygiene day participation, and food related HWWS frequency to find out whether the negative association between participating in special hygiene days and food related HWWS frequency depended on the average attitude of the persons.

A 2 x 2 x 2 (Special hygiene day [no, yes] x Attitude [rather negative, very positive] x Food related HWWS [rather low, very high]) loglinear analysis generated a final model that retained all effects[7], $\chi^2(0, N = 802) = 0.00$, $p = 1.00$. The three-way interaction was signifi-

[7]Here, the dichotomous attitude variable was created by a median split of the data of average attitude towards the promotion types excluding special hygiene days (*Mdn* = 3.00), so as not to bias its distribution in favor of the special hygiene day participants' attitude.

cant, $\chi^2(1) = 6.20$, $p = .013$. To interpret this effect, two separate 2 x 2 (Special hygiene day [no, yes] x Food related HWWS [rather low, very high]) chi-square tests were performed for persons with a rather negative and those with a very positive attitude. It was shown that the negative association between participating in special hygiene days and food related HWWS frequency was only significant among persons who had a rather negative attitude, $\chi^2(1, N = 476) = 9.91$, $p = .002$, $\varphi = -.14$, but not among persons who had a very positive attitude, $\chi^2(1, N = 326) = 0.50$, $p = .547$ (see also Figure 7). Among the interviewees who had a rather negative attitude, special hygiene day participants were 1.80 times more likely to have a rather low food related HWWS frequency than non-participants, but this likelihood was not significantly increased among persons who had a very positive average attitude towards the promotions. Hence, the negative association between special hygiene day experience and food related HWWS frequency did not disappear when controlling for the average attitude, meaning that it could not be explained by an effect of the average attitude towards the promotions.

Figure 7. Numbers of persons with rather low and very high food related HWWS frequency depending on special hygiene day experience among persons with rather negative and those with very positive attitude.

4.3.1.5. Average attitude, home visit, and food related HWWS

Likewise, a Mann-Whitney test was performed to explore the average attitude towards the promotion types (excluding the attitude towards home visits) depending on home visit experience. However, no significant differences were found between persons who experienced home visits and those who did not, $U = 66799$, $z = -1.26$, $p = .212$. Hence, we did not conduct any further analyses on interactions with food related HWWS frequency and home visits experience here.

4.3.2. Attitudes towards the NAPTs and HWWS

In the following sections, we approach question (5), whether there were relationships between feces and food related HWWS frequencies and the attitude towards the NAPTs among the NAPT participants, via chi-square tests. The distributions of the attitudes towards NAPTs were sharply pointed, each[8]. Kurtosis (with standard errors in parentheses) for the attitudes towards focus groups, stickers, posters, or paintings, special hygiene days, and home visits were 4.02 (0.27), 2.17 (0.20), 3.70 (0.27), and 2.70 (0.21), respectively (see Appendix E for histograms). Such being the case, a median split of the data would have led to highly unequal groups and we did not undertake it here. In contrast, the five levels of the likert scale on which the attitude variables were arranged were treated henceforth as discrete and cell frequencies of the contingency tables were interpreted accordingly.

4.3.2.1. Attitude towards focus groups and HWWS

4.3.2.1.1. Attitude towards focus groups and feces related HWWS

The association between the attitude towards focus groups and feces related HWWS frequency among focus group participants was analyzed by a 2 x 4 (Feces related HWWS [rather low, very high] x Liking focus group [no, quite, yes, very much]) chi-square test. Data of n = 2 persons who had answered not to like focus groups at all were excluded to avoid expected cell frequencies below five. Results showed a significant association, $\chi^2(3, N = 322) = 54.17$, $p < .001$, $V = .41$. Each of the 11 persons who indicated not to like focus groups and 33 out of 36 persons who quite liked them had rather low feces related HWWS frequencies, that is, much more than one would have expected by chance, $z = 2.64$ and $z = 4.04$, respectively. On the other hand, those who liked focus groups very much were less likely to have rather low feces related HWWS frequencies, $z = –2.02$.

4.3.2.1.2. Attitude towards focus groups and food related HWWS

An analogous analysis was conducted with regard to food related HWWS frequency. A significant association was revealed, $\chi^2(3, N = 322) = 49.40$, $p < .001$, $V = .39$. Standardized residuals were highest for persons who did not like or quite liked focus groups, as they more often had rather low food related HWWS frequencies than expected, $z = 2.43$ and $z = 3.93$, respectively.

[8]The vast majority of answers to the question whether the interviewee liked a promotion type were given at level 3 = *yes* on a 5-point likert scale from 0 = *not at all* to 4 = *very much.* Percentages of answers given at level 3: focus groups: 74.1%; stickers, poster, paintings: 71.4%; special hygiene days: 79.6%, home visits: 77.9% (see Appendix E for histograms). Therefore, a median split, as it was undertaken for the average attitude variable (see section 4.2.1.1.1), would have created very unequal group sizes here.

4.3.2.2. Attitude towards stickers, posters, paintings and HWWS

4.3.2.2.1. Attitude towards stickers, posters, paintings and feces related HWWS

Similarly, a 2 x 4 (Feces related HWWS [rather low, very high] x Liking stickers, posters, paintings [no, quite, yes, very much]) chi-square test was performed to test the association between feces related HWWS frequency and the attitude towards stickers, posters, or paintings. No interviewee had indicated to not like stickers, posters, or paintings at all. A significant association emerged, $\chi^2(3, N = 618) = 74.27$, $p < .001$, $V = .35$. Again, this was mainly driven by persons who did not like or quite liked stickers, posters, or paintings as they had more often than expected rather low feces related HWWS frequencies, $z = 4.02$ and $z = 4.50$, respectively. Contrarily, interviewees who liked this promotion type very much had less often than expected rather low feces related HWWS frequencies, $z = –2.02$.

4.3.2.2.2. Attitude towards stickers, posters, paintings and food related HWWS

Regarding food related HWWS frequency, the chi-square resulted in a significant association, $\chi^2(3, N = 618) = 79.44$, $p < .001$, $V = .36$. On the one hand, persons who did not like or quite liked stickers, posters, or paintings had more often than expected rather low food related HWWS frequencies, $z = 4.31$ and $z = 4.22$, respectively. Persons who liked stickers, posters, or paintings, on the other hand, had less often than expected rather low food related HWWS frequencies, $z = –2.20$.

4.3.2.3. Attitude towards special hygiene days and food related HWWS

Likewise, we tested the association between the attitude towards special hygiene days and food related HWWS frequency by a 2 x 3 (Food related HWWS [rather low, very high] x Special hygiene day liking [quite, yes, very much]) chi-square test. Among interviewees who participated in special hygiene days no one indicated to not like them at all and $n = 3$ persons indicated they did not like them. The latter were excluded from the analysis to avoid expected cell frequencies below five. A significant association was found, $\chi^2(2, N = 329) = 31.74$, $p < .001$, $V = .31$. This result was mainly driven by the effect that persons who quite liked special hygiene days had more often than expected rather low food related HWWS frequencies, $z = 3.70$.

4.3.2.4. Attitude towards home visits and food related HWWS

To test the association between the attitude towards home visits and food related HWWS frequency, we performed a 2 x 3 (Food related HWWS [rather low, very high] x Home visit liking [quite, yes, very much]) chi-square test. Among persons who experienced home visits no one said to not like them at all. Three persons who did not like them were excluded from

the analysis to avoid expected cell frequencies below five. The chi-square test revealed a significant association, $\chi^2(2, N = 530) = 21.66$, $p < .001$, $V = .20$. Again, the result was mainly due to the fact that persons who quite liked home visits had more often than expected rather low food related HWWS frequencies, $z = 3.32$.

In sum, the results suggested that NAPT participants who did not like the respective NAPT WHWS less often both after contact with feces and before contact with food than persons who liked the NAPT.

4.4. PAPTs, NAPTs, and HWWS

In what follows, question (6), whether there were interaction effects between the experience of NAPTs, the experience of PAPTs, and feces and food related HWWS frequencies, are addressed. As radio spots and material distributions had the highest positive associations with both feces and food related HWWS frequencies among all promotion types, interaction effects with these promotion types are tested for each NAPT and feces and food related HWWS frequency.

4.4.1. Radio spot, NAPTs, and HWWS

4.4.1.1. Radio spot, NAPTs, and feces related HWWS

To test the interaction between participating in focus groups, listening to radio spots, and feces related HWWS frequency, a hierarchical 2 x 2 x 2 (Focus group [no, yes] x Radio spot [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis was undertaken. The analysis generated a final model with a likelihood ratio of $\chi^2(2, N = 807) = 0.76$, $p = .684$, that retained two of three possible two-way interactions. The three-way interaction was not significant, $\chi^2(1) = 0.04$, $p = .836$. The Radio spot x Feces related HWWS interaction was not significant, either, $\chi^2(1) = 0.72$, $p = .398$, which was in contrast to the results found by Contzen and Mosler (in preparation). Both the Focus group x Feces related HWWS interaction, $\chi^2(1) = 19.03$, $p < .001$, and the Focus group x Radio spot interaction were significant, $\chi^2(1) = 13.16$, $p < .001$, and were retained in the final model. The fact that the association between listening to radio spots and feces related HWWS frequency was not significant in this model may be due to the data reduction caused by the median split of the HWWS variable. In order to examine in more detail this loss of effect, we split the rather-low- and very-high-feces-related-HWWS-frequency groups into two subgroups, each, and cross-tabbed the 4-leveled feces related HWWS variable with radio spot experience (see Appendix F). It was shown hereby that the observed frequencies only of persons with the very lowest feces related HWWS frequencies deviated from the expected ones. This means that interviewees at the lower end of the distribution of feces related HWWS frequency experienced hygiene promo-

tion via radio spots less often than what would have been expected by chance. Since, in the dichotomized feces related HWWS variable these persons were merged with persons with a medium feces related HWWS frequency, no significant association could be found between feces related HWWS frequency and radio spot experience when the dichotomized feces related HWWS variable was applied.

The same pattern of results was found for interactions between feces related HWWS frequency, listening to radio spots, and experiencing stickers, posters, or paintings and hygiene songs, respectively. These results are not displayed here but can be found in Appendix G.

4.4.1.2. Radio spot, NAPTs, and food related HWWS

Similar to the analyses regarding feces related HWWS frequency (see section 4.4.1.1) none of the hierarchical 2 x 2 x 2 (NAPT [no, yes] x Radio spot [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis was significant: Neither regarding focus groups, nor stickers, posters, or paintings, nor hygiene songs, nor special hygiene days, nor home visits (see Appendix H). Besides, the Radio spot x Food related HWWS interaction was not significant in any of the generated models (see Appendix H), in contrast to the findings by Contzen and Mosler (in preparation). This may be caused by the transformation of the food related HWWS variable into a dichotomous one. To go beyond the loss of effect we divided the rather-low- and very-high-food-related-HWWS-frequency groups into two subgroups, respectively, and cross-tabbed the four-leveled HWWS variable with radio spot experience. Standardized residuals showed significant deviations only for persons with the very lowest food related HWWS frequencies, as they experienced radio spots less often than expected (see Appendix I). The association between food related HWWS frequency and listening to radio spots was not significant for the dichotomized food related HWWS variable, because persons having a very low food related HWWS frequency were merged with persons having a medium food related HWWS frequency.

4.4.2. Material distribution, NAPTs, and HWWS

4.4.2.1. Material distribution, focus group, and HWWS

4.4.2.1.1. Material distribution, focus group, and feces related HWWS

To test the interaction between the participation in focus groups, the experience of material distributions, and feces related HWWS frequency, a hierarchical 2 x 2 x 2 (Focus group [no, yes] x Material distribution [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis was conducted. The final model retained all effects, $\chi^2(0, N = 806) = 0.00$, $p = 1.00$, meaning that the three-way interaction was significant, $\chi^2(1) = 4.18$, $p = .041$. We broke down this effect by conducting separate 2 x 2 (Focus group [no, yes] x Feces related HWWS

[rather low, very high]) chi-square tests for persons who experienced material distributions and for those who did not. Results showed that the association between participating in focus groups and feces related HWWS frequency was significant among persons who experienced material distributions, $\chi^2(1, N = 411) = 5.95$, $p = .019$, as well as among those who did not, $\chi^2(1, N = 395) = 29.93$, $p < .001$. However, as can be seen from Figure 8, the effect was much smaller for the former than for the latter, $\varphi = -.12$ and $\varphi = -.26$, respectively. The odds in favor of a rather low feces related HWWS frequency when participating in focus groups was 1.69 among persons who experienced material distributions and 3.23 among those who did not.

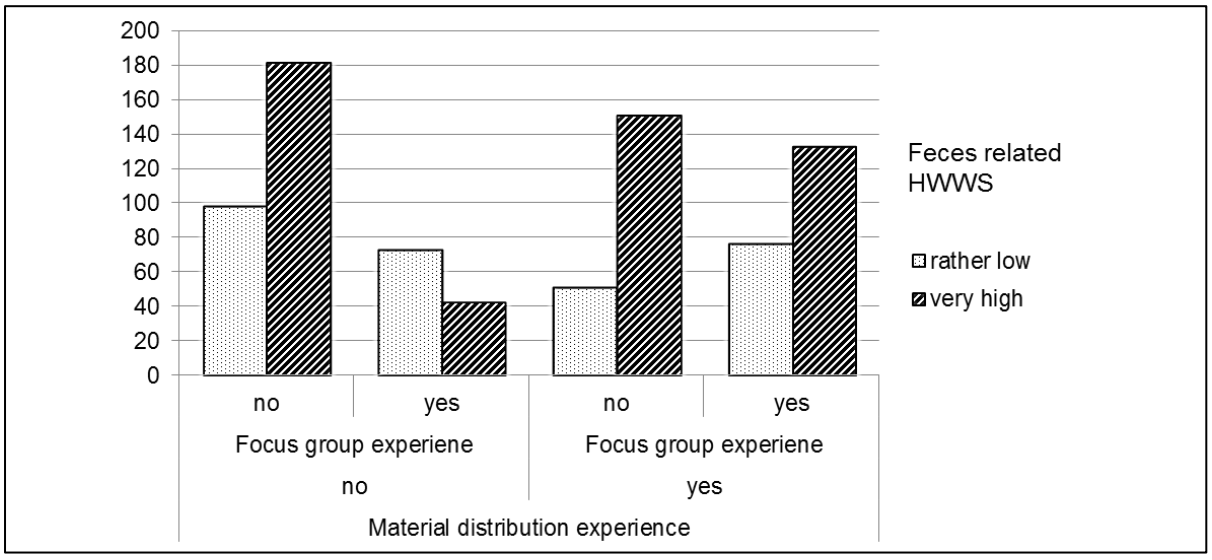

Figure 8. Numbers of persons with rather low and very high feces related HWWS frequency depending on focus group participation among persons who did and those who did not experience material distributions.

4.4.2.1.2. Material distribution, focus group, and food related HWWS

Similarly, we tested the three-way interaction between experiencing material distributions, participating in focus groups, and food related HWWS by means of a hierarchical 2 x 2 x 2 (Focus group [no, yes] x Material distribution [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis. A final model was produced that retained all effects, $\chi^2(0, N = 806) = 0.00$, $p = 1.00$. The three-way interaction was significant, $\chi^2(1) = 5.00$, $p = .025$. Succeeding chi-square tests revealed that the negative association between focus group participation and food related HWWS frequency was significant only among persons who did not experience material distributions, $\chi^2(1, N = 395) = 13.55$, $p < .001$, $\varphi = -.19$, while it was not significant among persons who did experience this promotion type, $\chi^2(1, N = 411) = 0.57$, $p = .477$ (see Figure 9). In other words, when focus group participants did not experience any

material distributions, the odds of having a rather low food related HWWS frequency was 2.31 compared to non-focus-group participants. However, when material distributions were experienced, the odds of a rather low feces related HWWS frequency was not significantly increased among persons who participated in focus groups.

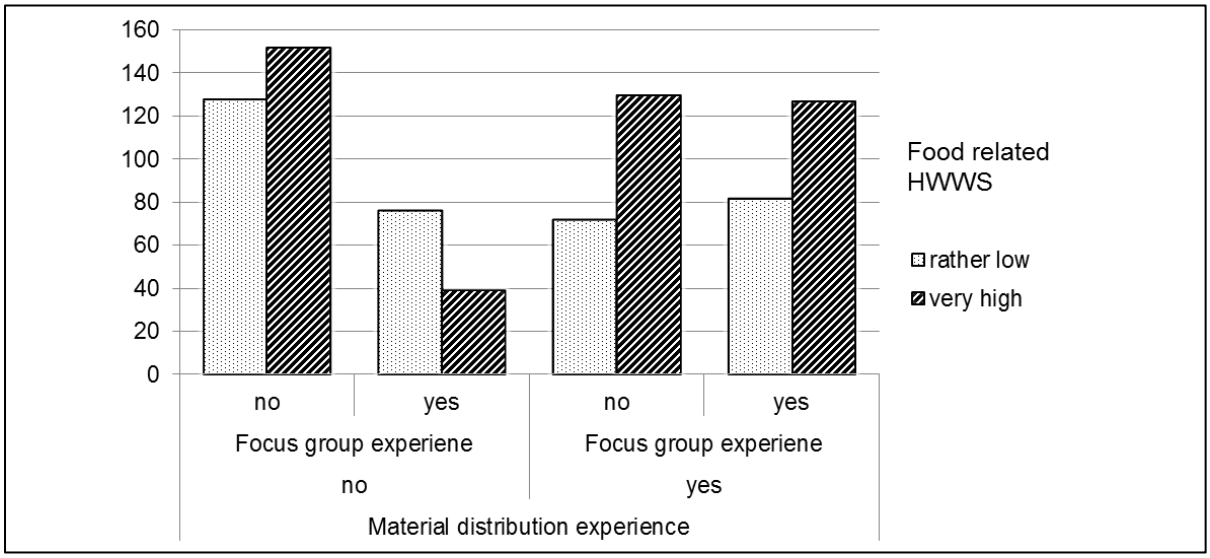

Figure 9. Numbers of persons with rather low and very high food related HWWS frequency depending on focus group participation among persons who did and those who did not experience material distributions.

4.4.2.2. Material distribution, stickers, posters, paintings, and HWWS

4.4.2.2.1. Material distribution, stickers, posters, paintings, and feces related HWWS

Similarly, we performed a hierarchical 2 x 2 x 2 (Stickers, posters, paintings [no, yes] x Material distribution [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis to test the interaction between the experience of stickers, posters, or paintings, the experience of material distributions, and feces related HWWS frequency. The final model retained all effects, $\chi^2(0, N = 808) = 0.00$, $p = 1.00$, meaning that the three-way interaction was significant, $\chi^2(1) = 7.32$, $p = .007$. To interpret the interaction we split up this effect by conducting separate 2 x 2 (Stickers, posters, paintings [no, yes] x Feces related HWWS [rather low, very high]) chi-square tests for persons who experienced material distributions and for those who did not. The negative association between the experience of stickers, posters, or paintings and feces related HWWS frequency was significant among persons who did not experience any material distribution, $\chi^2(1, N = 396) = 30.58$, $p < .001$, $\varphi = -.28$, but not among those who did, $\chi^2(1, N = 412) = 1.74$, $p = .234$ (see Figure 10). Among persons who did not experience material distributions, those who experienced stickers, posters, or paintings were 4.11 times more likely to have a rather low feces related HWWS frequency than those who expe-

rienced no stickers, posters, or paintings. When material distributions were experienced, however, the odds of a rather low feces related HWWS frequency was not significantly increased among persons who experienced stickers, posters, or paintings.

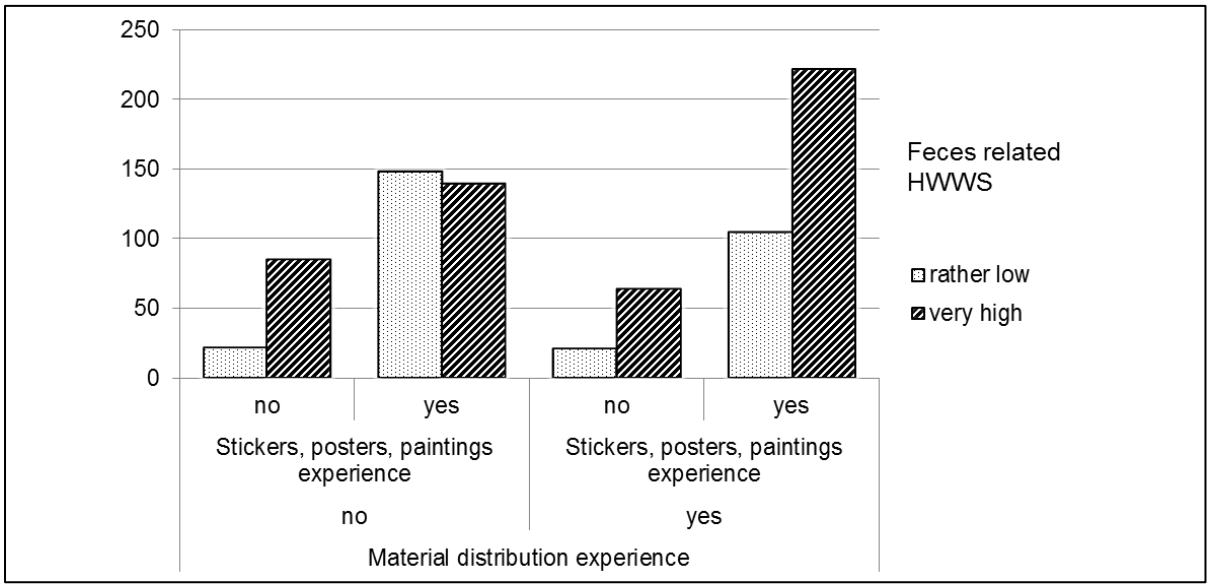

Figure 10. Numbers of persons with rather low and very high feces related HWWS frequency depending on experiencing sticker, posters, or paintings among persons who did and those who did not experience material distributions.

4.4.2.2.2. Material distribution, stickers, posters, paintings, and food related HWWS

Likewise, to analyze the three-way interaction between experiencing material distributions, experiencing stickers, posters, or paintings, and food related HWWS frequency we performed a hierarchical 2 x 2 x 2 (Stickers, posters, paintings [no, yes] x Material distribution [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis. The final model retained all effects, $\chi^2(0, N = 808) = 0.00$, $p = 1.00$, meaning that the three-way interaction was significant, $\chi^2(1) = 10.08$, $p = .002$. Subsequent chi-square tests for persons who experienced material distributions and those who did not showed that there was no significant association between the experience of stickers, posters, or paintings and food related HWWS frequency among the former, $\chi^2(1, N = 412) = 0.50$, $p = .531$, however, among the latter, there was, $\chi^2(1, N = 396) = 15.51$, $p < .001$, $\varphi = -.20$ (see Figure 11). Among persons who did not experience any material distributions, persons who experienced stickers, posters, or paintings were 2.49 times more likely to have a rather low food related HWWS frequency than those who did not experience any stickers, posters, or paintings. Conversely, when material distributions were experienced, the odds of a rather low food related HWWS frequency was not significantly increased among persons who experienced stickers, posters, or paintings.

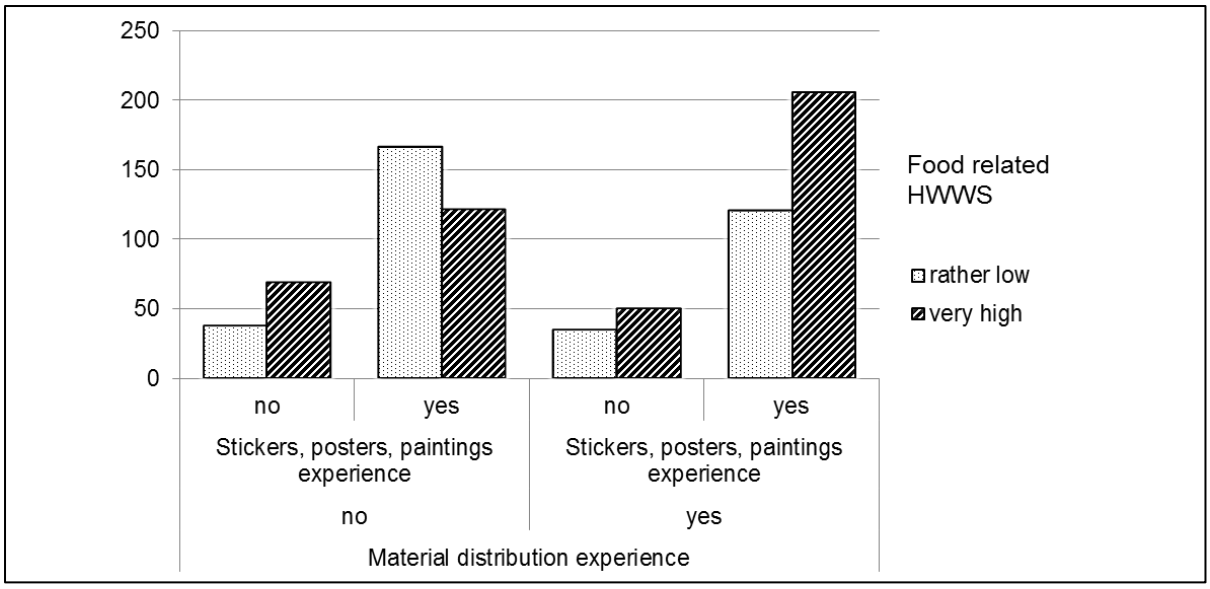

Figure 11. Numbers of persons with rather low and very high food related HWWS frequency depending on experiencing sticker, posters, or paintings among persons who did and those who did not experience material distributions.

4.4.2.3. Material distribution, song, and HWWS

4.4.2.3.1. Material distribution, song, and feces related HWWS

To test the interaction between knowing a hygiene song, experiencing material distributions, and feces related HWWS frequency, we performed a hierarchical 2 x 2 x 2 (Song [no, yes] x Material distribution [no, yes] x Feces related HWWS [rather low, very high]) loglinear analysis. The final model had a likelihood ratio of $\chi^2(1, N = 737) = 1.02$, $p = .313$, and retained all two-way, but not the three-way interaction. The Song x Feces related HWWS interaction was significant, $\chi^2(1) = 28.42$, $p < .001$, as well as the Material distribution x Feces related HWWS interaction, $\chi^2(1) = 18.14$, $p < .001$, replicating the results of Contzen and Mosler (in preparation). The Song x Material distribution interaction was significant, too, $\chi^2(1) = 17.34$, $p < .001$. Since the three-way interaction was not significant, the negative association between knowing a promotion song and feces related HWWS frequency was not attenuated by a positive association between the experience of material distributions and feces related HWWS frequency.

4.4.2.3.2. Material distribution, song, and food related HWWS

Likewise, we analyzed the three-way interaction between experiencing material distributions, knowing a hygiene song, and food related HWWS frequency by means of a hierarchical 2 x 2 x 2 (Song [no, yes] x Material distribution [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis. A final model was produced that retained all effects, $\chi^2(0,$

N = 737) = 0.00, *p* = 1.00. The three-way interaction was significant, $\chi^2(1) = 5.61$, *p* = .018. By breaking down this effect into separate chi-square tests it was shown that the association between knowing a hygiene song and food related HWWS frequency was significant among persons who did not experience any material distributions, $\chi^2(1, N = 365) = 6.39$, *p* = .015, φ = –.13. Here, the odds in favor of a rather low food related HWWS frequency was 1.72 when knowing a promotion song. However, there was no significant association between knowing a hygiene song and food related HWWS frequency among those persons who did experience material distributions, $\chi^2(1, N = 372) = 0.68$, *p* = .453. This pattern of results is shown in Figure 12.

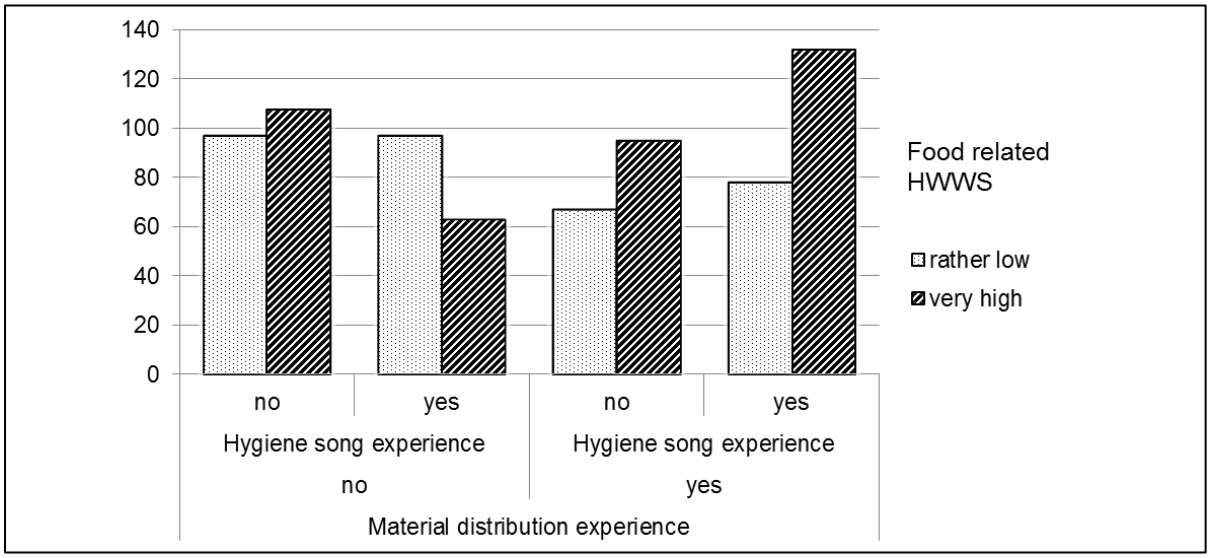

Figure 12. Numbers of persons with rather low and very high food related HWWS frequency depending on knowing a hygiene song among persons who did and those who did not experience material distributions.

4.4.2.4. Material distribution, special hygiene day, and food related HWWS

To test the three-way interaction between experiencing material distributions, participating in special hygiene days, and food related HWWS frequency, a hierarchical 2 x 2 x 2 (Special hygiene day [no, yes] x Material distribution [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis generated a final model with all effects retained, $\chi^2(0, N = 803) = 0.00$, *p* = 1.00. The three-way interaction was significant, $\chi^2(1) = 5.37$, *p* = .021. Further analyses showed a significant association between special hygiene day participation and food related HWWS frequency among persons who did not experience any material distributions, $\chi^2(1, N = 395) = 14.82$, *p* < .001, φ = –.19, meaning that special hygiene day participants were 2.39 times more likely to have a rather low food related HWWS frequency than non-participants (see also Figure 13). However, the experience of material distributions had

a mitigating effect as the negative association between participating in special hygiene days and food related HWWS frequency was not significant among persons who experienced material distributions, $\chi^2(1, N = 408) = 0.62$, $p = .474$.

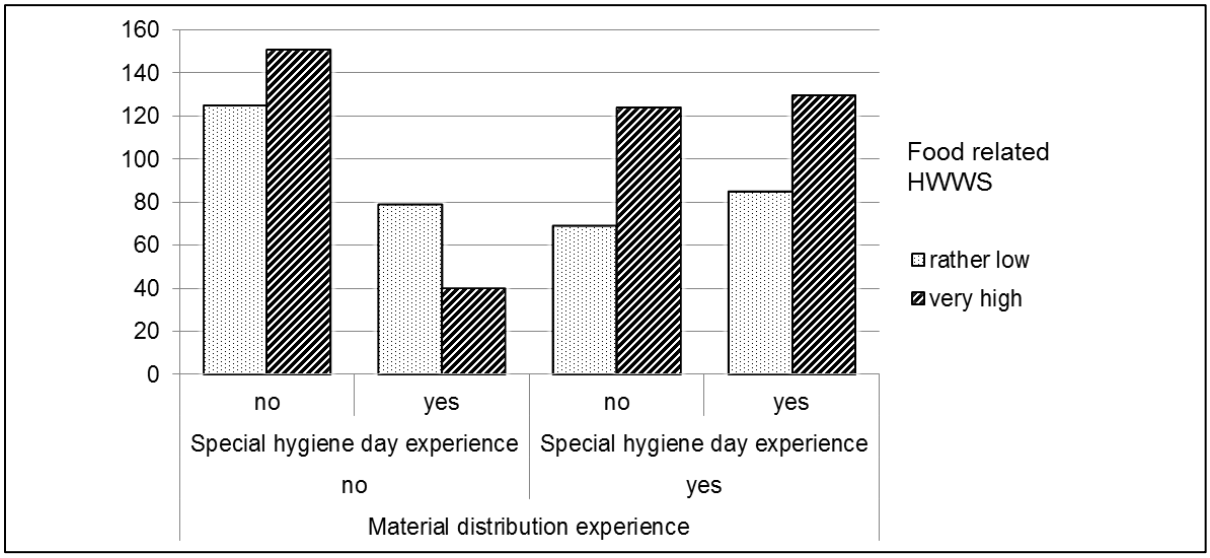

Figure 13. Numbers of persons with rather low and very high food related HWWS frequency depending on special hygiene day experience among persons who did and those who did not experience material distributions.

4.4.2.5. Material distribution, home visit, and food related HWWS

Finally, we analyzed the three-way interaction between experiencing material distributions, experiencing home visits, and food related HWWS frequency by conducting a hierarchical 2 x 2 x 2 (Home visit [no, yes] x Material distribution [no, yes] x Food related HWWS [rather low, very high]) loglinear analysis. The final model had a likelihood ratio of $\chi^2(1, N = 799) = 1.85$, $p = .174$, and retained all two-way interactions but not the three-way interaction. Although the pairwise associations were significant between home visit experience and food related HWWS frequency, $\chi^2(1) = 6.66$, $p = .010$, between the material distribution experience and food related HWWS frequency, $\chi^2(1) = 21.19$, $p < .001$, replicating the results of Contzen and Mosler (in preparation), each, and between home visit experience and material distribution experience, $\chi^2(1) = 96.87$, $p < .001$, they must be considered as being independent from each other.

5. Discussion

5.1. Discussion of the results

5.1.1. Associations with socio-demographic characteristics

5.1.1.1. Was NAPT experience related to socio-demographics?

With regard to our first research question about whether there were associations between the experience of NAPTs and socio-demographic variables, several significant results were found. Concerning the Oxfam affiliate, persons from OQ were more likely to experience focus groups, stickers, posters, or paintings, special hygiene days, and home visits. In contrast, persons from OGB were less likely to experience special hygiene days and home visits. The frequency of NAPT experience among persons from IO corresponded to the expected value for each NAPT.

Moreover, more persons in camps experienced the NAPTs (with exception of stickers, posters, or paintings) than did persons in neighborhoods. This finding is not quite surprising because health promotion activities started in camps right after the earthquake, whereas, in most neighborhoods, they did not start before the cholera outbreak nine months later. Thus, more promotions were actually conducted in camps than in neighborhoods.

Likewise, all NAPTs, besides stickers, posters, or paintings, were more likely to be experienced in the quarter Delmas – probably because OQ was mostly working in Delmas and all of the sites in Delmas were camps. Similarly, all NAPTs, except the promotion song, were less often experienced in Carrefour Feuille – probably because only OGB was working in Carrefour Feuille and all sites in Carrefour Feuille were neighborhoods.

With regard to the region type, we found a significant association with focus group participation, as focus groups were less frequently experienced in urban regions than in peri-urban or rural regions.

Furthermore, literacy was related to knowing a hygiene song, meaning that persons who could neither read nor write were less likely to know a hygiene song than others. This finding was rather surprising, as the hygiene songs were orally distributed and one would not expect literacy as a prerequisite to know these songs.

Notably, focus groups and songs were more likely to be experienced among persons who had children under the age of 12. Songs were very popular among children. Thus, it was likely that parents learned the songs from their children. Also, parents were perhaps more involved in community issues, which may be why they participated more often than others in focus groups.

Persons who were occupied with housekeeping less frequently experienced hygiene promotion via stickers, posters, or paintings than persons with other occupations. Also, persons whose highest educational level was primary school were less likely to experience

stickers, posters, or paintings, whereas those who attended but did not finish secondary school were more likely to experience this promotion type. The socio-demographic variables gender, area, babies, religion, voodoo, and age were not associated with any NAPT experience in the total sample.

5.1.1.2. Could socio-demographics explain lower HWWS frequencies of NAPT participants?

Although it was shown that experiencing NAPTs was related to several socio-demographic variables, we did not encounter any results that would allow us to confirm our second research question: whether the lower HWWS frequencies of NAPT participants were a result of the associations with the socio-demographic variables. Basically, three facts led us to this conclusion.

First, where associations between NAPT participation and socio-demographic variables emerged, these variables were mostly *not* associated with the HWWS frequencies. Regarding feces related frequency, this was the case for the variables quarter in PaP, region type, type of site, literacy, occupation, education, and age. Regarding food related HWWS frequency, this applies to the same socio-demographic variables except type of site. All of these variables were associated with experiencing one or several NAPTs, but none of them was related to HWWS frequencies. Therefore, the associations between the experience of NAPTs and these socio-demographic variables could not explain the negative association between the experience of NAPTs and the HWWS frequencies.

Second, where there was a significant association between socio-demographic variables and HWWS frequencies, in most cases the association was in a direction that could not explain the negative association between the respective NAPT experience and the HWWS frequencies – as was the case for the variables affiliate and type of site (but see below for an exception). More concretely, persons from OQ, on the one hand, were more likely to experience focus groups, stickers, posters, or paintings, special hygiene days, and home visits than persons from other affiliates. However, in order to conclude that that being an OQ beneficiary rather than the experience of the NAPTs was responsible for the lower HWWS rates among the NAPT participants, one would have expected beneficiaries from OQ to WHWS less often than beneficiaries from the other affiliates. Yet, the opposite was true. Our results showed that persons from OQ WHWS more often after contact with feces than persons from OGB and they WHWS more often before contact with food than persons from IO. Therefore, the negative association between NAPT experience and HWWS frequency could not be explained by an effect of the Oxfam affiliate.

Incidentally, it has to be noted that interviewees from OQ experienced all NAPTs, except hygiene songs, more often than persons from other affiliates, and above, they WHWS more

often than persons from IO and OGB. One could boldly suppose that persons from OQ had a higher acquiescence tendency in general, because they answered more often to have experienced a promotion type and to WHWS very often. Still, interactions with focus group participation and hygiene day experience regarding food related HWWS and affiliate showed that the negative associations between these two NAPTs and food related HWWS frequency could indeed be found among persons from OQ, while no associations emerged among persons from OGB (see section 5.1.1.3).

Similarly, focus groups, hygiene songs, special hygiene days, and home visits were more frequently experienced among persons living in camps than among persons living neighborhoods. If persons in camps in general WHWS less often than persons in neighborhoods, one could presume that the association between the experience of these promotion types and the HWWS frequencies was negative simply because the participants were mainly camp residents who already WHWS less often than others. Yet, again, the opposite was true. Persons living in camps did not differ in feces related HWWS frequency from persons living in neighborhoods, but, before contact with food, they WHWS even *more* often than persons living in neighborhoods. Accordingly, there was no negative effect of living in camps on the beneficiaries' HWWS frequencies which could have explained the negative association between the NAPT experience and feces or food related HWWS frequency.

Third, where there was a significant association between socio-demographic characteristics and HWWS frequencies, and, as opposed to the aforementioned pattern, the association was in the direction that it could potentially explain the negative association between the NAPT experience and the HWWS frequency, the three-way interaction was not significant – as it was the case for the variable children under the age of 12. Persons who had children under the age of 12 participated more often in focus groups and knew more often hygiene songs than persons who did not have children under the age of 12. Moreover, persons who had children under the age of 12 WHWS less often after contact with feces and before contact with food than persons without children. One would expect the negative association between promotion type experience and HWWS frequency to disappear when controlling for the variable children under the age of 12, in order to conclude that the reason for the negative associations between the HWWS frequencies and both focus group participation and knowing hygiene songs was the fact that these promotion types were mainly experienced by persons with children under the age of 12 because these persons had already lower HWWS frequencies. Yet, the three-way interaction between NAPT experience, having children under the age of 12, and HWWS frequency was not significant either for focus group participation or for knowing hygiene songs and either for feces or for food related HWWS frequency. That is, both participating in focus groups and knowing hygiene songs were negatively associated

with feces and food related HWWS frequency whether or not the persons had children under the age of 12.

Still, the finding that persons with children WHWS less often was quite worrisome. Presumably, interviewees with children are busier and have less time for hygiene practices. Apart from that, parents caring for their children might be more concerned about their own hygiene behavior and, because of this greater conscience, they might have given answers that were more honest. However, this assumption can hold true only if we presume that the answers to the HWWS questions were generally biased, which we address later in detail (see section 5.3).

All in all, we found no indications for underlying associations with socio-demographic characteristics from which the negative associations between the experience of NAPTs and the HWWS frequencies would have arisen through self-selection. Yet, this applies only to the 14 socio-demographic variables that we have measured. No conclusions are possible about any effects of other, non-measured socio-demographic characteristics that might have revealed self-selection among the NAPT participants.

5.1.1.3. Additional findings about subgroups

Furthermore, where a socio-demographic variable that was related to NAPT participation was associated with HWWS frequency in a way that could not explain the negative correlation between the NAPT experience and the HWWS frequency, we still analyzed the three-way interactions for further exploration of the data pattern. Although the results were not required to answer the research questions, we shortly address some points of interest about these additional findings.

Three-way interactions were significant between affiliate, food related HWWS frequency, and the NAPTs focus group, special hygiene day, and home visit, each. More precisely, focus group participation and special hygiene day experience were negatively associated with food related HWWS frequency only among persons from OQ and from IO and home visit experience only among persons from IO. The affiliates might have conducted these promotion types in different ways, thereby yielding different effects on the beneficiaries' HWWS frequencies. Alternatively, self-selection might have only taken place among persons from OQ and IO. Thus, we focused subsequent analyses on persons from OQ and IO and screened them for any interactions with socio-demographic characteristics analogously to the analyses conducted on the total sample. However, no such effects were detected. Rather, fewer associations with socio-demographic variables emerged, suggesting that the three-way interactions we found regarding the affiliate, food related HWWS frequency, and the three promotion types explained the data pattern quite well. Consequently, we assume that the affiliates differed in the implementation of the promotion types from each other and that only

the way in which OQ conducted focus groups and special hygiene days and the way in which IO conducted the same plus home visits had a negative effect on the food related HWWS frequency of the beneficiaries. The implementation of these promotion types by OGB, however, seemed to have no negative effect on food related HWWS frequency – albeit neither a positive one.

Moreover, there was a significant three-way interaction between knowing a hygiene song, type of site, and food related HWWS frequency. The negative association between knowing a hygiene song and food related HWWS frequency was significant only for interviewees living in neighborhoods. However, among the neighborhood subgroup, the negative association between knowing a hygiene song and food related HWWS frequency could not be further explained by any interactions with socio-demographic characteristics. Thus, hygiene songs seemed to have had a negative effect on the food related HWWS frequency of persons who lived in neighborhoods, but not on that of persons who lived in camps.

5.1.2. Associations with the attitudes towards the promotions

In what follows, we summarize and discuss results of the third and fourth research questions, whether NAPT participants had a rather negative attitude towards the promotion activities in general compared to other participants and if so, whether the lower HWWS frequencies of the NAPT participants were due to this rather negative attitude. Here, the findings were somewhat more revealing than the ones on the associations with socio-demographic characteristics. Persons who experienced focus groups, hygiene songs, and special hygiene days had less positive attitudes towards the promotion activities in general. This result can be explained in two different ways. On the one hand, the experience of these promotion types might have led these persons to obtain a rather negative attitude towards public health promotion in general. On the other hand, persons who had already a rather negative attitude towards health promotion activities in general might have participated preferentially in focus groups and special hygiene days and might have explicitly remembered hygiene songs. As focus groups, among other things, served as platforms to give feedback on the promotion activities, persons of a rather negative attitude might have gone there to state their grievances. However, for the associations between having a rather negative attitude and experiencing special hygiene days and hygiene songs, respectively, there is no comparably plausible explanation.

Beyond that, having a rather negative average attitude towards the promotions was negatively associated with the feces and food related HWWS frequencies in the total sample population. Persons with a rather negative attitude towards public hygiene promotion might have WHWS less frequently simply to do the opposite of what the promotion messages at-

tempted to encourage. On the contrary, persons who WHWS less often for any reason might have thought that health promotion was silly or pointless.

However, the negative associations between experiencing NAPTs and feces related HWWS frequency were not influenced by the persons' attitude towards health promotions because there was no significant three-way interaction between NAPT experience, feces related HWWS frequency, and average attitude. Hence, the negative associations between NAPT experiences and feces related HWWS frequency did not result from the fact that mainly persons of a rather negative attitude towards the promotions participated in the NAPTs.

In contrast, there were significant interactions between food related HWWS frequency, NAPT experiences, and average attitude towards the promotions. The experience of focus groups, hygiene songs, and special hygiene days was not negatively associated with food related HWWS frequency unless the participants had a rather negative average attitude towards the promotions. Apparently, a rather positive attitude had a mitigating effect, as there was no negative association between the experience of these promotion types and food related HWWS frequency among persons with a rather positive attitude towards health promotions. However, among those persons who had a rather negative attitude, the experience of these promotion types was still negatively associated with food related HWWS frequency, meaning that, by all indications, there was still a negative effect of the promotion type on food related HWWS frequency. Here, the good intentions of focus groups, hygiene songs, and special hygiene days seemed to backfire as their effect on food related HWWS frequency was just in the opposite direction than desired. Yet, the conclusion that the rather negative attitude alone accounted for the negative association between NAPT experience and HWWS frequency would have been appropriate only if there had been *no* negative association between NAPT experience and food related HWWS frequency anymore among persons with a rather negative attitude.

Apart from that, knowing a hygiene song, in fact, was positively associated with food related HWWS frequency as far as the beneficiaries liked the promotions in general. Presumably, persons who did not like public health promotion might have thought that hygiene songs were particularly silly and, because of this, they WHWS even less before contact with food. As opposed to this, those persons who really liked health promotion activities heeded the messages of hygiene songs and WHWS even more before contact with food.

The experience of health promotion through stickers, posters, or paintings and through home visits was not associated with interviewees' attitude. The negative associations between the experience of these two NAPTs and feces or food HWWS frequency therefore were not related to a rather negative attitude of the participants.

Furthermore, research question (5) concerning associations between the attitude towards the respective NAPTs and the HWWS frequencies among NAPT participants could be af-

firmed by our findings. The NAPT participants' HWWS frequencies were associated with the attitudes towards the particular NAPTs. For the promotion types focus group, stickers, posters, or paintings, special hygiene day, and home visit a common pattern was found (the attitude towards hygiene songs has not been assessed in the interview which is why no results could be stated here). Persons who did not quite like these promotions WHWS both after contact with feces and before contact with food less often than persons who liked them. First, this was in line with the finding about the association between the average attitude towards all promotion types and feces and food related HWWS frequency among the total sample. Second, the findings showed that those persons who liked the respective NAPT that they participated in were not affected by the NAPT's negative effect on the HWWS frequencies. In contrast, it was mainly those persons who did not like the respective NAPT who had rather low HWWS frequencies.

In the next section it is outlined that, besides having a positive attitude towards the promotions, the experience of material distributions also had a mitigating effect on the associations between NAPT experience and HWWS frequency.

5.1.3. Associations with the PAPTs

Our last research question, whether there were interaction effects between the experiences of NAPTs and the experience of PAPTs regarding the HWWS frequencies could be partially confirmed by the results. With regard to feces related HWWS frequency, the experience of focus groups and stickers, posters, or paintings was much less or not at all related to reduced HWWS frequency as far as the interviewees participated also in material distributions. This was not the case for the hygiene song, though. Persons who knew a hygiene song WHWS less often after contact with feces whether or not they also participated in material distributions. Concerning food related HWWS, experiencing focus groups, stickers, posters, or paintings, and special hygiene days, as well as knowing hygiene songs was not negatively associated with HWWS among persons who additionally experienced material distributions. Yet, the negative association between home visit experience and food related HWWS frequency was not influenced by the experience of material distributions.

On the one hand, the positive effect of material distributions on the HWWS frequencies might have been so big that it surpassed the negative effects of the NAPTs. On the other hand, these findings might be connected to the ones regarding the attitude towards the promotion activities outlined in section 5.1.2. Persons who experienced PAPTs might have had a more positive average attitude towards health promotions in general. Therefore, they might have WHWS more often as well as they might have not been impacted by a negative effect of the NAPTs on the HWWS frequencies.

After all, the findings that most of the negative associations between NAPT experience and HWWS frequency were not significant among PAPT participants showed that it is basically the effect of combined promotion types rather than the effect of single promotion types that should be further investigated and that should be considered when implementing public health promotion programs in practice.

No interaction effects were found regarding the experience of the PAPT radio spot. This was probably a result of the fact that – in contrast to the findings by Contzen and Mosler (in preparation) – no significant positive association emerged between listening to radio spots and the dichotomous HWWS variables. Crosstabs between radio spot experience and HWWS variables that were subdivided into four instead of two levels shed light upon the loss of impact. The association between listening to radio spots and HWWS frequencies were strongest among persons at the very bottom of the HWWS frequency distribution. As these persons were combined with persons of medium HWWS frequencies into one level of "rather low HWWS frequency", the effect was not visible when dichotomous variables were applied – a problem that we discuss in the next section.

5.2. Critical aspects of the data analysis

5.2.1. The problem of dichotomizations

We are aware that the present approach to analyze the data was not void of flaws. Because of the distributional characteristics of the data the choice of statistical methods was constrained to nonparametric techniques. To transform continuous variables into discrete ones and perform loglinear analysis is a means of testing interaction effects in data that do not meet distributional assumptions (Tabachnick & Fidell, 2007). However, by conducting a median split on the HWWS variables, we had to accept a considerable loss in resolution of the data. As a consequence, some associations that might have been significant when the continuous variables were applied could not be revealed by our analyses. Nevertheless, we did not choose to subdivide the HWWS variables into more than two levels, because very few persons were at the lower ends of the frequency distributions. Therefore, highly unequally sized groups would have been created and persons with the lowest HWWS frequencies even might have had to be excluded from some analyses because of low expected cell frequencies, which again might have resulted in non-significant findings.

The medians, meaning the intercept points of the dichotomous variables, were both located at quite high positions on the continuous HWWS frequency scales. That is, most interviewees had indicated that they WHWS very often both after contact with feces and before contact with food. Taking account of the fact that the answers were likely to be biased by social desirability effects (see section 5.3), we assert that it was quite reasonable to split the population into two groups at a rather high point.

5.2.2. The problem of *p*-value adjustments

Another delicate issue of our data analysis was the way to handle inflated type I error rates of multiple tests. Some authors argue against using any adjustments of *p*-values in exploratory studies at all, but to simply emphasize the *exploratory* approach of the study and to point out that any significant findings have to be further substantiated by confirmatory studies (Bender & Lange, 2001; Saville, 1990). Moreover, Perneger (1998) stated that the interpretation of a result as statistically significant or not is unfavorably dependent on the number of additional tests when Bonferroni adjustments are applied. This objection is clearly justifiable, as our interpretations of the results might have changed if tests on even more sociodemographic variables had been accomplished, for example. However, Perneger (1998) also mentioned that in some situations Bonferroni corrections should be undertaken, namely, in contexts in which the assumption of a universal null hypothesis is appropriate and in which no a priori hypotheses had been established before testing multiple associations. Both assertions apply here. We did not start from the premise that the associations between the NAPTs and the HWWS frequencies were dependent on effects of third variables, but rather the opposite, that is, that the NAPTs were "truly" negatively associated with the HWWS frequencies. Likewise, we did not have any hypotheses about interactions with third variables. Hence, the Bonferroni method was the proper solution to our approach, even though it is the most stringent one among other possible *p*-value adjustments (Field, 2009).

What is more, in large sample sizes like ours, results of statistical tests tend to become easily significant even when effects are actually very small. Indeed, most of the encountered findings in the present study had quite small effect sizes. Therefore, we did not have to worry about inflated type II error rates caused by Bonferroni adjustments – as some authors argue (e.g. Bender & Lange, 2001; Feise, 2002; Saville, 1990; Williams, Jones, & Tukey, 1999) – but rather counteracted the tendency to overstate negligibly small associations.

Still, we adjusted *p*-values only across the number of tests that were performed regarding a given promotion type, respectively, and not across all analyses that were accomplished in this study, nor did we adjust them for loglinear analyses – an approach that can be criticized, too. We acknowledge that there certainly was not just a single suitable procedure, but several. On these grounds, we deliberately reported all exact *p*-values correct to three decimal places and with confidence intervals where necessary. Whatever method of adjustment for multiplicity would have been chosen, we agree with Bender and Lange (2001) about emphasizing that all of our findings still warrant further confirmation by succeeding studies.

5.3. Critical aspects of the data collection – social desirability effects

Reported mean HWWS frequencies of our sample were unduly high. This could be due to the fact that the data were solely obtained from self-reports. However, persons often be-

have differently from what they may indicate (Foddy, 1995). Even though the presence of an observer also can influence behavior (Curtis et al., 1993), many researchers pointed out that observed HWWS frequencies were considerably lower than reported ones (e.g. Manun'Ebo et al., 1997; O'Boyle et al., 2001; Stanton, Clemens, Aziz, & Rahman, 1987). Hence, it is likely that reported HWWS frequencies were overestimated in our study. People generally want to be seen favorably by others which holds equally true for survey contexts. Paulhus (1984) described two dimensions of social desirability: Self-deception and impression management (see also Paulhus & Reid, 1991). Self-deception refers to the phenomenon that socially favorable answers are given unconsciously, as persons usually have inflated views of themselves (e.g. Miller & Ross, 1975; Paulhus, & Holden, 2010). Impression management, on the contrary, means that misreporting occurs intentionally (Paulhus, 1991). Consequently, our interviewees might have exaggerated their HWWS frequencies, on the one hand, because they really believed they do WHWS that often, and, on the other hand, because they wished to generate a positive image for the interviewer. This was aggravated by the fact that the interviewees might have taken our interviewers for health promoters, of whose expectations they did not want to fall short. For security reasons, the interviewers had to wear identification cards printed with Oxfam labels and were transported to the sites by Oxfam cars. Also, the mere association with the relief organization Oxfam might have elicited the interviewees' awareness for hand washing and hygiene issues, which might have pushed their answers in a favorable direction.

Furthermore, desirability effects might have biased not only reported HWWS, but also the answers of the attitudes towards the promotions. Suppose interviewees who overestimated their HWWS frequencies also overstated their attitudes towards the promotions. This assumption would challenge our findings regarding the associations between attitudes and HWWS because they might be confounded by the third variable "social desirability".

Nevertheless, it has been mentioned that HWWS rates can indeed considerably increase during cholera epidemics (Curtis et al., 2009). Consequently, the reported HWWS frequencies of our sample might not be as highly exaggerated as the aforementioned considerations suggest them to be.

5.4. Some hypothetical causations, the current state of evidence, and future perspectives

In what follows, we contextualize our findings in terms of other studies as well as tentatively give some suggestions of possible reasons for the negative associations between HWWS frequencies and some promotion types in our sample. Since we found no definitive indications for self-selection effects that could have accounted for the negative associations,

other possible explanations shall be proposed. Furthermore, we give suggestions for further research on the effectiveness of health promotion strategies.

Why the experience of focus groups was negatively associated with HWWS frequency is still not clear. No references can be drawn from existing research. As focus groups serve mostly to explore motives and beliefs related to hygiene behavior and do not serve explicitly to promote behavior change, other research projects used them for exploration purposes but did not study their effect on behavior change. Likewise, the focus groups that were investigated in the present study did not primarily intend to promote hygiene behavior, but to discuss issues and to evaluate the health promotion activities. A possible explanation for the negative association between HWWS frequency and focus group participation is that the discussions in those groups evolved mostly around current problems in the camp or neighborhood. For example, stolen or destroyed hand-washing devices, dirty, overflowing, or dilapidated latrines, or complications with water delivery were addressed. Also, volunteers had to be chosen for the cleaning of latrines and showers and for selling water, for example. Consequently, focus group participants might have been discouraged by these meetings, or they might have gained greater awareness for actual problems related to hygiene issues in their camp or neighborhood, both of which might have resulted in lower HWWS frequency, be it real or reported.

Stickers, posters, or paintings have often been applied as reminders for the target behavior in health promotion research (e.g. Anderson et al., 2008; Tamas, Tobias, & Mosler, 2009). The use of reminders in general has proved to foster habitual health behavior (e.g. Hill, Abraham, & Wright, 2007; Lee et al., 2012). Moreover, contrary to our findings, the experience of printed promotion materials including posters was positively associated with HWWS after defecation in an intervention project in Myanmar (Bajracharia, 2003). Also, Pinfold (1999) found that posters, leaflets, and stickers had a stronger influence on knowledge compared to other promotion activities, even though greater knowledge did not translate into improved hygiene behavior. The negative associations between experiencing stickers, posters, or paintings and HWWS frequency in our study, thus, is in contrast with the findings of other studies and its reason remains unclear.

Likewise, no definite explanation can be given for the negative association between HWWS frequency and the experience of hygiene songs and special hygiene days, respectively. While we did not find any existing research that investigated the effect of songs on behavior change, there is one study which showed that health fairs, that is, leisure events comparable to special hygiene days, were less effective in promoting SODIS use compared to other promotion types (Tamas et al., 2009). A common feature of the NAPTs hygiene songs, special hygiene day, and, to a certain extent, stickers, posters, or paintings is that they were all more or less tailored to children or that they placed HWWS in a rather silly con-

text. Therefore, it is possible that these promotion types appeared to adults as less serious and less reliable information sources. This is in line with the conclusions by Tamas, et al. (2009) who found that opinion leaders, that is, non-experts from the community, as well as health fairs were much less effective in changing behavior than interpersonal communication with trained promoters. Moreover, it is indicative that in our study the experience of hygiene songs and special hygiene days was negatively associated with HWWS frequency only among persons who had a rather negative attitude towards the promotion types. Persons who did not like public health promotion activities very much might have been annoyed by children constantly singing hygiene songs and by the noise and fanfare caused by special hygiene days. Above all, it is difficult to find a quiet haven in the usually very crowded quarters of PaP and its surroundings. Persons who liked health promotion activities, in contrary, were not affected by any negative effect of special hygiene days and hygiene songs on hand washing.

Another aspect that might have affected the negative association between special hygiene day experience and HWWS frequency was the unfortunate timing of the "global handwashing day". This was a grand activity day featuring the topic of hand washing in plenty of sites throughout Haiti. Most of the persons who experienced special hygiene days certainly also celebrated the global handwashing day. It took place on 15 October 2010, with the cholera outbreak following only four days later. Unfortunately, some persons correlated both events, consequently blaming HWWS and its promotion for cholera. As cholera was an unknown disease for Haiti's population such myths could spread easily all over the country.

The negative association between home visit experience and HWWS frequency remains an open question. In spite of the facts that home visits are very cost- and time-intensive and that they are unable to achieve high population coverage, they are frequently applied in public health campaigns. Evidence about the effectiveness of home visits compared to other strategies is scarce and ambiguous. On the one hand, Arnold, Arana, Mäusezahl, Hubbard, and Colford (2009) found that the promotion of water treatment and HWWS via face to face domestic visits in Guatemala did not yield significant outcomes. Notably, these visits were primarily for educational purposes (Arnold et al., 2009). Likewise, home visits were less effective than other intervention formats in a field study by Cairncross et al. (2005). On the other hand, some studies found positive associations between home visit experience and hygiene behavior (e.g. Bajracharia, 2003; Luby et al., 2006), though the sustainability of the effects over a longer period remained questionable (Luby et al., 2009).

In the present study, we could not rule out negative effects of the pertinent hygiene promotion types on hand washing behavior. If these promotion types indeed negatively affect the desired hygiene behavior, then this is cause for concern. Even though some might not explicitly intend to promote a behavior, as is the case for focus groups, their application is still

worrisome if these reunions prompt the participants to wash hands less often. So far, we could only speculate about the reasons of the negative effects of these promotion types on HWWS. Consequently, further research is required to get to the bottom of these effects. Thorough analyses of the promotion types' content might yield a better understanding. Knowing if and how the content or topics of the NAPTs differed from that of the PAPTs would provide important clues to the underlying causes of the negative effects. Also, we could choose to avoid these topics or to approach them more cautiously in future health campaigns.

Moreover, further studies should explicitly compare the effects of different components of the promotion types on hand washing in a more controlled setting. For example, in future projects one could conduct focus groups that exclusively address current problems about hygiene and sanitary infrastructure in one group of beneficiaries, focus groups which involve exclusively the evaluation of promotion activities in a second group, and focus groups which involve solely the recruitment of volunteers for cleaning work. By this, we would gain insight in which of these components, if any, has negative effects on the beneficiaries' hand washing behavior. Similarly, the promotion type stickers, posters, or paintings investigated in the present study was all-encompassing. We would gain more detailed information by comparing the effects of posters of varying layouts between groups, for example, present posters with primarily text in one group and those with primarily pictures in another, or display posters with a humorous presentation of messages in one group and those with rather sober messages in another group. Hygiene songs of varying lyrics could be broadcasted in different groups, as well as via different communication channels, such as radios, schools, megaphones, etc. It is certainly not easy to analyze the different components that might have caused the negative effects of special hygiene days on hand washing. Notably, the findings by Contzen and Mosler (in preparation) showed that some of the single promotion activities that took place – amongst other occasions – during special hygiene days in Haiti were either not associated with HWWS, such as quiz games, or even positively related to HWWS, such as theater plays. Future studies should explore whether it is the funfair-like character of special hygiene days that has a negative impact on hand washing or whether it is the seemingly random compilation of promotion activities. Likewise, the negative effect of home visits might have resulted from a number of aspects. Futures studies could have a closer look on the effect of the person who is conducting the home visits, be it a nonlocal health expert or a trained person from the community, and on the way these visits are implemented, be it in a top-down, educational model or in a bottom-up, participatory format.

All in all, it has to be noticed that the Oxfam affiliates in Haiti used a rather educational approach as most promotion activities focused on conveying information, for example, about germs and contamination pathways. However, rational arguments often fail to have the desired effect on health behavior (e.g. Biran, Tabyshalieva, & Salmorbekova, 2005). The provi-

sion of information primarily induces factual knowledge (see section 2.7). Knowledge is a precondition for health practice, but it does not necessarily translate into action if presented alone (Pinfold, 1999; Naikoba & Hayward, 2001). However, we have to admit that the educational approach applies to all of the promotions types conducted by Oxfam in Haiti, among which some were indeed positively related to HWWS frequency. Thus, we cannot conclude that the educational format of the promotion strategies was accountable for the association of NAPT experience with lower HWWS frequency.

In summary, as the reasons for the negative associations between NAPT experience and HWWS frequency remained unclear, future research is needed to investigate in detail the diverse effects of different promotion activities and their combinations on hygiene behavior.

6. Conclusions

In emergency situations, such as in Haiti after the earthquake and the cholera outbreak, organizations usually do not have time to conduct thorough formative research. Relief organizations ideally should have therefore a number of effective promotion techniques on hand on which they can rely and apply during an emergency. As the study by Contzen and Mosler (in preparation) revealed, however, not all of the commonly used health promotion types yielded the desired outcomes in Haiti, but, indeed, some were negatively related to the hand washing frequency of the beneficiaries, namely the promotion types focus groups, stickers, posters, or paintings, hygiene songs, special hygiene days, and home visits. In the present study we tried to explore whether the negative associations could be explained by third variables or self-selection of the participants. Our findings did not point to any self-selection effects that could be held accountable for the negative associations. Still, attitudes towards the promotion activities seemed to play an important role regarding extent and direction of the associations. Also, the experience of material distributions as a positively with hand washing associated promotion type could offset some negative associations. However, this was an exploratory study based on correlational data. Our findings are far from being definite and warrant further examination by succeeding studies.

All in all, as the negative associations between the pertinent promotion types and hand washing could not be explained by self-selection effects, we could not rule out that these promotions did indeed negatively influence the beneficiaries' hand washing frequency. With that said, future research that establishes a set of reliable and well-functioning promotion types is indispensable for effective public health promotion in emergency situations.

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Appendix A. List of promotion types

Table A1

Promotion Types with Percentages and Numbers of Participants

Promotion type	Percentage of participants from the total sample	Number of participants
Radio spot	91.9%	745
Radio program	27.9%	226
Megaphone	72.1%	585
Group discussion	55.9%	453
Hygiene training	31.7%	257
Home visit	65.8%	534
Material distribution	50.9%	413
Neighbor/friend	60.8%	493
Focus group	40.1%	325
Cinema show	33.7%	273
Theater	31.2%	253
Special hygiene day	41.3%	335
Quiz	15.8%	128
Stickers, posters, paintings	76.2%	618
Community club	39.8%	323
Painting contest[a]	3.0%	24
Art/Handicraft contest[a]	3.5%	28
Other contest[a]	3.3%	27
Song	45.9%	372

Note. N = 811.

[a]Not included in the analyses by Contzen and Mosler (in preparation).

Appendix B. Examples of stickers, posters, paintings

Figure B1. Examples of the promotion type stickers, posters, or paintings.

Appendix C. English version of the questionnaire

Water, sanitation and hygiene practices in different areas in Haiti

Structured Interviews May/June 2011

For the interviewers:

Start at the agreed tent/house and try to interview every third household.
Please interview the person of the household that is responsible for preparing food and childcare!

Please write down how many households did not want to be interviewed before you found this household who takes part in the interview and in how many households no one was present.

Number of households not wanting to be interviewed: .....

Number of households where nobody was at home: .....

Introduction

Please introduce yourself!

Hello, my name is …….. and I am working for Eawag, the Swiss Federal Institute of Aquatic Science and Technology. I would like to speak with the person of the household that is responsible for preparing food and childcare. We are conducting a research study on water, sanitation and hygiene practices. If you don't mind, I would like to interview you about your water, sanitation and hygiene practices. It will take some time. Do you have the time for the interview? You can continue with your daily work, that does not disturb us. We are also interviewing other households in your community as well as other communities in Haiti. The results will be treated anonymously. We are not interested in any particular answers, just in the answers that really represent your opinion. We would like to know why people are doing what they are doing so that we can improve the water, sanitation and hygiene situation depending on this information. It helps us most if you answer as honest and properly as possible. Please help us in finding out how things really are!

General information regarding the interview

B101 ID number: .....

B102 Date of the interview: .....

B103 Affiliate: [1] ❑ Oxfam Great Britain [2] ❑ Oxfam Quebec [3] ❑ Intermón Oxfam

B104 Number and name of the interviewer: .....

B105 Area: [1] ❑ PaP metropolitan area [2] ❑ Leogane [3] ❑ Gressier [4] ❑ Grand Goâve
[5] ❑ Petit Goâve [6] ❑ Other: .....

B106 Neighborhood in Port-au-Prince:
[1] ❑ Delmas [2] ❑ Carrefour [3] ❑ Croix de Bouquet
[4] ❑ Carrefour Feuille [5] ❑ Other:.....

B107 Name of the site (camp, village, neighborhood): .....

B108 Type of site: [0] ❑ Camp [1] ❑ Neighborhood

Data of the interviewed person

B109 Start time: .....

B110 Name *(if they refuse, no problem)*:.....

B111 Gender: [0] ❑ Male [1] ❑ Female

B112 Age:..... [99] ❑ I don't know [999] ❑ I don't want to tell it

B113 Children under the age of 12 in the household? [1] ❑ yes [0] ❑ no ***Interviewer:*** *Please memorize!*

B114 Babies in the household? [1] ❑ yes [0] ❑ no ***Interviewer:*** *Please memorize!*

B115 Respondent's occupation:

[1] ❑ Unemployed
[2] ❑ Housewife
[3] ❑ Agriculture
[4] ❑ Informal employment
[5] ❑ Formal employment
[6] ❑ Independent work
[7] ❑ Studies
[8] ❑ Retired
[9] ❑ Other: .....

B116 Are you able to read or write?

[1] ❑ Can neither read nor write
[2] ❑ Can read only
[3] ❑ Can write only
[4] ❑ Can both read and write

B117 Education:

[0] ❑ No school
[1] ❑ Kindergarten
[2] ❑ Primary school - not finished
How many years? .....
[3] ❑ Primary school - Certificate
[4] ❑ Secondary school - not finished
How many years? .....
[5] ❑ Secondary school - Reto
[6] ❑ Secondary school - Filo
[7] ❑ Professional school
[8] ❑ University
[99] ❑ I don't want to tell it
[999] ❑ I can't remember

B118 Religion:

[1] ❑ Roman Catholic [2] ❑ Protestant [3] ❑ Other: ..... [4] ❑ none

B119 Do you practice Voodoo? [1] ❑ yes [0] ❑ no

Water consumption and treatment

Please inform the Interviewee!! In the following we talk about water consumption and treatment.

What is your primary source of drinking water? Do you use any additional sources of drinking water?
Interviewer: *Ask open-ended and check according boxes.*

	B201 Primary source	*B202* Additional water sources ***(more than one answer possible!)***
Rainwater	[1] ❑	[1] ❑
Pond/river/canal	[2] ❑	[2] ❑
Well	[3] ❑	[3] ❑
Spring water	[4] ❑	[4] ❑
Private house connection	[5] ❑	[5] ❑
Water kiosk vending DINEPA/CAMEP water	[6] ❑	[6] ❑
Water kiosk vending reverse osmoses treated water	[7] ❑	[7] ❑
Public fountain / Water pump	[8] ❑	[8] ❑
Camion vending reverse osmoses treated water	[9] ❑	[9] ❑
Vender of private water	[10] ❑	[10] ❑
Bladder water	[11] ❑	[11] ❑
Water bottles	[12] ❑	[12] ❑
Plastic bags (sachet)	[13] ❑	[13] ❑
Other:	[14] ❑	[14] ❑

B203 Why is ..... your primary source of drinking water?

.....

B204 Do you treat your drinking water?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B205 ***If 1-4:*** Why do you treat your drinking water? .....

.....

B206 ***If 0:*** Why you do not treat your drinking water? .....

.....

B207 ***If 1-4:*** How do you usually treat your water? ***Interviewer:*** *Ask open-ended and check the according boxes. More than one answer possible!*

[1] ❑ Let it stand and settle/sedimentation
[2] ❑ Strain it through cloth
[3] ❑ Boil
[4] ❑ Add aquatab
[5] ❑ Add chlorine
[6] ❑ Add jif
[7] ❑ Water filter (ceramic, sand)
[8] ❑ Solar disinfection
[9] ❑ Other: .....
[99] ❑ Don't know

B208 Considering all potential benefits and efforts related to drinking treated water, how much do you think is it worthwhile for you to drink treated water?

Rather more effort than benefit			Rather neutral			Rather higher benefit than effort		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
It costs much more effort than benefit	It costs more effort than benefit	It costs quite more effort than benefit	It costs slightly more effort than benefit	The effort and the benefit are about the same	The benefit is slightly higher than the effort	The benefit is quite higher than the effort	The benefit is higher than the effort	The benefit is much higher than the effort

B209 How much do like you or dislike the **taste** of **chlorinated/jif water**?

Rather dislike it			Rather neutral			Rather like it		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I dislike it very much	I dislike it	I quite dis-like it	I rather dislike it	I neither dislike it nor do I like it	I rather like it	I quite like it	I like it	I like it very much

Latrine usage

Please inform the Interviewee!! In the following we talk about defecation practices.

B301 Which is your primary practice for defecation? ***Interviewer:*** *Ask open-ended and check according boxes.*

[0] ❑ Outdoors [1] ❑ Latrine/Toilet [2] ❑Plastic bag [3] ❑ Other: .....

If other: Why? .....

.....

B302 In general, how often do you defecate outdoors (courtyard, garden, river, field, bush etc)?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

Why? .....

B303 In general, how often do you defecate at latrines/toilets?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

Why? .....

B304 In general, how often do you defecate into a plastic bag?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

Why? .....

B305 Considering all potential benefits and efforts related to using latrines for defecation, how much do you think is it worthwhile for you to use latrines for defecation?

Rather more effort than benefit			Rather neutral			Rather higher benefit than effort		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
It costs much more effort than benefit	It costs more effort than benefit	It costs quite more effort than benefit	It costs slightly more effort than benefit	The effort and the benefit are about the same	The benefit is slightly higher than the effort	The benefit is quite higher than the effort	The benefit is higher than the effort	The benefit is much higher than the effort

Interviewer: *The following questions apply only to households with babies****. If not applicable go to B307. If they neither have children under the age of 12, go directly to B401.***

B306 Where do you dispose of your baby's/babies' feces? ***Interviewer:*** *Ask open-ended and check according boxes.*

0 ❑ I don't dispose of them 1 ❑ Outdoors 2 ❑ Into latrine/toilet 3 ❑ Into garbage can

4 ❑ Other: .....

Why? .....

Interviewer: *The following questions apply only to households with children under the age of 12.* ***If not applicable go to B401.***

B307 How often does/do your child/children use latrines/toilets for defecation?

0 ❑ (Almost) never 1 ❑ Seldom 2 ❑ Sometimes 3 ❑ Often 4 ❑ (Almost) always

Why? .....

B308 Where does/do your child/children defecate during night time? ***Interviewer:*** *Ask open-ended and check according boxes.*

0 ❑ Latrine/Toilet1 ❑ Outdoors 2 ❑ Plastic bag 3 ❑ Tub 4 ❑ Chamber pot

5 ❑ Other: .....

Why? .....

B309 ***If 1-5:*** Where do you dispose of your child's/children's feces?

0 ❑ I don't dispose of them 1 ❑ Outdoors 2 ❑ Into latrine/toilet 3 ❑ Into garbage can

4 ❑ Other: .....

Why? .....

Soap

Please inform the interviewee!! In the following we talk about soap.

B401 Do you have soap? 1 ❑ yes 0 ❑ no ***Interviewer:*** *Please memorize!*

B402 ***If yes:*** Can you show me the soap?

Interviewer: *Measure time elapsed till soap is brought!* .....Seconds

99 ❑ Does not want to show it 999 ❑ Does not find it

B403 Who in your household has **NO** access to the soap? ***Interviewer:*** *Ask open-ended and check the according boxes. More than one answer possible!*

1 ❑ Everyone has access
2 ❑ Son(s)
3 ❑ Daughter(s)
4 ❑ Brother
5 ❑ Sister
6 ❑ Father
7 ❑ Mother
8 ❑ Respondent
9 ❑ Wife
10 ❑ Husband
11 ❑ Other: .....

B404 In general, for what do you use the soap? ***Interviewer:*** *Ask open-ended and check the according boxes. More than one answer possible!*

[1] ❑ Washing hands
[2] ❑ Laundry
[3] ❑ Clean the dishes
[4] ❑ Clean the house
[5] ❑ Personal hygiene
[6] ❑ Other: .....

B405 How much does your household spend for soap per month? .....Gourde
[-9] ❑ Does not know because not responsible

Hand washing with soap (HWWS)

Please inform the interviewee!! In the following we talk about hand washing with soap.

B406 Since this time yesterday, how many times did you wash your hands with soap? ..... times.

B407 ***If 1 and more times:*** Under which circumstances did you wash your hands with soap? Please name each situation. ***Interviewer:*** *Ask open-ended and check the according boxes. More than one answer possible!*

[1] ❑ Before eating
[2] ❑ Before feeding a child
[3] ❑ Before cooking, cutting or preparing food
[4] ❑ After eating
[5] ❑ Before handling drinking water
[6] ❑ After defecation
[7] ❑ After wiping a child's bottom
[8] ❑ After other kinds of contacts with feces
[9] ❑ After caring for a sick person
[10] ❑ Other: .....
.....
.....
[99] ❑ I don't remember

B408 ***If one or more times AND if having no soap (B401):*** Since yesterday you have washed your hands with soap. Where did you get soap for washing hands?

.....

In general, how often do you wash your hands with soap at the following times?

B409 Before eating?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B410 Before feeding a child?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B411 Before cooking, cutting or preparing food?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B412 After eating?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B413 Before handling drinking water?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B414 After defecation?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B415 After wiping a child's bottom?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B416 After other kinds of contacts with feces?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B417 After caring for a sick person?
[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B418 In general, why do you wash your hands with soap? .....

.....

B419 Do you think that washing hands with soap is time-consuming?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
Not at all time-consuming	Not time-consuming	A little time-consuming	Time-consuming	Very time-consuming

B420 Do you think that washing hands with soap is effortful?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
Not at all effortful	Not effortful	A little effortful	Effortful	Very effortful

B421 Do you think that soap is too expensive for everyday handwashing?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
Not at all	No	A little	Yes	Absolutely

B422 How much do you like or dislike washing hands with soap?

Rather dislike it			Rather neutral			Rather like it		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I dislike it very much	I dislike it	I quite dislike it	I rather dislike it	I neither dislike it nor do I like it	I rather like it	I quite like it	I like it	I like it very much

B423 How much do you like or dislike the smell of the soap?

Rather dislike it			Rather neutral			Rather like it		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I dislike it very much	I dislike it	I quite dislike it	I rather dislike it	I neither dislike it nor do I like it	I rather like it	I quite like it	I like it	I like it very much

B424 How pleasant or unpleasant do you think is it to wash hands with soap?

Rather unpleasant			Rather neutral			Rather pleasant		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
Very unpleasant	Unpleasant	Quite unpleasant	Rather unpleasant	Neither unpleasant nor pleasant	Rather pleasant	Quite pleasant	Pleasant	Very pleasant

B425 How often does it happen that you want to wash hands with soap but are hindered in doing so?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B426 How often does it happen that the hand washing station is damaged?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B427 How often does it happen that the hand washing station is stolen?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B428 How often does it happen that there is no water available for hand washing?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B429 How often does it happen that there is no soap available at the hand washing station?

[0] ❑ (Almost) never [1] ❑ Seldom [2] ❑ Sometimes [3] ❑ Often [4] ❑ (Almost) always

B430 Have you made a detailed plan regarding what to do if the hand washing station is out of order (e.g. damaged, no water or no soap)?

0❑	1❑	2❑	3❑	4❑
No detailed plan at all	No detailed plan	Quite detailed plan	Detailed plan	Very detailed plan

B431 Imagine you have stopped washing hands with soap for several days e.g. because the handwashing station was out of order. How confident are you to start washing hands with soap again?

0❑	1❑	2❑	3❑	4❑
Not at all confident	Not confident	Quite confident	Confident	Very confident

B432 Considering all the benefits and efforts related to washing hands with soap, how much do you think is it worthwhile for you to wash hands with soap?

Rather more effort than benefit			Rather neutral			Rather higher benefit than effort		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
It costs much more effort than benefit	It costs more effort than benefit	It costs quite more effort than benefit	It costs slightly more effort than benefit	The effort and the benefit are about the same	The benefit is slightly higher than the effort	The benefit is quite higher than the effort	The benefit is higher than the effort	The benefit is much higher than the effort

How much do you agree to the following statements?

B433 Soap is only needed when you have stubborn dirt on your hands that you can't remove only with water.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B434 I wash my hands because I would risk the health of my children if I did not wash my hands with soap.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B435 I wash my hands because I want to set a good example to the children.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B436 It is important to teach the children to wash their hands with soap.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B438 I feel more attractive when I have washed my hands with perfumed soap.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B439 I wash my hands with soap because that is what the hygiene mobilizers told us.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B440 The handwashing station is too far away to go there every time I should wash my hands.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

HWWS after stool contact

Please inform the Interviewee!!

In the following we would like to talk about one sort of hand washing situations, namely about stool related handwashing. This includes hand washing after defecation, after wiping a child's bottom, and other kinds of contacts with stool.

B501 To wash hands with soap after contact with stool is something I do because I am used to doing it.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B502 I feel uncomfortable when I do not wash hands with soap after contact with stool.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B503 How often does it happen that you forget to wash hands with soap after contact with stool?

0 ❑ (Almost) never 1 ❑ Seldom 2 ❑ Sometimes 3 ❑ Often 4 ❑ (Almost) always

B504 Have you made a detailed plan regarding how to avoid forgetting to wash hands with soap after contact with stool?

0❑	1❑	2❑	3❑	4❑
No detailed plan at all	No detailed plan	Quite detailed plan	Detailed plan	Very detailed plan

B506 How important is it for you to wash hands with soap after contact with stool?

[0] ❑ Not at all important [1] ❑ Not important [2] ❑ Quite important [3] ❑ Important [4] ❑ Very important

B507 How annoyed do you feel when you forget to wash hands with soap after contact with stool?

[0] ❑ Not at all annoyed [1] ❑ Not annoyed [2] ❑ Quite annoyed [3] ❑ Annoyed [4] ❑ Very annoyed

B508 Do you feel committed to wash hands with soap after contact with stool?

[0] ❑ Not at all committed [1] ❑ Not committed [2] ❑ Quite committed [3] ❑ Committed [4] ❑ Very committed

B509 Do you intend to always wash hands with soap after contact with stool?

[0] ❑ Not at all [1] ❑ Not [2] ❑ Medium [3] ❑ Yes [4] ❑ Very much

Attitudes towards HWWS after stool contact

B510 I feel dirty and smelly if I don't wash my hands with soap after visiting the toilet.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B511 If you can't see any dirt on your hands after visiting the toilet there is no need to wash them.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B512 How many people of your relatives wash hands with soap after contact with stool?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
(Almost) nobody (0%)	Some of them (25%)	Half of them (50%)	Most of them (75%)	(Almost) all of them (100%)

B513 How many people of your community wash hands with soap after contact with stool?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
(Almost) nobody (0%)	Some of them (25%)	Half of them (50%)	Most of them (75%)	(Almost) all of them (100%)

B514 Most of the people who are important to me support me in washing hands with soap after contact with stool.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B515 Most of the people who are important to me think I should wash my hands with soap after contact with stool.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B516 In general, I want to do, what people who are important to me think I should do.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B517 I feel a strong personal obligation to wash hands with soap after contact with stool.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B518 I would feel guilty if I didn't wash hands with soap after contact with stool.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B519 Do you think you are able to always wash hands with soap after contact with stool?

0 ❑ Not at all able 1 ❑ Not able 2 ❑ Quite able 3 ❑ Able 4 ❑ Very able

B520 How difficult or easy is it to always wash hands with soap after contact with stool?

Rather difficult			Rather neutral			Rather easy		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
Very difficult	Difficult	Quite difficult	Rather difficult	Neither easy nor difficult	Rather easy	Quite easy	Easy	Very easy

B521 ***If difficult (-4--1):*** Why? .....

HWWS before handling food

Please inform the Interviewee!!

Now we would like to talk about another sort of hand washing situations, namely about food related handwashing. This includes hand washing before preparing food, before eating, and before feeding a child.

B601 To wash hands with soap before handling food is something I do because I am used to doing it.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B602 I feel uncomfortable when I do not wash hands with soap before handling food.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B603 How often does it happen that you forget to wash hands with soap before handling food?

0 ❑ (Almost) never 1 ❑ Seldom 2 ❑ Sometimes 3 ❑ Often 4 ❑ (Almost) always

B604 Have you made a detailed plan regarding how to avoid forgetting to wash hands with soap before handling food?

0❑	1❑	2❑	3❑	4❑
No detailed plan at all	No detailed plan	Quite detailed plan	Detailed plan	Very detailed plan

B605 How important is it for you to wash hands with soap before handling food?

0 ❑ Not at all important 1 ❑ Not important 2 ❑ Quite important 3 ❑ Important 4 ❑ Very important

B606 How annoyed do you feel when you forget to wash hands with soap before handling food?

0 ❑ Not at all annoyed 1 ❑ Not annoyed 2 ❑ Quite annoyed 3 ❑ Annoyed 4 ❑ Very annoyed

B607 Do you feel committed to wash hands with soap before handling food?

0 ❑ Not at all committed 1 ❑ Not committed 2 ❑ Quite committed 3 ❑ Committed 4 ❑ Very committed

B608 Do you intend to always wash hands with soap before handling food?

0 ❑ Not at all 1 ❑ Not 2 ❑ Medium 3 ❑ Yes 4 ❑ Very much

Attitudes towards HWWS before handling food

B609 If I wash my hands with soap before eating the perfume of the soap spoils the taste of the food.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B610 I wash my hands with soap before handling food because it would be disgusting to get dirt into the food and then eat it.

Rather disagree			Rather neutral			Rather agree		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B611 How many people of your relatives wash hands with soap before handling food?

0❑	1❑	2❑	3❑	4❑
(Almost) nobody (0%)	Some of them (25%)	Half of them (50%)	Most of them (75%)	(Almost) all of them (100%)

B612 How many people of your community wash hands with soap before handling food?

[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
(Almost) nobody (0%)	Some of them (25%)	Half of them (50%)	Most of them (75%)	(Almost) all of them (100%)

B613 Most of the people who are important to me support me in washing hands with soap before handling food.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B614 Most of the people who are important to me think I should wash my hands with soap before handling food.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B615 I feel a strong personal obligation to wash hands with soap before handling food.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B616 I would feel guilty if I didn't wash hands with soap before handling food.

Rather disagree			Rather neutral			Rather agree		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
I strongly disagree	I disagree	I quite disagree	I rather disagree	I neither agree nor disagree	I rather agree	I quite agree	I agree	I strongly agree

B617 Do you think you are able to always wash hands with soap before handling food?

[0] ❑ Not at all able [1] ❑ Not able [2] ❑ Quite able [3] ❑ Able [4] ❑ Very able

B618 How difficult or easy is it to always wash hands with soap before handling food?

Rather difficult			Rather neutral			Rather easy		
[-4]❑	[-3]❑	[-2]❑	[-1]❑	[0]❑	[1]❑	[2]❑	[3]❑	[4]❑
Very difficult	Difficult	Quite difficult	Rather difficult	Neither easy nor difficult	Rather easy	Quite easy	Easy	Very easy

B619 ***If difficult (-4--1):*** Why? .....

Health status and awareness

Please inform the interviewee!! In the following we talk about health issues.

Diarrhea

B701 How high or low do you feel are the chances that you or someone in your family gets diarrhea?

Rather low			Rather average			Rather high		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
Very low	Low	Quite low	Rather low	Average	Rather high	Quite high	High	Very high

B702 Imagine that you contracted diarrhea, how severe would be the impact on your life in general?

0 ❑ Not severe at all 1 ❑ Not severe 2 ❑ Quite severe 3 ❑ Severe 4 ❑ Very severe

B703 Imagine that your child under the age of 5 contracted diarrhea, how severe would that be?
Interviewer: *If the interviewee has no child under the age of 5, ask to imagine having one.*

0 ❑ Not severe at all 1 ❑ Not severe 2 ❑ Quite severe 3 ❑ Severe 4 ❑ Very severe

Cholera

B704 Can you tell me what causes cholera? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

1 ❑ Drink unsafe water
2 ❑ Eat with dirty hands
3 ❑ Prepare food with dirty hands
4 ❑ Eat raw food which is not washed with safe water
5 ❑ Eat food which is not boiled long enough
6 ❑ Not covering food (from flies)
7 ❑ Not washing hands with soap
8 ❑ Bad hygiene
9 ❑ Defecate anywhere/not using latrine
10 ❑ The courtyard or the house are dirty
11 ❑ Other: .....
.....
.....
99 ❑ I don't know

B705 What are the effects of cholera on your body? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

1 ❑ Diarrhea
2 ❑ "White" diarrhea
3 ❑ Vomiting
4 ❑ Fever
5 ❑ Dehydration
6 ❑ Other: .....
.....
9 ❑ I don't know

B706 What do you think of people who have cholera?

Rather badly			Rather neutral			Rather well		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
I think very badly of them	I think badly of them	I think quite badly of them	I think rather badly of them	I think neither badly nor well of them	I think rather well of them	I think quite well of them	I think well of them	I think very well of them

B707 How high or low do you feel are the chances that you or someone in your family gets cholera?

Rather low			Rather average			Rather high		
-4❑	-3❑	-2❑	-1❑	0❑	1❑	2❑	3❑	4❑
Very low	Low	Quite low	Rather low	Average	Rather high	Quite high	High	Very high

B708 Why do you think that the chances that you or someone in your family gets cholera are high/average/low?

.....
.....

B709 Since the cholera outbreak in October has anyone in your family had cholera?
[1] ❑ yes [0] ❑ no [9] ❑ I don't know

If yes: How many people and which? ..... people [888] ❑ I don't know

Which? .....

If yes: Has anyone died due to cholera? [1] ❑ yes [0] ❑ no ***If yes:*** Who? .....

Imagine that you contracted cholera, how severe would be the impact on…

B710 … your life in general?

[0] ❑ Not severe at all [1] ❑ Not severe [2] ❑ Quite severe [3] ❑ Severe [4] ❑ Very severe

B711 … your social life?

[0] ❑ Not severe at all [1] ❑ Not severe [2] ❑ Quite severe [3] ❑ Severe [4] ❑ Very severe

B712 … your economic situation?

[0] ❑ Not severe at all [1] ❑ Not severe [2] ❑ Quite severe [3] ❑ Severe [4] ❑ Very severe

B713 Can you tell me how you can protect yourself and your family from getting cholera or diarrhea? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

[1] ❑ Wash hands with soap after defecation
[2] ❑ Wash hands with soap after contact with stool
[3] ❑ Wash hands with soap before handling food
[4] ❑ Wash hands with soap after caring for a sick person
[5] ❑ Wash hands with soap before feeding a child
[6] ❑ Wash hands with soap after wiping a child's bottom
[7] ❑ Drinking only safe water
[8] ❑ Using latrines for defecation
[9] ❑ Disposal of feces at latrines
[10] ❑ Boil food long enough
[11] ❑ Wash raw food with safe water
[12] ❑ Good household hygiene
[13] ❑ Cleaning latrines regularly
[14] ❑ Cover the food (from flies)
[15] ❑ Other: .....
.....
.....
[99] ❑ I don't know

B714 Can you tell me what you have to do if someone gets cholera? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

[1] ❑ Give much liquid
[2] ❑ Give ORS
[3] ❑ Give water with salt and sugar
[4] ❑ Bring the sick person to a doctor
[5] ❑ Bring the sick person to a hospital
[6] ❑ Bring the sick person to a cholera treatment center
[7] ❑ Clean and disinfect the latrines
[8] ❑ Clean and disinfect the household
[9] ❑ Other: .....
.....
[99] ❑ I don't know

General

B715 Can you tell me why it is important to wash hands with soap after defecation and before handling food? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

[1] ❑ To wash off germs that are in the stool
[2] ❑ To stop spreading of germs
[3] ❑ To keep food safe from germs
[4] ❑ Prevent contamination of food
[5] ❑ Other: .....
.....
.....
[9] ❑ I don't know

B716 How certain are you that washing hands with soap after defecation and before handling food prevents you and your family from getting diarrhea or cholera?

[0] ❑ Not at all certain [1] ❑ Not certain [2] ❑ Quite certain [3] ❑ Certain [4] ❑ Very certain

Promotion

Please inform the Interviewee!!

Since the earthquake, hygiene promotion and cholera response was conducted at the camp/neighborhood where you live. People from Oxfam or the community held group discussions, organized events or talked with you directly about hand washing, hygiene, cholera or diarrhea. We now would like to talk about the information you might have received there.

	B801 Since the earthquake, have you gained information about hygiene, handwashing, cholera or diarrhea from the following sources?	*B802* How many times?	*B803* Did you like it?	*B804* Was the information rather unconvincing or convincing?	*B805* Is the source rather untrustworthy or trustworthy?
a.	Radio spot [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
b.	Radio program at which you can call and ask questions [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
c.	Information spread by megaphone in your camp/neighborhood [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
d.	Group discussion/ Community reunion where you discussed e.g. good and bad behavior. Maybe picture cards similar to this were used. ***(Interviewer: show the picture card)*** [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy

B801 Since the earthquake, have you gained information about hygiene, handwashing, cholera or diarrhea from the following sources?		*B802* How many times?	*B803* Did you like it?	*B804* Was the information rather unconvincing or convincing?	*B805* Is the source rather untrustworthy or trustworthy?
e.	Hygiene training lasting for 2-3 days [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
f.	Home visit of people from Oxfam or the community who discussed hygiene behavior with you [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
g.	Material distribution where you learned how to use the material [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
h.	Neighbor/friend [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
i.	Focus group/Discussion reunion where you discussed problems in the community or gave feedback to the promotion activities [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy

B801 Since the earthquake, have you gained information about hygiene, handwashing, cholera or diarrhea from the following sources?		*B802* How many times?	*B803* Did you like it?	*B804* Was the information rather unconvincing or convincing?	*B805* Is the source rather untrustworthy or trustworthy?
j.	Cinema show with films about hygiene etc. [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
k.	Theatre about hygiene, hand washing, cholera or diarrhea [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
l.	Special hygiene day (for example hand washing day, day of water, etc.) [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
m.	Quiz about hygiene, hand washing, cholera or diarrhea [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy
n.	Sticker, poster, paintings about hygiene, hand washing, cholera or diarrhea [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very unconvincing [1] ❑ Unconvincing [2] ❑ Quite convincing [3] ❑ Convincing [4] ❑ Very convincing	[0] ❑ Very untrustworthy [1] ❑ Untrustworthy [2] ❑ Quite trustworthy [3] ❑ Trustworthy [4] ❑ Very trustworthy

B806 Do you participate regularly in a community club about health issues and hygiene? (e. g. Mothers' club)

[1] ❑ yes [0] ❑ no [9] ❑ I don't remember

B807 ***If yes:*** Do you think the club is useful for the community?

[0] ❑ Not at all useful [1] ❑ Not useful [2] ❑ Quite useful [3] ❑ Useful [4] ❑ Very useful

B808	Did you participate in one of the following contests about hygiene, handwashing, cholera or diarrhea?	*B809* How many times?	*B810* Did you like it?	*B811* Was it fun?	*B812* Was it rather uninformative or informative?
a.	Painting contest [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very uninformative [1] ❑ Uninformative [2] ❑ Quite informative [3] ❑ Informative [4] ❑ Very informative
b.	Art/Handicraft contest [1] ❑ yes [0] ❑ no [9] ❑ I don't remember	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very uninformative [1] ❑ Uninformative [2] ❑ Quite informative [3] ❑ Informative [4] ❑ Very informative
c.	Other contest [1] ❑ yes [0] ❑ no [9] ❑ I don't remember ***If yes:*** Which one?.....	[0] ❑ 1 time [1] ❑ 2-5 times [2] ❑ 5-10 times [3] ❑ More than 10 times [4] ❑ Many times	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Not at all [1] ❑ No [2] ❑ Quite [3] ❑ Yes [4] ❑ Very much	[0] ❑ Very uninformative [1] ❑ Uninformative [2] ❑ Quite informative [3] ❑ Informative [4] ❑ Very informative

B813 Do you know a song about handwashing, hygiene, cholera or diarrhea?

[1] ❑ yes [0] ❑ no [9] ❑ I don't remember

Has anyone of Oxfam provided one of the following in your camp/neighborhood?		
B814	Latrines?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B815	Handwashing station?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B816	Soap at hand washing stations?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B817	Water source?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember

Has anyone of Oxfam provided your family with one of the following?		
B818	Soap?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B819	Handwashing station?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B820	Water bucket?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B821	Aquatabs or chlorine?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B822	Water filter?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B823	ORS?	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember
B824	Hygiene or cholera flyer? ***Interviewer:*** *If the interviewee does not remember, show him/her a flyer!*	[1] ❑ yes [0] ❑ no [9] ❑ I don't remember

Interviewer: *The following section is only applicable to Interviewees who experienced any form of promotion.* ***If Interviewee did not experience any form of promotion go to B717.***

B825 You received information about hygiene, handwashing, cholera or diarrhea. Can you recall what you learned thereby regarding handwashing, water consumption, latrine usage, cholera and diarrhea? ***Interviewer:*** *Ask open-ended and check the according box. More than one answer possible!*

[1] ❑ It is important to HWWS after defecation.

[2] ❑ It is important to HWWS after wiping a child's bottom.

[3] ❑ It is important to HWWS after caring for a sick person.

[4] ❑ It is important to HWWS before eating.

[5] ❑ It is important to HWWS before handling food.

[6] ❑ It is important to HWWS before feeding a child.

[7] ❑ HWWS eliminates invisible germs on my hands.

[8] ❑ Invisible germs on my hands can cause diarrhea and cholera.

[9] ❑ Consuming untreated water can cause diarrhea and cholera.

[10] ❑ Using latrines/toilets for defecation prevents the spreading of germs.

[11] ❑ Other: .....

.....

[99] ❑ I don't remember

B826 Did you receive plausible reasons for the fact that you should behave in a certain way? (wash your hands with soap/consume treated water)

[0] ❑ Not at all plausible [1] ❑ Not plausible [2] ❑ Quite plausible [3] ❑ Plausible [4] ❑ Very plausible

B827 Did you learn what happens if you do not behave in the recommended way? (not wash your hands with soap /consume untreated water)

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B828 The information you received does it correspond to your world view?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B829 Was the information you received novel to you?

[0] ❑ Not at all new [1] ❑ Not new [2] ❑ Quite new [3] ❑ New [4] ❑ Very new

B830 Was the information you received important?

[0] ❑ Not at all important [1] ❑ Not important [2] ❑ Quite important [3] ❑ Important [4] ❑ Very important

B831 Is it important to you to protect you and your family from getting diarrhea or cholera?

[0] ❑ Not at all important [1] ❑ Not important [2] ❑ Quite important [3] ❑ Important [4] ❑ Very important

B832 Will the information you received be helpful for you in future?

[0] ❑ Not at all helpful [1] ❑ Not helpful [2] ❑ Quite helpful [3] ❑ Helpful [4] ❑ Very helpful

How do you think about the person(s) from whom you received the information?

B833 Did the persons know what they were talking about?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B834 Were they nice persons?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B835 Are these persons important to you?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B836 Do you trust these persons?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B837 Did the persons give you many arguments for why you should HWWS and use the latrine for defecation?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B838 Do you know Oxfam?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B839 ***If 2-4:*** Do you like Oxfam?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

B840 ***If 2-4 concerning B838:*** Do you trust Oxfam?

[0] ❑ Not at all [1] ❑ No [2] ❑ Not really [3] ❑ Yes [4] ❑ Absolutely

Communication

B717 How often do you talk positively about handwashing with soap and health with others?

[0] ❑ Never [1] ❑ Less often than every month [2] ❑ Every month [3] ❑ Every 3 weeks

[4] ❑ Every 2 weeks [5] ❑ Every week [6] ❑ Every 1 to 3 days

Data of the household

B120 Address or description: .....

B121 Coordinates: ***Mark waypoint on GPS!*** .....

B122 Number of persons living in the household (incl. children) (TOTAL): .....

B123 Number of people present during interview ***(observation!!)***: .....

B124 Monthly expenditure:.....Gourdes [-9] ❑ I don't know

B125 Monthly income:.....Gourdes [-9] ❑ I don't know

B126 Do you have electricity? [1] ❑ yes [0] ❑ no

B127 Prior to the earthquake did you have access to a latrine/toilet? [1] ❑ yes [0] ❑ no

B128 ***Ask in neighborhoods:*** Do you currently have access to a latrine/toilet?[1] ❑ yes [0] ❑ no
Interviewer: *Please memorize!*

B129 Prior to the earthquake what kind of water source did you use? .....

How many of the following commodities do you or any member of your household own today or owned prior to the earthquake?		
	Now	*Prior to the earthquake*
B130 Radio	Quantity	Quantity
B131 Television	Quantity	Quantity
B132 Computer	Quantity	Quantity
B133 Refrigerator	Quantity	Quantity
B134 Motorcycle	Quantity	Quantity
B135 Mobile phone	Quantity	Quantity

Thank you very much for taking the time to talk with us! We finished the interview.

Interviewer: Ask in households that have access to a latrine/toilet: To end, could I please have a look at the latrine/toilet you are using? [1] ❑ Does not want to show it

B136 End time: .....

Observations

Interviewer: *Have a look at the latrine and describe the condition of the latrine accordingly:*

B137 Condition of the latrine(s): (***More than one answer possible!)***

[1] ❑ Solid
[2] ❑ Very clean
[3] ❑ Cracking
[4] ❑ Unswept
[5] ❑ In a bad state
[6] ❑ Dirty
[7] ❑ Full
[8] ❑ Bad smell
[9] ❑ Flies
[10] ❑ Toilet paper present

B138 Type of latrine:

[0] ❑ Public latrine
[1] ❑ Latrine for several families
[2] ❑ Household latrine/Family latrine
[3] ❑ Neighbor's latrine

B139 Technical features:

[0] ❑ Sewer connection/septic tank (WCs)
[1] ❑ Pit latrine
[2] ❑ Chemical latrine

B140 Distance of latrine to the tent/house:

[0] ❑ Very far
[1] ❑ Far
[2] ❑ Not too far
[3] ❑ Close
[4] ❑ Very close

Official use:

Checked: ❑ yes Initials: ..... **Data entered:** ❑ yes Initials: .....

Appendix D. Distributional characteristics of HWWS, average attitude, and age and assessment of the assumptions of parametric tests

Parametric tests require several assumptions to be true in order to draw accurate conclusions from their results. If the assumptions are broken, one cannot make any sound generalizations of the results beyond the sample. Hereafter, we outline first the descriptive statistics of the main continuous variables of the data, that is, the interviewees' age, feces and food related HWWS frequency, and the average attitude towards the promotions (see Table D1). Subsequently, we check whether the assumptions were satisfied for each of the parametric test that we could have applied instead of a non-parametric procedure to answer our research questions.

The standardized scores for skewness and kurtosis of the interviewees' age significantly deviated from zero, $z = 10.80$ and $z = 4.26$, respectively, meaning that the distribution of age was skewed in the direction of younger participants and that it was sharply pointed. Likewise, the Kolmogorov-Smirnov test depicted significant non-normality, $D(782) = 0.11$, $p < .001$.

Similarly, the standardized scores for both skewness and kurtosis of feces related HWWS frequency were significantly deviating from zero, $z = –18.55$ and $z = 19.28$, respectively, meaning that the distribution was skewed in the direction of high values and that it was sharply pointed. Regarding food related HWWS frequency, the standardized value was significant only for skewness, $z = –10.37$, but not for kurtosis, $z = 0.34$. The results of Kolmogorov-Smirnov tests for normality supported these findings, as they were significant for feces related HWWS frequency, $D(811) = 0.26$, $p < .001$, as well as for food related HWWS frequency, $D(811) = 0.15$, $p < .001$.

The standardized values for skewness and kurtosis of the interviewees' average attitude towards the promotions significantly deviated from zero, too, $z = –6.94$ and $z = 10.57$, respectively, indicating that the distribution was skewed in the direction of higher values and that it was sharply pointed. Correspondingly, the Kolmogorov-Smirnov test depicted significant non-normality, $D(808) = 0.27$, $p < .001$.

However, in large sample sizes such as ours, standard errors are prone to become very small. As a result, *z*-scores and statistical tests for normality should be interpreted with caution as they show significant results even for negligibly small deviations from normality (Field, 2009). The distributions should be interpreted visually in this case. Hence, we additionally displayed histograms and Q-Q-plots, all of which clearly illustrate the non-normal shapes of the age, feces and food related HWWS frequency, and average attitude distributions (see Figures D1 to D4).

Table D1

Descriptive Statistics of Feces and Food Related HWWS, the Average Attitude Towards the Promotion Types, and Age

Variable	*N*	*M*	*SD*	*Mdn*	*Mode*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Feces-HWWS	811	3.57	0.56	3.67	4.00	–1.59	0.09	3.31	0.17
Food-HWWS	811	3.05	0.82	3.25	4.00	–0.89	0.09	0.06	0.17
Av. attitude	808	3.06	0.39	3.00	3.00	–0.60	0.09	1.82	0.17
Age	782	34.68	12.90	32.00	30.00	0.94	0.09	0.74	0.18

Note. Kurt. = Kurtosis; Av. = Average.

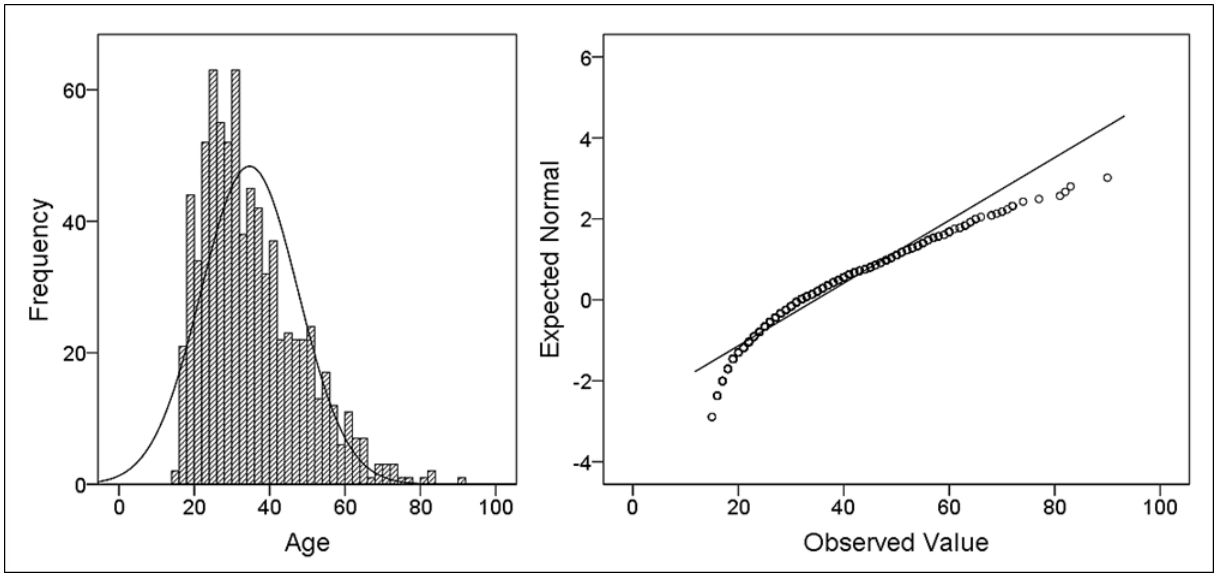


Figure D1. Histogram with normal curve and normal Q-Q plot of the interviewees' age.

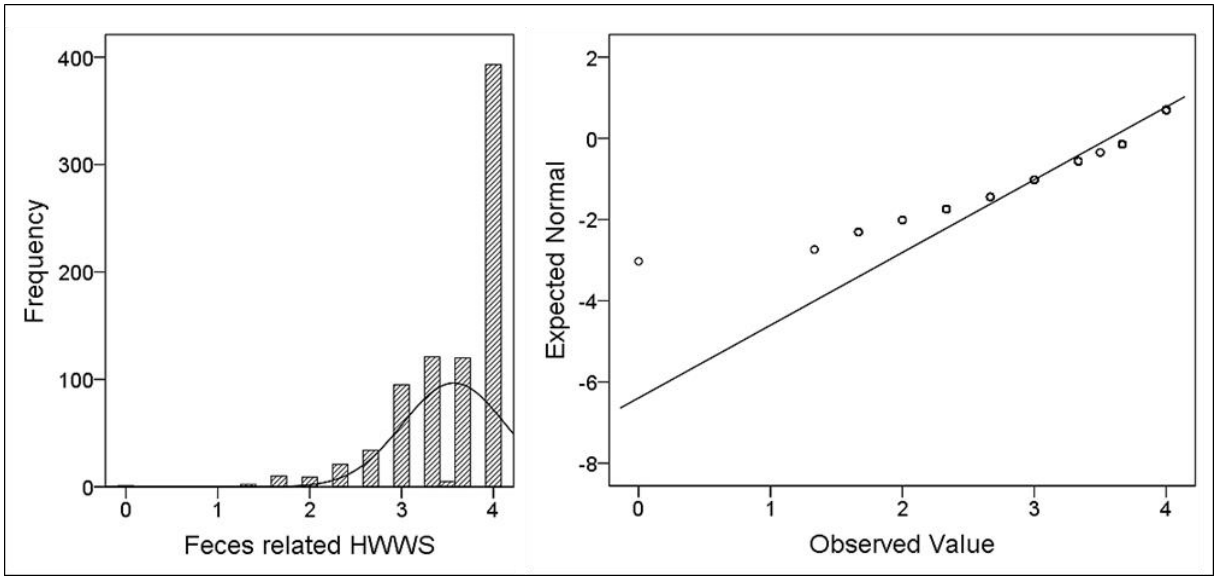


Figure D2. Histogram with normal curve and normal Q-Q plot of feces related HWWS.

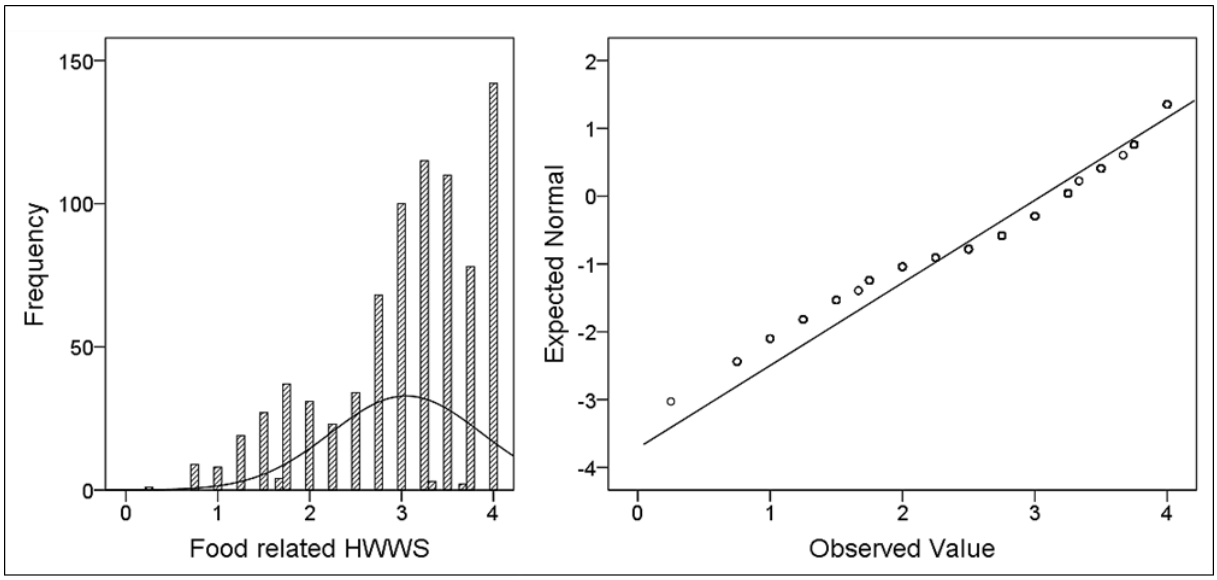


Figure D3. Histogram with normal curve and normal Q-Q plot of food related HWWS.

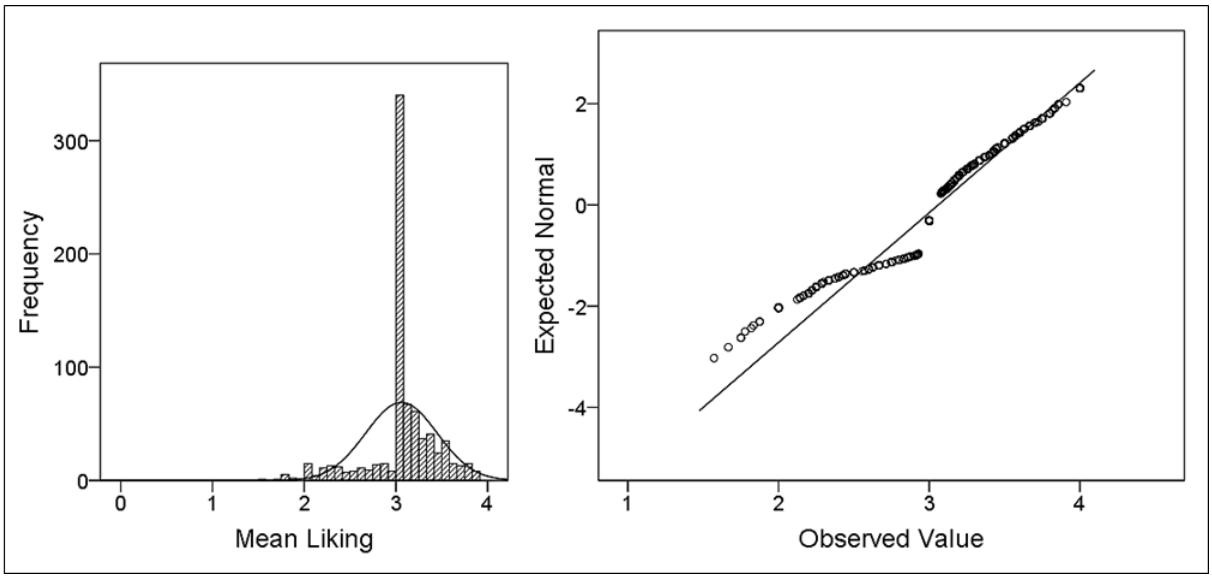


Figure D4. Histogram with normal curve and normal Q-Q plot of the average attitude towards the promotions.

Yet, parametric tests, like t-tests and analyses of variance, assume that the scores of the dependent variable are normally distributed *within* the groups. Therefore, we performed Kolmogorov-Smirnov tests for normality on the distributions age, feces and food related HWWS frequency, and average attitude within each of the groups that were compared to each other in the present paper. As can be seen from Table D2, Kolmogorov-Smirnov tests revealed significant non-normality of the age distribution for each group of NAPT participants and non-participants both for the total sample as well as for the OQ, the IO, and the neighborhood subsample, respectively. Table D3 shows significant non-normality of the feces related HWWS frequency distributions among each group of persons at specific socio-demographic

characteristics with exception of participants attending professional school. In regard to food related HWWS frequency, the distributions were significantly non-normal for each group of persons at specific socio-demographic characteristics, except for persons who could write only, who were engaged in agriculture, who had a formal employment, and for those who attended professional school or university, as well as for persons living in neighborhoods who were aged between 15 and 19 years and between 35 and 39 years (see Table D4). Table D5 shows that the distribution of the average attitude towards the promotions was significantly non-normal among NAPT participants and non-participants for each NAPT. Finally, the tests revealed significant non-normality for the distributions of feces and food related HWWS frequency for persons with a rather negative and those with a very positive attitude towards the promotion types (see Table D6).

Table D2

Results of Kolmogorov-Smirnov Tests on the Distributions of the NAPT Participants' Age and the Non-Participants Age

Promotion type experience	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Total sample						
Focus group						
No	466	0.12***	0.96	0.11	0.68	0.23
Yes	313	0.10***	0.78	0.14	0.19	0.28
Stickers, posters, paintings						
No	184	0.12***	0.85	0.18	0.35	0.36
Yes	597	0.11***	0.92	0.10	0.71	0.20
Song						
No	350	0.10***	0.89	0.13	0.63	0.26
Yes	362	0.10***	0.93	0.13	0.52	0.26
Special hygiene day						
No	450	0.12***	0.96	0.12	0.69	0.23
Yes	362	0.10***	0.78	0.14	0.21	0.27
Home visit						
No	257	0.11***	0.97	0.15	0.71	0.30
Yes	516	0.11***	0.89	0.11	0.52	0.22
OQ subsample						
Focus group						
No	105	0.14***	0.90	0.24	0.46	0.47
Yes	110	0.12***	0.73	0.23	0.11	0.46

Table D2 continues

Table D2 continued

Promotion type experience	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Special hygiene day						
No	95	0.13***	0.76	0.25	0.14	0.49
Yes	118	0.13***	0.85	0.22	0.46	0.44
IO subsample						
Focus group						
No	177	0.12***	1.02	0.18	0.64	0.36
Yes	106	0.11**	0.77	0.24	0.02	0.47
Special hygiene day						
No	169	0.11***	1.02	0.19	0.68	0.37
Yes	115	0.10**	0.76	0.23	0.00	0.45
Home visit						
No	80	0.12**	1.02	0.27	0.44	0.53
Yes	202	0.11***	0.88	0.17	0.43	0.34
Neighborhood subsample						
Song						
No	181	0.08**	0.62	0.18	0.00	0.36
Yes	141	0.10**	0.81	0.20	0.06	0.41

Note. Kurt. = Kurtosis.
**$p \leq .01$. ***$p \leq .001$.

Table D3

Results of Kolmogorov-Smirnov Tests on the Distributions of Feces Related HWWS Frequency at Different Socio-Demographic Characteristics

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Affiliate						
OGB	291	0.23***	–1.47	0.14	2.58	0.29
OQ	225	0.32***	–1.27	0.16	1.32	0.32
IO	295	0.27***	–1.38	0.14	1.72	0.28
Quarter in PAP						
Delmas	202	0.27***	–1.39	0.17	1.53	0.34
Carrefour	32	0.30***	–0.76	0.41	–0.68	0.81
Croix-de-Bouquet	75	0.26***	–2.69	0.28	11.83	0.55
Carrefour Feuille	134	0.22***	–1.11	0.21	0.50	0.42
Centre Ville	42	0.29***	–1.47	0.37	1.65	0.72

Table D3 continues

Table D3 continued

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Martissant	43	0.29***	–0.83	0.36	–0.37	0.71
Region type						
Urban	288	0.27***	–1.26	0.14	0.91	0.29
Peri-urban	240	0.24***	–2.01	0.16	6.93	0.31
Rural	283	0.29***	–1.40	0.15	2.03	0.29
Type of site						
Camp	446	0.28***	–1.87	0.12	5.54	0.23
Neighborhood	365	0.25***	–1.31	0.13	1.39	0.26
Literacy						
Can neither read nor write	271	0.29***	–1.56	0.15	2.31	0.30
Can read only	16	0.29***	–1.61	0.56	2.09	1.09
Can write only	18	0.21*	0.04	0.54	–1.68	1.04
Can both read and write	492	0.26***	–1.61	0.11	3.87	0.22
Children under 12						
No	297	0.33***	–2.00	0.14	3.88	0.28
Yes	510	0.23***	–1.43	0.11	3.39	0.22
Occupation						
Unemployed	264	0.28***	–1.24	0.15	0.87	0.30
Housewife/houseman	146	0.31***	–1.30	0.20	1.15	0.40
Agriculture	13	0.32***	–1.09	0.62	0.53	1.19
Informal employment	186	0.29***	–3.19	0.18	17.88	0.36
Formal employment	30	0.28***	–0.20	0.43	–1.79	0.83
Independent work	96	0.19***	–1.26	0.25	1.44	0.49
Studies	59	0.23***	–1.38	0.31	2.26	0.61
Education						
No school attendance at all	193	0.26***	–1.35	0.18	1.44	0.35
Primary school – not finished	196	0.25***	–1.75	0.17	4.65	0.35
Primary school – Certificate	87	0.36***	–2.31	0.26	6.60	0.51
Secondary school – not finished	236	0.24***	–1.34	0.16	1.68	0.32
Secondary school – Reto	41	0.33***	–0.77	0.37	–1.03	0.72
Secondary school – Filo	21	0.28***	–0.80	0.50	–0.43	0.97
Professional school	8	0.23	–0.27	0.75	–1.22	0.48
University	14	0.27**	–1.66	0.60	3.30	1.15

Table D3 continues

Table D3 continued

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Age						
15-19	67	0.27***	–1.54	0.29	1.94	0.58
20-24	115	0.23***	–1.22	0.23	1.49	0.45
25-29	141	0.25***	–1.12	0.20	0.85	0.41
30-34	120	0.28***	–1.11	0.22	0.83	0.44
35-39	100	0.25***	–2.77	0.24	12.39	0.48
40-49	126	0.34***	–2.01	0.22	4.39	0.43
50-90	113	0.28***	–1.54	0.23	1.78	0.45

Note. Kurt. = Kurtosis.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table D4

Results of Kolmogorov-Smirnov Tests on the Distributions of Food Related HWWS Frequency at Different Socio-Demographic Characteristics

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
		Total sample				
Affiliate						
OGB	291	0.16***	–0.90	0.14	0.44	0.29
OQ	225	0.19***	–0.92	0.16	0.04	0.32
IO	295	0.17***	–0.81	0.14	0.12	0.28
Quarter in PAP						
Delmas	202	0.16***	–0.98	0.17	0.32	0.34
Carrefour	32	0.20**	–1.16	0.41	0.71	0.81
Croix-de-Bouquet	75	0.17***	–1.26	0.28	1.04	0.55
Carrefour Feuille	134	0.17***	–0.73	0.21	0.35	0.42
Centre Ville	42	0.17**	–0.78	0.37	0.61	0.72
Martissant	43	0.16**	–0.80	0.36	0.18	0.71
Region type						
Urban	288	0.16***	–0.86	0.14	–0.06	0.29
Peri–urban	240	0.17***	–1.08	0.16	0.54	0.31
Rural	283	0.16***	–0.81	0.15	–0.09	0.29
Type of site						
Camp	446	0.17***	–1.03	0.12	0.42	0.23
Neighborhood	365	0.16***	–0.74	0.13	–0.25	0.26

Table D4 continues

Table D4 continued

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Literacy						
Can neither read nor write	271	0.15***	–1.02	0.15	0.51	0.30
Can read only	16	0.24*	–0.90	0.56	–0.10	1.09
Can write only	18	0.18	–0.29	0.54	–0.40	1.04
Can both read and write	492	0.16***	–0.87	0.11	–0.10	0.22
Children under 12						
No	297	0.15***	–1.09	0.14	0.75	0.28
Yes	510	0.16***	–0.79	0.11	–0.22	0.22
Occupation						
Unemployed	264	0.14***	–0.65	0.15	–0.69	0.30
Housewife/houseman	146	0.17***	–1.33	0.20	2.13	0.40
Agriculture	13	0.17	–0.38	0.62	–0.79	1.20
Informal employment	186	0.15***	–1.18	0.18	1.49	0.36
Formal employment	30	0.15	–0.54	0.43	–0.69	0.83
Independent work	96	0.18***	–0.92	0.25	0.10	0.49
Studies	59	0.12*	–0.63	0.31	–0.13	0.62
Education						
No school attendance at all	193	0.16***	–0.85	0.18	0.03	0.35
Primary school – not finished	196	0.16***	–0.80	0.17	–0.22	0.35
Primary school – Certificate	87	0.15***	–0.96	0.26	0.29	0.51
Secondary school – not finished	236	0.16***	–0.85	0.16	–0.26	0.32
Secondary school – Reto	41	0.19***	–0.84	0.37	0.21	0.73
Secondary school – Filo	21	0.19*	0.18	0.50	–1.28	0.97
Professional school	8	0.24	–0.94	0.75	–0.14	1.48
University	14	0.20	–1.08	0.60	1.05	1.15
Age						
15-19	67	0.13**	–0.60	0.29	–0.69	0.58
20-24	115	0.16***	–0.63	0.23	–0.55	0.45
25-29	141	0.17***	–1.08	0.20	0.38	0.41
30-34	120	0.18***	–0.89	0.22	–0.04	0.44
35-39	100	0.16***	–1.16	0.24	2.02	0.48
40-49	126	0.17***	–1.11	0.22	0.55	0.43
50-90	113	0.16***	–0.77	0.23	–0.28	0.45

Table D4 continues

Table D4 continued

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
OQ subsample						
Area						
Port-au-Prince	152	0.19***	–1.03	0.20	0.36	0.39
Leogane	73	0.20***	–0.71	0.28	–0.69	0.56
Region type						
Urban	69	0.17***	–1.23	0.29	1.23	0.57
Peri-urban	83	0.20***	–0.93	0.26	0.12	0.52
Rural	73	0.20***	–0.71	0.28	–0.69	0.56
Type of site						
Camp	164	0.19***	–1.04	0.19	0.42	0.38
Neighborhood	61	0.20***	–0.64	0.31	–0.88	0.60
IO subsample						
Area						
Port–au–Prince	85	0.16***	–0.77	0.26	–0.32	0.52
Leogane	35	0.18**	–0.71	0.40	–0.41	0.78
Gressier	38	0.16*	–0.32	0.38	–0.80	0.75
Grand Goave	44	0.22***	–1.17	0.36	0.71	0.70
Petit Goave	93	0.20***	–0.99	0.25	0.33	0.50
Children under 12						
No	107	0.14***	–0.87	0.23	0.34	0.46
Yes	188	0.18***	–0.76	0.18	–0.36	0.35
Babies						
No	168	0.17***	–0.92	0.18	0.30	0.35
Yes	95	0.20***	–0.61	0.25	–0.72	0.49
Neighborhood subsample						
Literacy						
Can neither read nor write	119	0.16***	–0.92	0.22	0.35	0.44
Can read or write only	14	0.27**	–0.70	0.60	0.29	1.15
Can both read and write	222	0.16***	–0.72	0.16	–0.41	0.33
Age						
15-19	26	0.16	–0.24	0.46	–1.49	0.89
20-24	49	0.14*	–0.55	0.34	–0.55	0.67
25-29	57	9.15**	–0.69	0.32	–0.61	0.62

Table D4 continues

Table D4 continued

Variable	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
30-34	52	0.19***	–0.76	0.33	–0.42	0.65
35-39	40	0.14	–0.50	0.37	–0.39	0.73
40-49	64	0.20***	–1.27	0.30	1.31	0.59
50-90	61	0.15**	–0.67	0.31	–0.40	0.60

Note. Kurt. = Kurtosis.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table D5

Results of Kolmogorov-Smirnov Tests on the Distributions of the Average Attitude Towards the Promotions Among NAPT Participants and Non-Participants

Promotion type experience	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Focus group						
No	480	0.27***	–0.19	0.11	2.28	0.22
Yes	325	0.27***	–0.84	0.14	1.08	0.27
Stickers, posters, paintings						
No	189	0.35***	0.57	0.18	3.10	0.35
Yes	616	0.25***	–0.49	0.10	1.29	0.20
Song						
No	364	0.24***	–0.33	0.13	2.13	0.26
Yes	372	0.29***	–0.76	0.13	1.10	0.25
Special hygiene day						
No	467	0.26***	–0.15	0.11	2.00	0.23
Yes	335	0.29***	–0.93	0.13	1.06	0.27
Home visit						
No	264	0.26***	–0.23	0.15	1.42	0.30
Yes	534	0.29***	–1.07	0.11	2.32	0.21

Note. Kurt. = Kurtosis.
***$p \leq .001$.

Table D6

Results of Kolmogorov-Smirnov Tests on the Distributions of Feces and Food Related HWWS Frequency Among Persons of Different Attitudes Towards the Promotions

Average attitude	*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Feces related HWWS frequency						
Rather negative	475	0.24***	–1.32	0.11	2.09	0.22
Very positive	333	0.33***	–1.32	0.13	1.44	0.27
Food related HWWS frequency						
Rather negative	475	0.16***	–0.62	0.11	–0.65	0.22
Very positive	333	0.14***	–0.89	0.13	0.71	0.27

Note. Kurt. = Kurtosis.

***$p \leq .001$.

Moreover, t-tests, analyses of variance, as well as regression analyses with categorical predictor variables require that the variances are distributed equally across groups, also known as homogeneity of variances or homoscedasticity (Field, 2009). Hence, we conducted Levene's tests on the homogeneity of the variance distributions to check whether this assumption was met for tests on differences in the interviewee's age and average attitude between NAPT participants and non-participants, and for the tests on differences in feces and food related HWWS frequency between persons of different socio-demographic characteristics and between persons of different attitudes towards the promotion activities. Additionally, we looked at Hartley's F_{Max}, as Levene's test can detect significant results even for small differences in variance when the sample size is big (Field, 2009). Hartley's F_{Max} is the ratio between the variance of the group with the biggest variance and the one of the group with the smallest variance. The critical values for Hartley's F_{Max} for groups with more than 60 participants are not exactly defined, but for sample sizes as big as ours, Hartley's F_{Max} should approximate 1.00, and values higher than that indicate that the group variances differ significantly from each other (Pearson & Hartley, 1954). The closer the value of Hartley's F_{Max} is to 1.00, the more equal the group variances.

Both the results of Levene's tests and Hartley's F_{Max} showed that, for each NAPT, the variances of the NAPT participants' age differed significantly from that of non-participants in the total sample (see Table D7). In the OQ and IO subsamples, the assumption of homogeneity of variances was met between focus group participants and non-participants, as it was between special hygiene day participants and non-participants in the IO subsample.

Table D7

Results of Levene's Tests on Homogeneity of Variances of the NAPT Participants' Age and the Non-Participants' Age

Promotion type	*df*	*F*	Hartley's F_{Max}	$s^2_{participants}$	$s^2_{non\text{-}participants}$
		Total sample			
Focus group	1, 777	16.28***	1.53	125.85	192.66
Stickers, posters, paintings	1, 779	10.75***	1.46	148.97	216.83
Song	1, 710	19.57***	1.54	129.51	200.09
Special hygiene day	1, 774	12.64***	1.46	131.39	192.43
Home visit	1, 771	12.55***	1.45	144.79	210.32
		OQ subsample			
Focus group	1, 213	3.53	1.40	99.42	138.95
Special hygiene day	1, 211	6.83**	1.56	94.24	147.23
		IO subsample			
Focus group	1, 281	3.64	1.51	161.87	243.87
Special hygiene day	1, 282	2.51	1.40	173.45	242.24
Home visit	1, 280	7.09**	1.66	180.08	299.79
		Neighborhood subsample			
Song	1, 320	6.62*	1.45	198.52	136.74

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

As shown in Table D8, Levene's test revealed significant heterogeneity of variances of feces related HWWS frequencies for persons of different affiliates, different Quarters in Pap, different region types, different occupations, and different educational levels, but not for persons of different levels of literacy, between persons having children under the age of 12 and those who did not, and between persons of different age groups. Concerning food related HWWS frequency, the assumption of homogeneity of variances was violated regarding the total sample for persons of different levels of literacy, for persons having children under the age of 12 or not, for persons of different occupations, and for those of different educational levels, while it was not violated regarding the remaining tests on differences in food related HWWS frequency depending on socio-demographic characteristics (see Table D9).

Table D10 shows that the variances of the average attitude towards the promotion activities did not differ significantly between each group of NAPT participants and non-participants. Finally, persons with a rather negative attitude towards the promotions differed significantly in

the variances of both feces related HWWS frequency (s^2 = 0.39), F(1, 806) = 82.32, p < .001, Hartley's F_{Max} = 2.72, and food related HWWS frequency (s^2 = 0.83), F(1, 806) = 82.87, p < .001, Hartley's F_{Max} = 2.35, from persons with a very positive attitude (s^2 = 0.15, and s^2 = 0.35, respectively).

Table D8

Results of Levene's Tests on Homogeneity of Variances of Feces Related HWWS Frequency Between Persons at Different Socio-Demographic Characteristics

Variable	*df*	*F*	Hartley's F_{Max}	smallest s^2	biggest s^2
Affiliate	2, 808	20.67***	2.22	0.20	0.45
Quarter in PaP	5, 522	3.89**	4.31	0.12	0.47
Region type	2, 808	13.16***	1.81	0.22	0.39
Type of site	1, 809	5.16*	1.17	0.29	0.34
Literacy	3, 793	1.87	3.67	0.17	0.64
Children under 12	1, 805	3.52	1.02	0.31	0.31
Occupation[a]	6, 787	5.06***	2.97	0.19	0.58
Education[d]	7, 788	3.54***	2.85	0.14	0.40
Age[c]	6, 775	1.22	1.55	0.27	0.41

[a]Retired persons (n = 3) are excluded. [b]Persons who attended kindergarten only (n = 6) are excluded. [c]Data has been grouped into seven age categories: 15-19 years (n = 67), 20-24 years (n = 115), 25-29 years (n = 141), 30-34 years (n = 120), 35-39 years (n = 100), 40-49 years (n = 126), 50-90 years (n = 113).

*p ≤ .05. **p ≤ .01. ***p ≤ .001.

Table D9

Results of Levene's Tests on Homogeneity of Variances of Food Related HWWS Frequency Between Persons at Different Socio-Demographic Characteristics

Variable	*df*	*F*	Hartley's F_{Max}	smallest s^2	biggest s^2
		Total sample			
Affiliate	2, 808	2.92	1.46	0.53	0.78
Quarter in PaP	5, 522	1.45	2.15	0.38	0.82
Region type	2, 808	0.27	1.10	0.63	0.70
Type of site	1, 809	3.23	1.17	0.62	0.72
Literacy	3, 793	3.58*	3.03	0.24	0.72

Table D9 continues

Table D9 continued

Variable	*df*	*F*	Hartley's F_{Max}	smallest s^2	biggest s^2
Children under 12	1, 805	3.92*	1.22	0.59	0.71
Occupation[a]	6, 787	8.79***	2.91	0.36	1.04
Education[b]	7, 788	3.30**	4.42	0.19	0.82
Age[c]	6, 775	1.84	1.57	0.50	0.78
OQ subsample					
Area	1, 223	0.64	1.05	0.53	0.55
Region type	2, 222	0.61	1.16	0.49	0.57
Type of site	1, 223	2.09	1.17	0.51	0.60
IO subsample					
Area	4, 290	0.28	1.54	0.50	0.77
Children under 12	1, 293	1.53	1.24	0.56	0.69
Babies	1, 287	3.66	1.16	0.62	0.72
Neighborhood subsample					
Literacy	2, 352	2.66	2.38	0.32	0.77
Age[d]	6, 342	1.73	2.02	0.43	0.87

[a]Retired persons (*n* = 3) are excluded. [b]Persons who attended kindergarten only (*n* = 6) are excluded. [c]Data has been grouped into seven age categories: 15-19 years (*n* = 67), 20-24 years (*n* = 115), 25-29 years (*n* = 141), 30-34 years (*n* = 120), 35-39 years (*n* = 100), 40-49 years (*n* = 126), 50-90 years (*n* = 113). [d]Data has been grouped into seven age categories: 15-19 years (*n* = 26), 20-24 years (*n* = 49), 25-29 years (*n* = 57), 30-34 years (*n* = 52), 35-39 years (*n* = 40), 40-49 years (*n* = 64), 50-90 years (*n* = 61).

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table D10

Results of Levene's Tests on Homogeneity of Variances of the Average Attitude Towards the Promotions Between NAPT Participants and Non-Participants

Promotion type	*df*	*F*	Hartley's F_{Max}	$s^2_{participants}$	$s^2_{non\text{-}participants}$
Focus group	1, 803	3.43	1.38	0.18	0.13
Stickers, posters, paintings	1, 803	1.34	1.31	0.15	0.12
Song	1, 734	0.21	1.28	0.17	0.13
Special hygiene day	1, 800	2.72	1.32	0.18	0.13
Home visit	1, 796	2.34	1.07	0.16	0.17

In addition, we looked at the assumptions for linear regression analyses. Particularly, tests on the associations between the participants' age and feces and food related HWWS frequency, between the average attitude towards the promotions and feces and food related HWWS frequency and between the respective attitude towards a NAPT and feces and food related HWWS frequency could have been best analyzed by means of linear regression if the assumptions were met. Several assumptions have to be met in order to be able to generalize the results of a linear regression analysis beyond the sample.

On the one hand, the residuals of the model should be independent; an assumption which is also called lack of autocorrelation (Field, 2009). It can be assessed by the Durbin-Watson statistic, whose values always lie between zero and four. A Durbin-Watson statistic of $d = 2$ indicates perfect independency, while values below two indicate positive autocorrelation and values above two indicate negative autocorrelation. For a table of critical values of the Durbin-Watson statistic for high sample sizes see Savin and White (1977). Instead of exact values, upper and lower levels of the critical values are given. For models with one predictor variable and sample sizes bigger than 200, the critical value of the Durbin-Watson statistic lies between $d = 1.76$ and $d = 1.78$ (Savin & White, 1977), meaning that values lower than 1.76 indicate a violation of the assumption of independent errors.

With regard to the regression analyses with age as the predictor and feces and food related HWWS frequency as outcome variables, each, the Durbin-Watson statistic was below the lower limit of the critical value ($d = 1.49$ and $d = 1.44$, respectively). That is, the assumption of independent residuals was violated in both models. Analogous analyses were made for the neighborhood subsample. Here, the Durbin-Watson statistic for the linear regression of food related HWWS frequency on age was $d = 1.35$, indicating a positive autocorrelation which was too high to satisfy the assumption of independent errors.

Concerning the regression of feces and food related HWWS frequency on the average attitude towards the promotions, the Durbin-Watson statistics were d = 1.71 and d = 1.75, respectively, which is close to, but still below, the lower limit of the critical value.

Moreover, the Durbin-Watson statistics for regression analyses on the prediction of feces and food related HWWS by the attitude towards focus groups were d = 1.71 and d = 1.40, indicating a positive autocorrelation. For the regression of feces related HWWS frequency on the attitude towards stickers, posters, or paintings, there was a significant autocorrelation, d = 1.74, while the Durbin-Watson statistic for the prediction of food related HWWS frequency by the attitude towards stickers, posters, or paintings lied within the limits of the critical value, d = 1.77, that is, one could liberally interpret the assumption of no autocorrelation as satisfied. There were significant autocorrelations concerning the regression of food related HWWS frequency on the attitude towards special hygiene days, d = 1.49, and on the attitude towards home visits, d = 1.56, violating the assumption of independent residuals.

On the other hand, linear regression analyses further assume that the variances of the residual terms are equal at each level of the predictor variable, which is called homoscedasticity (Field, 2009). In case of categorical predictors, this assumption and the method to test it correspond to the assumption of homogeneity of variances, which we tested by means of Levene's tests, above (see Tables D7 to D10). In case of continuous predictors, this assumption can be checked visually by a look at normal probability plots of the standardized residuals against the standardized predicted values. An even dispersion of the dots around zero indicates homoscedasticity, whereas a funnel-like distribution, meaning a bigger vertical distribution of the dots on one side of zero than on the other side, indicates heteroscedasticity (Field, 2009). This plot also provides information about the linearity of the association, another assumption of linear regression analysis. If the dots are spread in a curvilinear form the assumption of linearity has been violated. See Figures D5 to D15 for the relevant normal probability plots of standardized residuals against standardized predicted values. Both the assumption of homoscedasticity and the assumption of linearity were apparently met for each of the linear regression analyses as the vertical distributions of the dots were roughly alike on both sides of zero and no curvilinear form could be found.

Moreover, the residuals of the regression model are assumed to be normally distributed. This can be assessed by a look at the shape of the histograms of the residuals. In addition, as mentioned above, normality can be analyzed quantitatively, too, by means of Kolmogorov-Smirnov tests. See figures D5 to D15 for the relevant histograms and Table D11 for results of Kolmogorov-Smirnov tests on the distributions of the residuals. Each of the of Kolmogorov-Smirnov tests showed significant non-normality of the distribution of the standardized residuals at a level of $p < .001$ (see Table D11), which is further illustrated by the shapes of the corresponding histograms (see Figures D5 to D15).

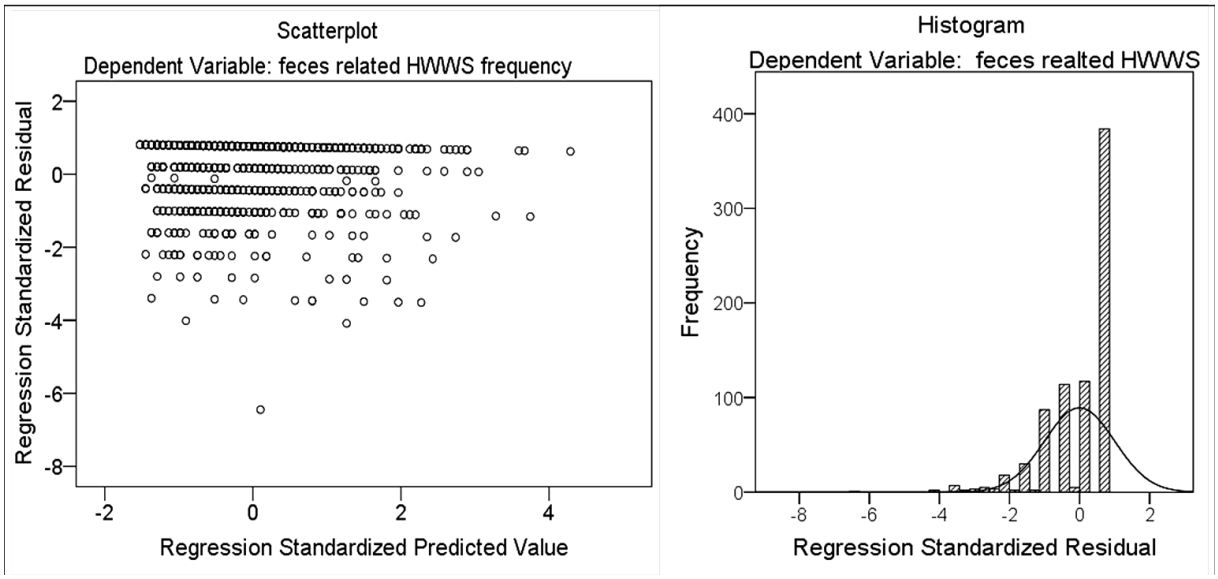


Figure D5. Normal probability plot and histogram of residuals of the linear regression of feces related HWWS frequency on age.

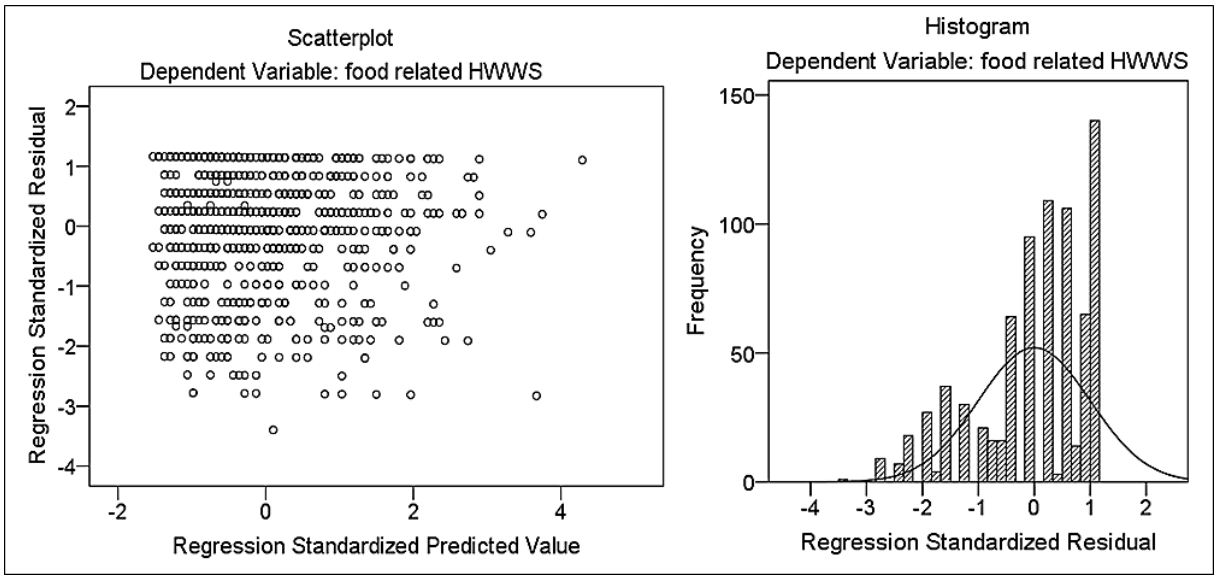


Figure D6. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on age.

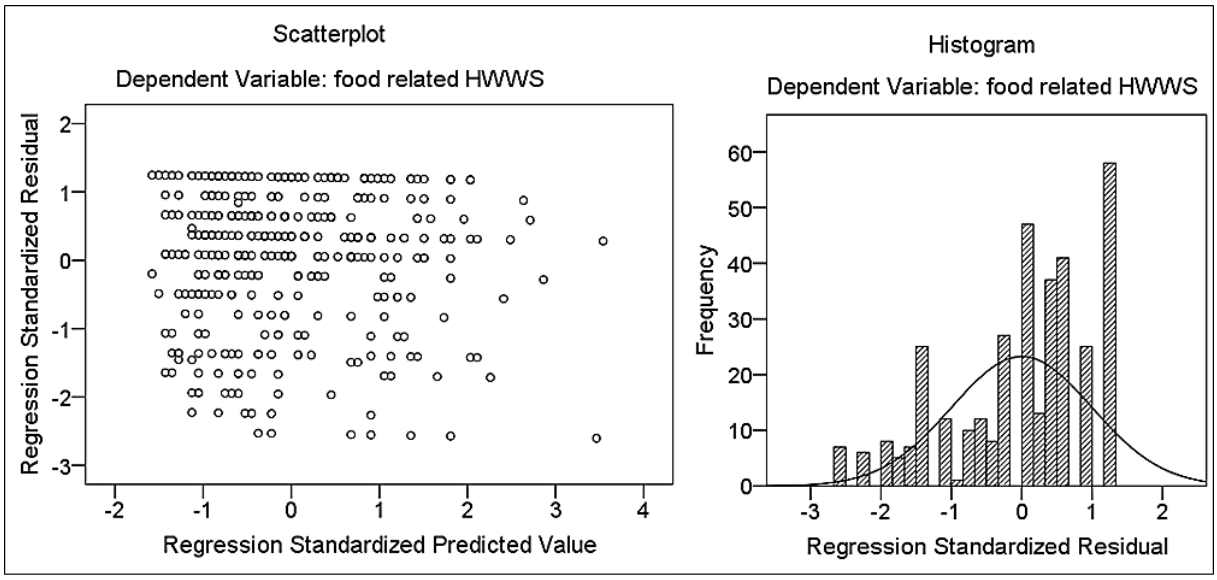


Figure D7. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on age for the neighborhood subsample.

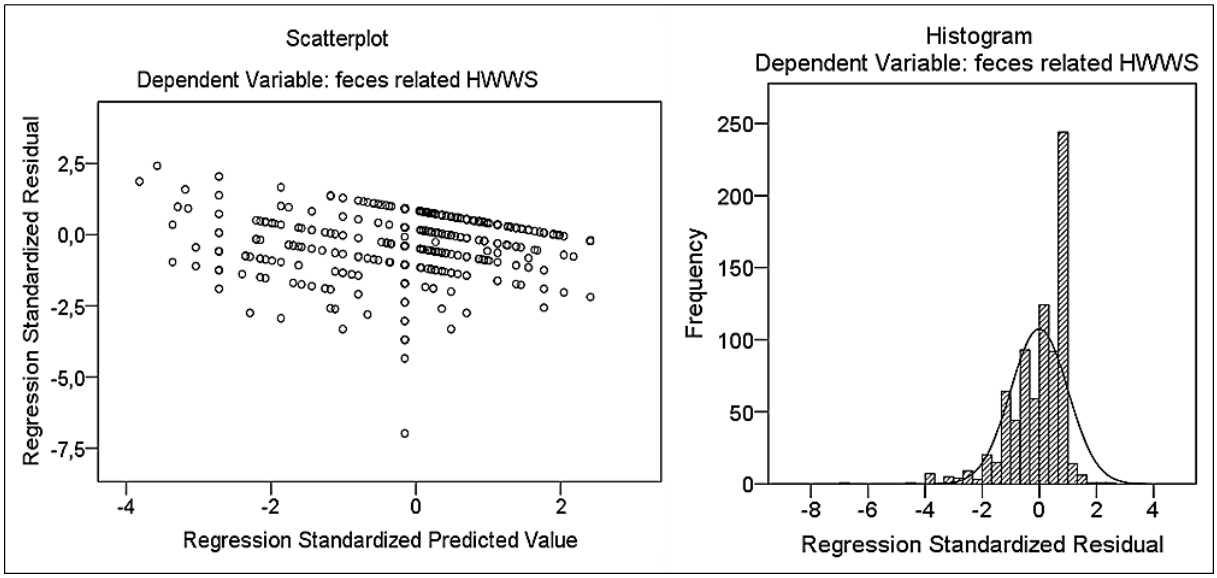


Figure D8. Normal probability plot and histogram of residuals of the linear regression of feces related HWWS frequency on average attitude towards the promotion activities.

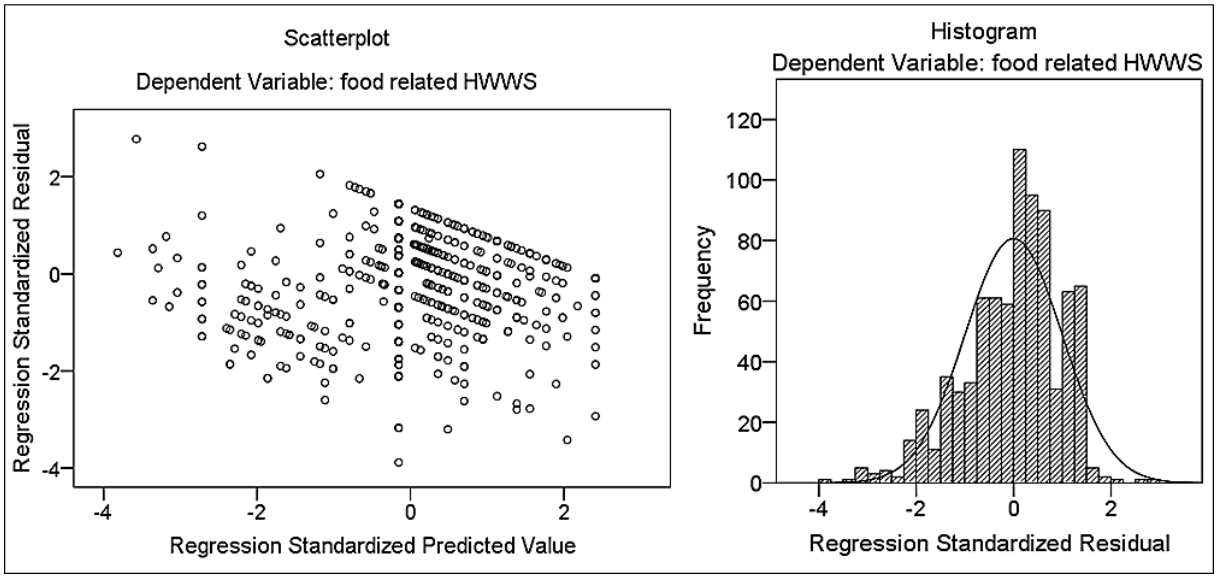


Figure D9. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on average attitude towards the promotion activities.

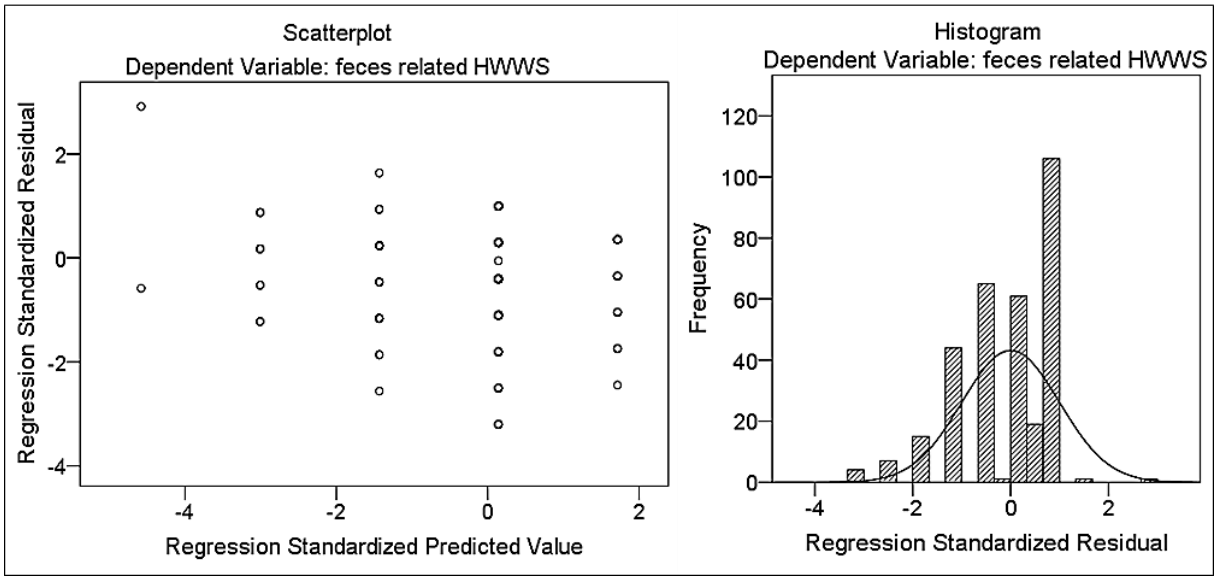


Figure D10. Normal probability plot and histogram of residuals of the linear regression of feces related HWWS frequency on attitude towards focus groups.

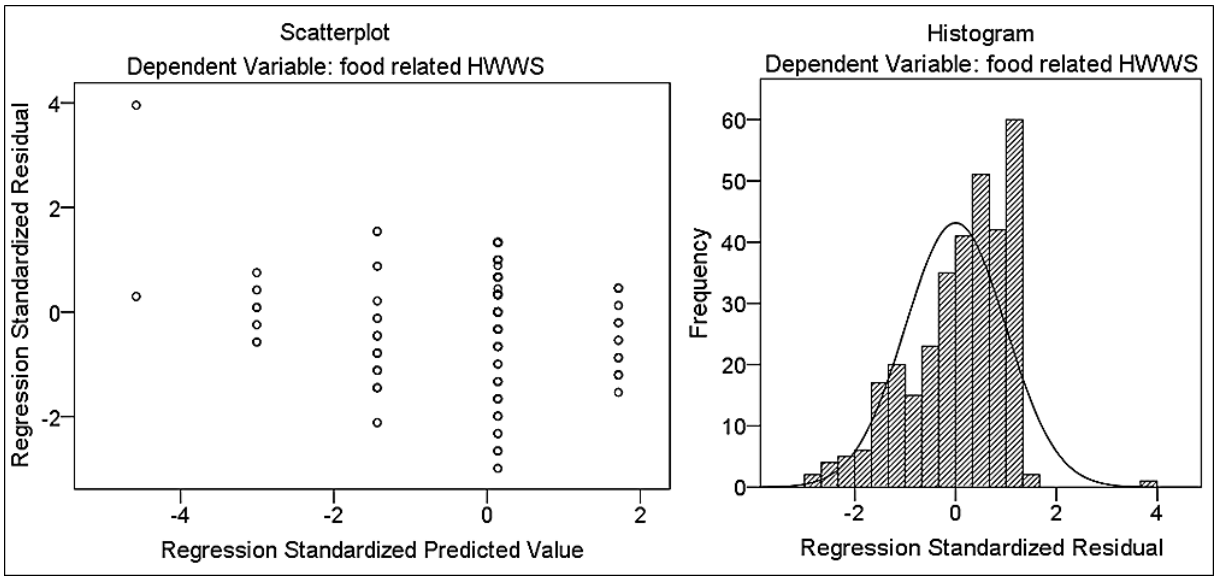


Figure D11. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on attitude towards focus groups.

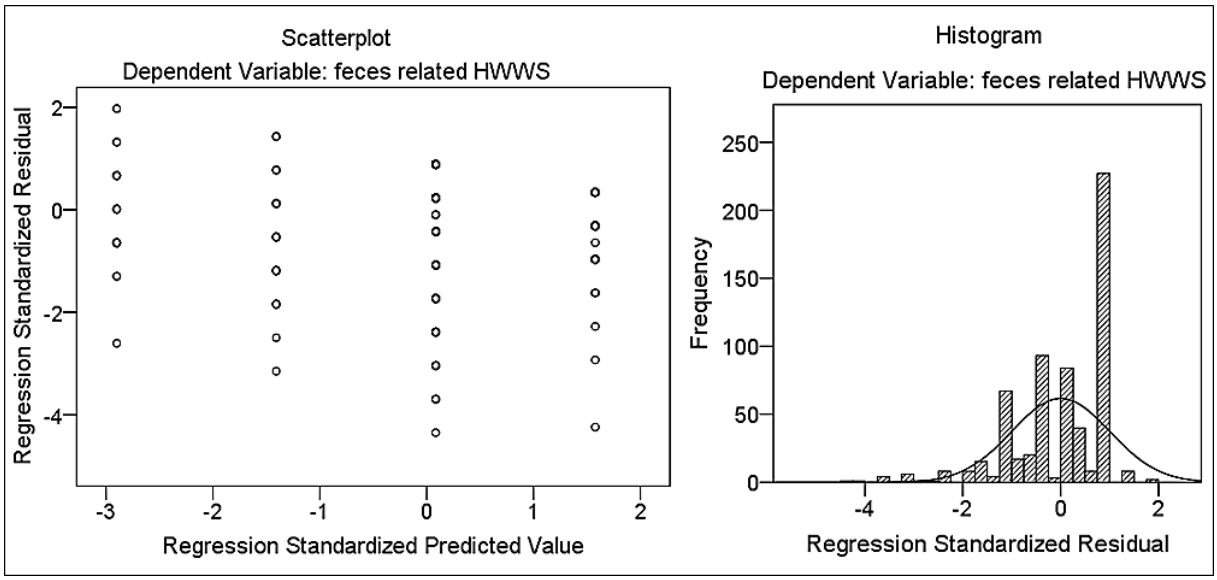


Figure D12. Normal probability plot and histogram of residuals of the linear regression of feces related HWWS frequency on attitude towards stickers, posters, or paintings.

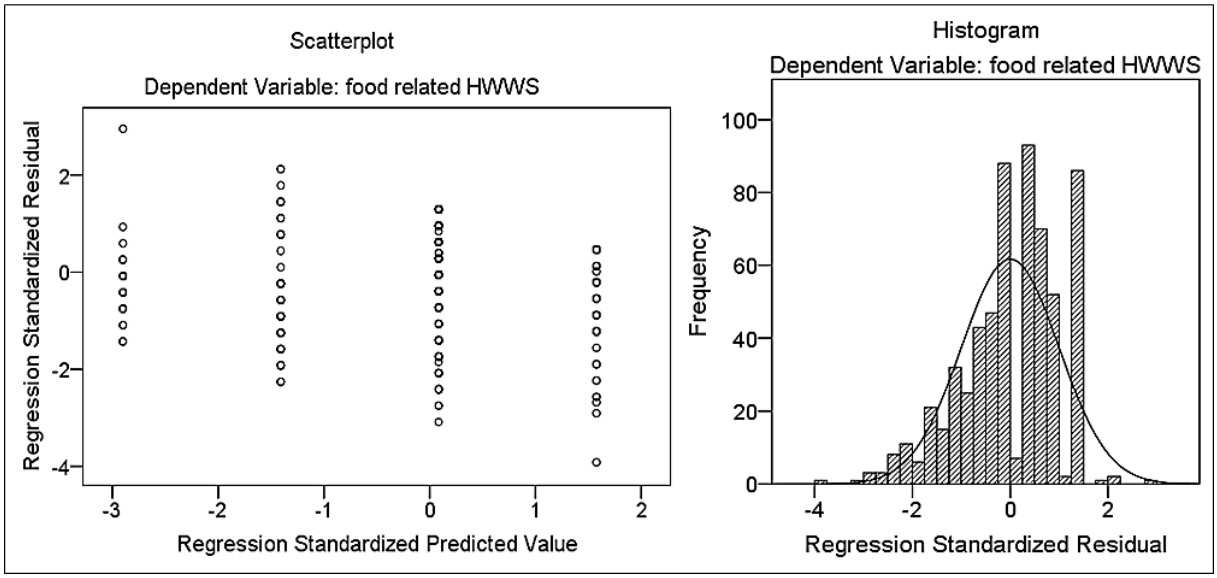


Figure D13. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on attitude towards stickers, posters, or paintings.

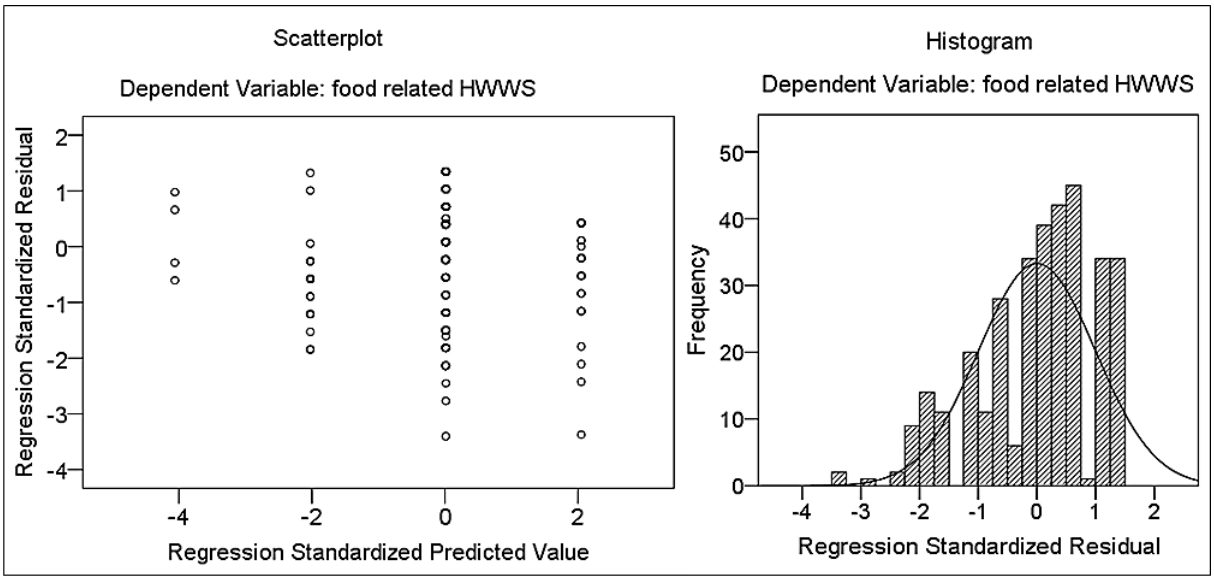


Figure D14. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on attitude towards special hygiene days.

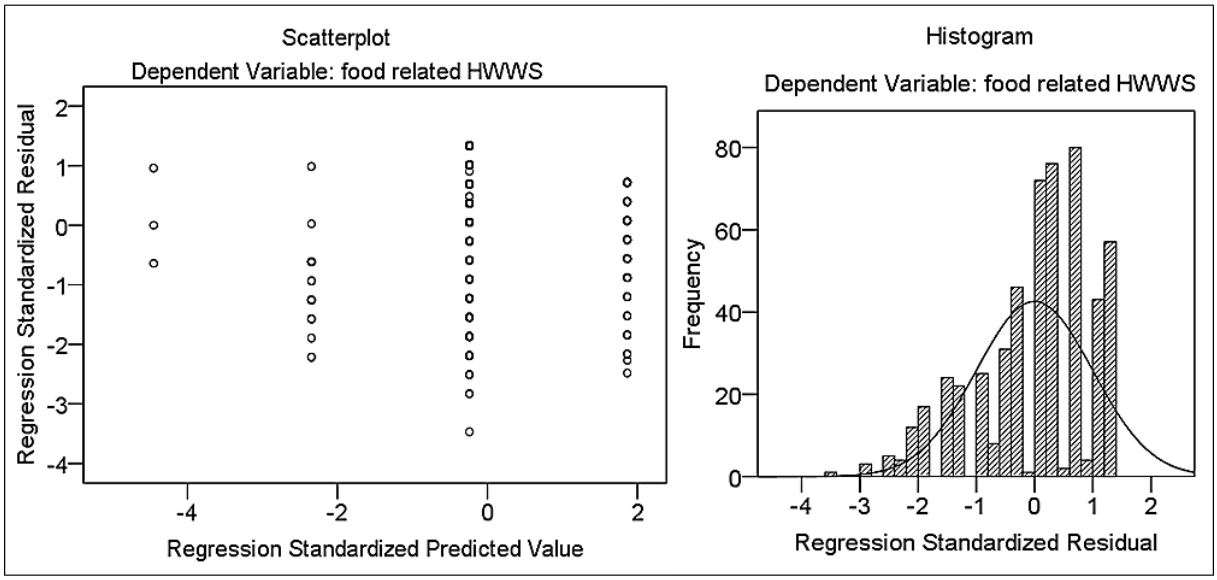


Figure D15. Normal probability plot and histogram of residuals of the linear regression of food related HWWS frequency on attitude towards home visits.

Table D11

Results of Kolmogorov-Smirnov Tests on the Distributions of the Standardized Residuals of Linear Regression Models

Variables		*df*	*D*	*Skew*	SE_{Skew}	*Kurt.*	$SE_{Kurt.}$
Predictor	Outcome						
		Total sample					
Age	Feces related HWWS	782	0.24***	–1.64	0.09	3.55	0.18
	Food related HWWS	782	0.14***	–0.89	0.09	0.04	0.18
Average attitude	Feces related HWWS	808	0.15***	–0.15	0.09	4.33	0.17
	Food related HWWS	808	0.08***	–0.63	0.09	0.42	0.17
Attitude towards focus groups	Feces related HWWS	324	0.16***	–0.82	0.14	0.49	0.27
	Food related HWWS	324	0.11***	–0.49	0.14	0.59	0.27
Attitude towards stickers, posters, paintings	Feces related HWWS	618	0.19***	–1.20	0.10	1.71	0.20
	Food related HWWS	618	0.10***	–0.62	0.10	0.17	0.20
Attitude towards special hygiene days	Food related HWWS	333	0.12***	–0.74	0.13	0.07	0.27
Attitude towards home visits	Food related HWWS	533	0.15***	–0.78	0.11	–0.02	0.21
		Neighborhood subsample					
Age	Food related HWWS	349	0.14***	–0.74	0.13	–0.29	0.26

Note. Kurt. = Kurtosis.

***$p \leq .001$.

Appendix E. Frequency distributions of the attitudes towards the NAPTs

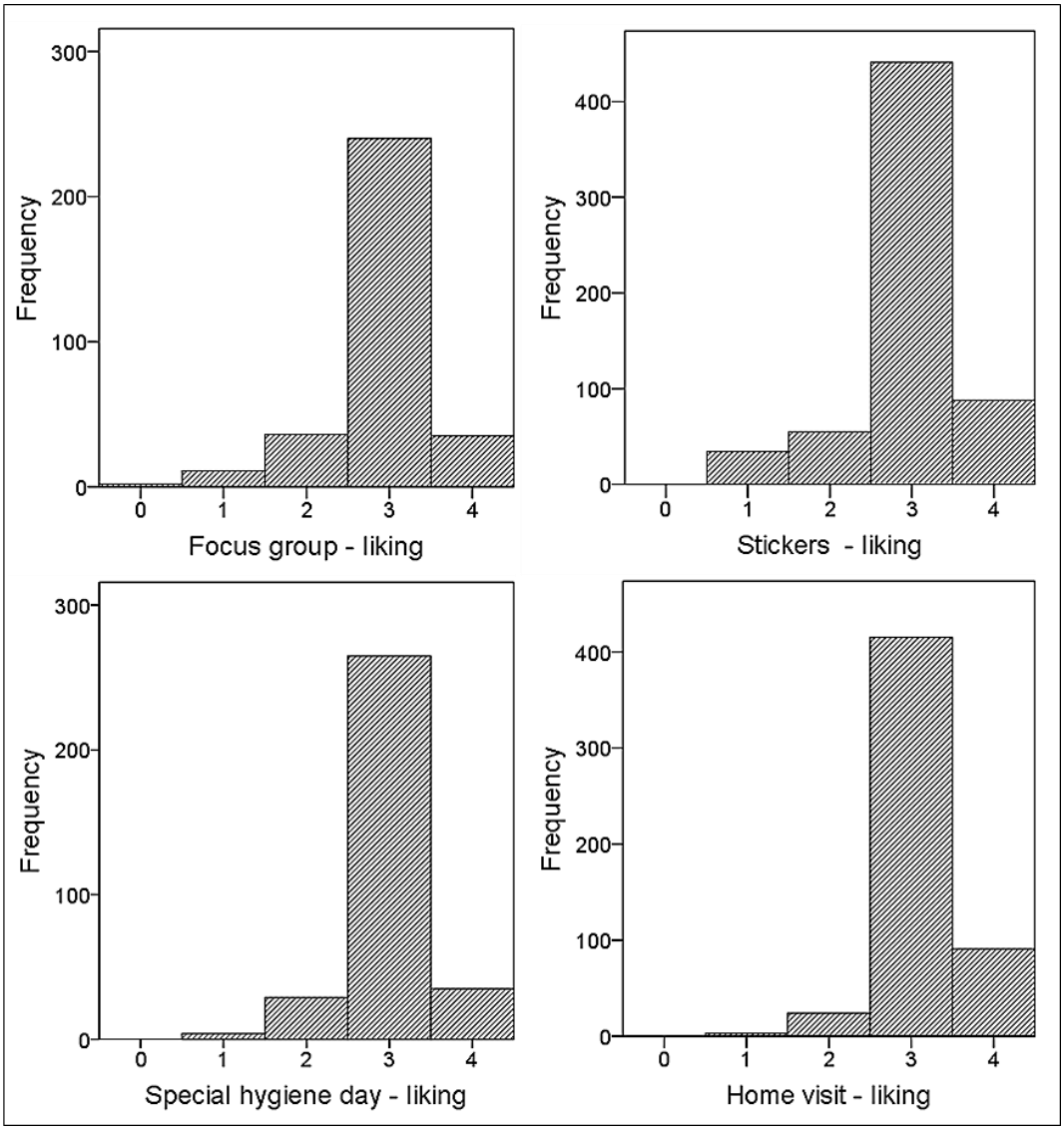


Figure E1. Histograms of the attitudes towards the NAPTs.

Appendix F. Crosstabulations of radio spot with feces related HWWS

Table F1

Crosstabulation of Radio Spot Experience With Dichotomized Feces Related HWWS frequency

Feces related HWWS frequency - dichotomized		Radio spot experience		
		No	Yes	Total
0.00 - 3.50 (rather low frequency)	Count	25.0	272.0	297.0
	Expected count	23.8	273.2	297.0
	% within feces related HWWS	8.4%	91.6%	100.0%
	% within radio spot experience	38.5%	36.5%	36.7%
	% of total	3.1%	33.6%	36.7%
	Standardized residual	0.24	–0.07	
3.67 - 4.00 (very high frequency)	Count	40.0	473.0	513.0
	Expected count	41.2	471.8	513.0
	% within feces related HWWS	7.8%	92.2%	100.0%
	% within radio spot experience	61.5%	63.5%	63.3%
	% of total	4.9%	58.4%	63.3%
	Standardized residual	–0.18	0.05	
Total	Count	65.0	745.0	810.0
	% of Total	8.0%	92.0%	100.0%

Table F2

Crosstabulation of Radio Spot Experience With 4-Leveled Feces Related HWWS frequency

Feces related HWWS frequency - 4 levels		Radio spot experience		
		No	Yes	Total
Rather low frequency				
0.00 - 2.67	Count	13.0	64.0	77.0
	Expected count	6.2	70.8	77.0
	% within feces related HWWS	16.9%	83.1%	100.0%
	% within radio spot experience	20.0%	8.6%	9.5%
	% of total	1.6%	7.9%	9.5%
	Standardized residual	2.74	–0.81	
3.00 - 3.50	Count	12.0	208.0	220.0
	Expected count	17.7	202.3	220.0
	% within feces related HWWS	5.5%	94.5%	100.0%
	% within radio spot experience	18.5%	27.9%	27.2%
	% of total	1.5%	25.7%	27.2%
	Standardized residual	–1.35	0.40	
Very high frequency				
3.67	Count	13.0	107.0	120.0
	Expected count	9.6	110.4	120.0
	% within feces related HWWS	10.8%	89.2%	100.0%
	% within radio spot experience	20.0%	14.4%	14.8%
	% of total	1.6%	13.2%	14.8%
	Standardized residual	1.09	–0.32	
4.00	Count	27.0	366.0	393.0
	Expected count	31.5	361.5	393.0
	% within feces related HWWS	6.9%	93.1%	100.0%
	% within radio spot experience	41.5%	49.1%	48.5%
	% of total	3.3%	45.2%	48.5%
	Standardized residual	–0.81	0.24	
Total	Count	65.0	745.0	810.0
	% of total	8.0%	92.0%	100.0%

Appendix G. Results of NAPT x Radio spot x Feces related HWWS loglinear analyses

Table G1

Likelihood Ratios of Interactions and Final Models of Hierarchical 2 x 2 x 2 (NAPT [no, yes] x Radio Spot [no, yes] x Feces Related HWWS [rather low, very high] Loglinear Analyses

	N	χ^2	*df*	*p*
Focus group				
Focus group x Feces related HWWS	807	19.03	1	.000
Radio spot x Feces related HWWS	807	0.72	1	.398
Focus group x Radio spot	807	13.16	1	.000
Focus group x Radio spot x Feces related HWWS	807	0.04	1	.836
Final model	807	0.76	2	.684
Stickers, posters, paintings				
Stickers, posters, paintings x Feces related HWWS	809	23.08	1	.000
Radio spot x Feces related HWWS	809	0.52	1	.169
Stickers, posters, paintings x Radio spot	809	4.88	1	.027
Stickers, posters, paintings x Radio spot x Feces related HWWS	809	0.01	1	.941
Final model	809	0.53	2	.767
Song				
Song x Feces related HWWS	738	22.76	1	.000
Radio spot x Feces related HWWS	738	0.47	1	.492
Song x Radio spot	738	6.89	1	.009
Song x Radio spot x Feces related HWWS	738	2.43	1	.119
Final model	738	2.90	2	.234

Note. Interactions with $p < .05$ were retained in the final models.

Appendix H. Results of NAPT x Radio spot x Food related HWWS loglinear analyses

Table H1

Likelihood Ratios of Interactions and Final Models of Hierarchical 2 x 2 x 2 (NAPT [no, yes] x Radio Spot [no, yes] x Food Related HWWS [rather low, very high] Loglinear Analyses

Variables	*N*	χ^2	*df*	*p*
Focus group				
Focus group x Food related HWWS	807	4.22	1	.040
Radio spot x Food related HWWS	807	2.66	1	.103
Focus group x Radio spot	807	13.16	1	.000
Focus group x Radio spot x Food related HWWS	807	2.46	1	.117
Final model	807	5.11	2	.078
Stickers, posters, paintings				
Stickers, posters, paintings x Food related HWWS	809	4.32	1	.038
Radio spot x Food related HWWS	809	2.24	1	.135
Stickers, posters, paintings x Radio spot	809	4.88	1	.027
Stickers, posters, paintings x Radio spot x Food related HWWS	809	0.84	1	.359
Final model	809	3.08	2	.215
Song				
Song x Food related HWWS	738	0.63	1	.428
Radio spot x Food related HWWS	738	1.18	1	.277
Song x Radio spot	738	6.89	1	.009
Song x Radio spot x Food related HWWS	738	0.64	1	.425
Final model	738	2.45	3	.485
Special hygiene day				
Special hygiene day x Food related HWWS	804	4.82	1	.028
Radio spot x Food related HWWS	804	1.80	1	.180
Special hygiene day x Radio spot	804	3.20	1	.074
Special hygiene day x Radio spot x Food related HWWS	804	0.06	1	.806
Final model	804	5.06	3	.168
Home visit				
Home visit x Food related HWWS	800	1.42	1	.234
Radio spot x Food related HWWS	800	2.02	1	.155
Home visit x Radio spot	800	4.27	1	.039
Home visit x Radio spot x Food related HWWS	800	0.80	1	.371
Final model	800	4.24	3	.237

Note. Interactions with $p < .05$ were retained in the final models.

Appendix I. Crosstabulations of radio spot with food related HWWS

Table I1

Crosstabulation of Radio Spot Experience With Dichotomized Food Related HWWS frequency

Food related HWWS frequency - dichotomized		Radio spot experience		
		No	Yes	Total
0.25 - 3.00 (rather low frequency)	Count	34.0	326.0	360.0
	Expected count	28.9	331.1	360.0
	% within food related HWWS	9.4%	90.6%	100.0%
	% within radio spot experience	52.3%	43.8%	44.4%
	% of total	4.2%	40.2%	44.4%
	Standardized residual	0.95	–0.28	
3.25 - 4.00 (very high frequency)	Count	31.0	419.0	450.0
	Expected count	36.1	413.9	450.0
	% within food related HWWS	6.9%	93.1%	100.0%
	% within radio spot experience	47.7%	56.2%	55.6%
	% of total	3.8%	51.7%	55.6%
	Standardized residual	–0.85	0.25	
Total	Count	65.0	745.0	810.0
	% of Total	8.0%	92.0%	100.0%

Table I2

Crosstabulation of Radio Spot Experience With 4-Leveled Food Related HWWS frequency

Food related HWWS frequency - 4 levels		Radio spot experience		
		No	Yes	Total
Rather low frequency				
0.25 - 1.75	Count	14.0	90.0	104.0
	Expected count	8.3	95.7	104.0
	% within food related HWWS	13.5%	86.5%	100.0%
	% within radio spot experience	21.5%	12.1%	12.8%
	% of total	1.7%	11.1%	12.8%
	Standardized residual	1.96	–0.58	
2.00 - 3.00	Count	20.0	236.0	256.0
	Expected count	20.5	235.5	256.0
	% within food related HWWS	7.8%	92.2%	100.0%
	% within radio spot experience	30.8%	31.7%	31.6%
	% of total	2.5%	29.1%	31.6%
	Standardized residual	–0.12	0.04	
Very high frequency				
3.23 - 3.50	Count	16.0	212.0	228.0
	Expected count	18.3	209.7	228.0
	% within food related HWWS	7.0%	93.0%	100.0%
	% within radio spot experience	24.6%	28.5%	28.1%
	% of total	2.0%	26.2%	28.1%
	Standardized residual	–0.54	0.16	
3.67 - 4.00	Count	15.0	207.0	222.0
	Expected count	17.8	204.2	222.0
	% within food related HWWS	6.8%	93.2%	100.0%
	% within radio spot experience	23.1%	27.8%	27.4%
	% of total	1.9%	25.6%	27.4%
	Standardized residual	–0.67	0.20	
Total	Count	65.0	745.0	810.0
	% of total	8.0%	92.0%	100.0%

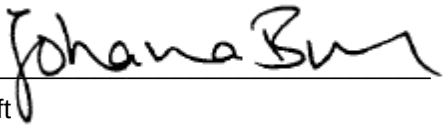
Appendix J. Statement of authorship

Hiermit erkläre ich, dass

die Masterarbeit von mir selbst und ohne unerlaubte Beihilfe verfasst worden ist und ich die Grundsätze wissenschaftlicher Redlichkeit einhalte (vgl. dazu: http://www.lehre.uzh.ch/index/LK-Plagiate-Merkblatt.pdf).

Zürich, 24.10.2012 _____

Ort und Datum



Unterschrift