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Evaluation of Multiple Treatment Interventions to Impact Hand Washing in a Human Service Organization

by

Tamika N. Rickerson

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts Department of Child and Family Studies College of Behavioral and Community Sciences University of South Florida

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Abstract

Hand washing has been proven to be effective in preventing many serious diseases World Health Organization (WHO, 2009). Nonetheless, both the general public and many healthcare professionals fail to wash their hands. Very little research has been conducted outside of healthcare settings to evaluate the adherence of hand-washing procedures. This study investigated if hand washing adherence in a residential setting can be improved with the use of verbal and graphical feedback a probabilistic bonus. Results suggested that the probabilistic bonus had a substantial impact on hand washing performance: more so than signs, educational in-service, and verbal-graphical feedback alone. Reactivity data were collected and showed performance was weak to non-existent throughout all phases until the probabilistic bonus. This final phase improved performance when staff did not know they were being watched, however, performance was only moderate and variable both within- and between-staff.
Chapter 1:
Introduction

Hand washing is essential to decrease chances of germs being spread from person to person and object-to-object (Centers for Disease Control and Prevention, [CDC] 2011). The Centers for Disease Control and Prevention (CDC, 2011) also states that keeping your hands clean reduces the probability of becoming infected with diseases. Reducing the risk of spreading germs is essential and hand washing is the fundamental behavior to prevent the spread of germs. Safe health and sanitary practices in the workplace are essential to the productivity of staff and the health of the consumers they serve. Using sanitation techniques and protocols can prevent serious health issues.

Proper hand washing techniques have been studied in different settings such as in schools, hospitals, and other healthcare settings (Jarvis, 1994; Obeng, 2008; Simmons, Bryant, Neiman, Spencer, & Ar Heart 1990; Tibballs, 1996). However the procedures used to achieve proper hand washing behavior have been inconsistent (Smith, 2009). Smith (2009) reviewed numerous articles on hand washing techniques and found that there were few articles that operationally define hand washing. Hand washing must be operationally defined and described consistently in detail to ensure that it can be observed and measured consistently to maintain treatment and procedural integrity. Finally, many of the articles that were reviewed by Smith (2009) cited the CDC for their proper hand
washing procedures. Smith (2009) identified that there needs to be a more efficient procedure that is used and consistently measured. There have been limitations to the research on hand washing due to procedural differences (Smith, 2009).

**Research on Hand Washing Compliance**

Research on increasing hand washing compliance has revealed there are a number of strategies that show promise for training individuals to properly wash their hands. Those strategies include: educational materials (Chen & Chiang, 2007; Creedon, 2005; Mathai, George, & Abraham, 2011; Naikoba & Hayward, 2001; Obeng, 2008; Smith & Lokhurst, 2009; Waltman, Schenk, Martin, & Walker, 2011), visual and auditory reminders/cues (Creedon, 2005; Judah et al., 2009; Mathai et al., 2011; McGuckin et al., 1999; Waltman et al., 2011), performance measurement and feedback (Bittner, Rich, Turner, William, & Arnold, Jr., 2002; Creedon, 2005; Mathai et al., 2011; van de Mortel & Heyman, 1995; Waltman et al., 2011), and behavior skills training (Waltman et al., 2011). Although these strategies have been shown to be effective in teaching individuals how to wash hands, and in some cases increasing initial hand washing compliance, they have shown little improvement with maintaining proper hand washing behavior over time.

**Education and training.** Chen and Chiang (2007) developed teaching materials to increase hand washing and evaluated to what extent video instruction or illustrated handouts would increase hand washing and improve hand-washing skills. It is imperative to note that baseline data were not collected prior to beginning the intervention and as such it is difficult to determine the participants’ level of hand washing prior to the study. There were 123 families who participated in this study. These families visited a pediatric
intensive care unit and were randomly assigned to one of the two groups. The experimental group was taught proper hand washing procedures using video instruction. The video instruction showed one of the researchers modeling and describing each hand washing step. The comparison group was taught a 20-item hand washing checklist (displayed in poster form & handout) that outlined hand washing accuracy. The experimental group consisted of 61 families with the comparison group including 62 families.

The researchers found that the group who received the video instruction improved their hand washing skills compared to the group who only received handouts. The researchers used a generalized estimating equation to analyze the data. Compliance of hand washing between groups and times was compared. The experimental group increased their compliance score from a mean value of 7.0 to 8.6. The comparison group level of compliance was a mean value of 4.7 to 5.9. Chen and Chiang (2007) found that video instruction to teach hand washing increased hand washing compliance more than traditional handouts and/or verbal instructions. This may be important for training on hand washing accuracy as it may help the participants learn hand washing procedures more effectively and in an efficient manner. Here it is important to indicate that the term ‘compliance’ in the context of the hand washing literature corresponds more closely to the term ‘adherence’ in the behavioral usage as it is applied to accuracy of completing the steps in the task analysis correctly.

Creedon (2005) examined the use of direct observation to better understand whether health care professionals’ hand washing adherence during baseline and after an educational program on hand washing demonstrated a significant difference. The author
furthermore sought to investigate the participants’ “knowledge, attitudes, and beliefs” on hand washing compliance during baseline and after the hand washing education program. The participants in the study were healthcare workers in a medical/surgical intensive care unit in a teaching hospital in Ireland. The intervention consisted of hand washing guidelines as per the CDC (2011) through instructive handouts and a poster campaign. The handouts described justification for hand washing and statistical information on the rate of infections at the hospital, reasons for infections, and cost of acquiring the infections, and the steps necessary to complete hand washing effectively.

The poster was presented at the nurses’ station as a visual reminder, which may have decreased the stimulus control of the sign, as it was not posted close to the sinks or where the nurses would be likely to need a reminder. Creedon (2005) found that initial results were strong with a 32% increase in hand washing performance over baseline levels (51% to 83%), however, hand washing did not maintain over time.

Visual cues and reminders. McGuckin et al. (1999) investigated whether patients would be successful in prompting health care workers to wash their hands and what percentage of healthcare workers would comply with the request of the patients. Patients in a four bed intensive care unit facility were given instructions to ask health care workers such as nurses and physicians, if they would wash their hands prior to giving care to the patients. There were some patients who were reluctant to give verbal prompts to health care workers and they were shown small hand signs that said, “Have you washed your hands?” The amount of soap used per day was measured and it was shown there was a 34% increase in soap used per day but the rate did not maintain over time. This research article was important because it showed yet again that hand washing
performance can be impacted, however, even with salient stimuli being present in the environment, little maintenance separate from a contingency will occur.

Performance measurement and feedback. Sometimes a simple contingency such as feedback can be applied to affect change and produce maintenance over time. Bittner, Rich, Turner, William and Arnold Jr., (2002) investigated whether hand washing would increase if feedback was provided based on measurements of soap and paper towel utilization. Performance increased initially after feedback phase; however the most significant increases were observed when the participants knew they were being watched. Bittner et al. (2002), included how to teach hand washing properly; however, the study did not include a procedure on how to measure actual correct hand washing. A procedure to measure correct hand washing is essential to ensure the health of individuals working in health care and other professions.

Feedback has been successful in increasing initial hand-washing compliance. van de Mortel and Heyman (1995) conducted a study, which extended research from Tibballs (1996). The researchers observed all healthcare workers that came into contact with patients including the orderlies, as well as the nurses and physicians. The first phase consisted of the healthcare staff being covertly observed to assess hand washing after patient contact and before patient contact. The second phase consisted of feedback provided via charts and graphic display of performance for six weekly intervals. The third phase consisted of no observations being conducted and also during this phase staff was informed that the study was finished. The fourth and final phase included participants being observed for hand washing frequency without the subject’s knowledge for 2 months. Results indicated that percentage of healthcare workers washing their
hands in baseline was low. During the performance feedback phase the rates increased and remained higher than baseline levels but were still low at 50%-60%.

Mathai et al. (2011) used “verbal reminders” by informing healthcare workers when there was observation of no hand washing between patients. These reminders were a form of feedback and social disapproval for not hand washing. The staff was reminded that before and after they come into contact with patients they were to wash their hands. The percentage of healthcare workers who responded to the verbal reminders was 6.7%. This is significant as with other previous research (Bittner et al., 2002; van de Mortel & Heyman, 1995; Waltman et al., 2011), in that the healthcare workers continued to disregard hand washing prompts.

Clearly the research in the area of hand washing behaviors is quite thin. Additionally, what research there is fails to identify effective strategies for all facets of behavior change: what to train, how to train, where to train, how to set the occasion for behavior to occur, and the use of contingency management to produce initial changes over time. To this end, it will be important to include discussion of behavior management strategies that may be applied in the area of health and sanitation behaviors.

Staff Management Research

Staff performance in human service organizations has been the target of myriad behavioral interventions in efforts to increase productivity and treatment integrity for the clients that are served, and ensure staff and clients have an efficient and safe work environment. A primary intervention technique that addresses both antecedent and consequent events is feedback. Feedback serves as an antecedent in the form of instructions for subsequent opportunities for behavior. So too, feedback serves as a
social positive reinforcer for behaviors that occurred correctly. A common training procedure named Behavior Skills Training (Miltenberger, 2008) utilizes feedback as an integral piece of its training procedure.

There are four components to Behavior Skills Training (BST): 1) instructions, 2) modeling, 3) rehearsal (role-play), 4) feedback (Stewart, Carr, & LeBlanc, 2007). Instructions involve the instructor to specifically describe the behaviors the learner is to engage as well as the conditions in which the behaviors are to occur (Miltenberger, 2008). Modeling involves the instructor demonstrating an illustration of the behavior to the learner. During the rehearsal (role-play), the learner demonstrates the behavior with an instructor providing feedback in the form of verbal praise for implementing the behavior appropriately and correction for segments that are inappropriately implemented (Miltenberger, 2008). While shown efficacious, BST as a training protocol has yet to be included in evaluation of training in health care settings, and for hand washing specifically

Research in health care settings typically use single components found in BST, and rarely if ever incorporate role-playing with feedback. In fact, instruction as an in-service is typically seen as the primary intervention strategy. Video instruction and traditional verbal instruction were compared to see which impacted hand washing (Chen & Chiang, 2007). The instructor modeled in the video appropriate times to wash hands and the accurate way to wash hands per the CDC (2011). There was no rehearsal (role-play) demonstrated by the participants in the study and feedback was not given when participants were observed engaging in hand washing. Chen and Chiang (2007) found that video instruction increased hand washing compliance and accuracy. Chen and
Chiang (2007) may have been able to show an increase in hand washing compliance if all four components of BST were used.

Creedon (2005), used instructions and graphical feedback to increase hand washing however there was no modeling or rehearsal of the target behavior by the author. Modeling is important as it shows the learner the correct behaviors to imitate in applicable situations (Miltenberger, 2008). Rehearsal is also a significant component of BST as this component is the only means to demonstrate to the instructor the learner is able to perform the behavior, and it presents an opportunity to correct errors that may hinder the performance of the behavior (Miltenberger, 2008). In each of the aforementioned studies, graphical feedback was an integral procedure as it served both as a social positive reinforcer and discriminative stimulus for correct responding in the future.

**Performance measurement and feedback (graphical and verbal).** Feedback has been used in many different types of settings with different populations such as: nursing homes (Alavosius & Sulzer-Azaroff, 1990) restaurants, (Austin, Weatherly & Gravina, 2005); Banks, (Crowell, Anderson, Abel, & Sergio, 1998) and schools, (Codding, Feinberg, Dunn, & Pace, 2005).

For instance, Alavosius and Sulzer-Azaroff (1990) investigated different schedules of feedback (dense and thin) on the effects of safety behavior. Research in this area arose as a result of an increase in workers having work injuries; particularly back injuries due to improperly lifting patients in a health care facility. The participants were four female direct-care workers in a residential facility. The dependent variable was patient transfer. Patient transfers techniques were given in task analysis form and were
integrated into checklists used to evaluate safety with care givers who lift and transfer of patients with physical disabilities (Alavosius & Sulzer-Azaroff, 1990). The independent variable consisted of two schedules of feedback that were implemented sequentially to determine the effects of feedback schedules on healthcare routines. A thin intermittent schedule of feedback was implemented once a week and a denser intermittent schedule was implemented for every few responses. The research design was a multiple baseline across subjects and behaviors.

The results showed that using a dense schedule rather than a thin schedule of feedback was more effective in increasing staff performance. Acquisition of correct routines was rapid under dense feedback. This finding indicates that employers might consider using a dense schedule of feedback to increase desirable work behaviors from employees. After follow-up data was collected, supervisor performance was maintained at high levels apart from feedback schedules. In some instances, supervisor performance was more variable over time but higher than baseline levels.

van de Mortel and Heyman (1995) hypothesized that the medical professions of the participants would not increase their hand washing behavior. The second hypothesis was that performance feedback would not increase hand washing compliance among medical professionals after patient contact. The subjects were registered nurses, visiting medical officers, resident medical officers and registrars, physiotherapists, radiographers, and wardsmen. In baseline, wardsmen and physiotherapist had the highest level of hand washing. During the performance feedback phase, the wardsmen's mean level of responding declined from baseline levels of 90% to 81%. Physiotherapists improved from 57% to 94% in feedback phase and declined to 93% over time. It was noted that the
healthcare workers profession influenced the frequency of hand washing. For example
the wardsmen’s job duties dealt with more odious and foul smells as they worked mainly
with deceased patients and cleaning up waste. Feedback on hand washing improved hand
washing for four out of six health care workers in the study. It is also important to note
that the feedback phase was only three weeks and hand washing was not maintained after
the feedback phase ended. This is a short amount of time for the novelty of the
performance feedback procedure to lose it reinforcing value to the participants’ in the
study. (van de Mortel & Heyman, 1995). Also, only one component of behavior skills
training was used in this study. It would have been beneficial if the authors had used each
component of BST to help increase hand washing in this study.

Incentive Programs. Incentive programs have been used to increase staff
performance help maintain increased staff performance (Cook & Dixon, 2005). An
advantage of a monetary incentive procedure is that it can increase staff performance to
high levels (Cook & Dixon, 2005; Dixon, Hayes & Stack, 2003). When monetary
incentive procedures are used individually, staff performance does not increase over
baseline levels if not combined with performance feedback (Cook & Dixon, 2005).
Probabilistic bonuses are an extension of incentive procedures and are viewed as a way to
increase performance within the budget of the company. It is a type of lottery system
where employees earn tokens on a certain schedule for engaging in targeted behaviors.
The more tokens earned, the greater the chance the employee will contact the backup
reinforcers.

Cook and Dixon (2005) evaluated performance of supervisors’ monitoring of
direct care staff to record four forms that had to be documented daily. The forms included
a shift summary report, daily observation report, behavioral tracking sheet, and a program
task analysis. The interventions included verbal feedback, verbal and graphical feedback,
and graphical feedback and a lottery system. The verbal feedback condition consisted of
supervisors providing direct care staff feedback once a week on completing forms each
day. The participants’ performance on the forms ranged from 0%-100%. They were given
praise for completing the forms and corrective feedback for not completing the forms on
a weekly schedule. The comparative graphical feedback phase consisted of anonymous,
individual graphical display of each participant’s performance weekly. Verbal feedback
also occurred in this phase. They increased the supervisors monitoring performance by
using verbal feedback and then adding a lottery based financial incentive program to the
performance feedback intervention.

The results showed that there was a higher increase in performance of supervisors
when the lottery incentive was added. During baseline all three participants’ level of
responding was near 65%. In the verbal and graphical feedback phases there was a
gradual increase in performance to 15%-80%, however, the performance levels were
higher in the lottery system phase. The limitations to the study were that the study was
fairly long and that staff would have benefited from a stimulus preference assessment to
ensure reinforcing function associated with the lottery prizes. Also, the lottery condition
started at the same time for all participants; thus weakening arguments for experimental
control. The reason for this, however, was that it was imperative that all participants had
an opportunity to win the lottery at the same time.

Reactivity. In regards to staff performance reactivity has been a limitation to
studies as well as used as dependent variables in research studies (Brackett, Reid, &
Green, 2007). Reactivity is defined as when participants alter their behavior when they are aware they are being observed (Cooper, Heron, & Heward, 1987). The current study evaluated reactivity by using conspicuous and inconspicuous observers during specified phases. Confederates were inconspicuous observers to investigate whether the participants engaged in correct hand washing adherence for specified phases of the study. This study expanded the research regarding reactivity, as it has not been used in hand washing adherence literature.

Increasing hand washing is essential to prevent the spreading of infections to direct care staff, supervisors and the consumers they serve. The purpose of the current study is to evaluate the impact of a probabilistic bonus when added to traditional behavioral interventions on hand washing behavior. Antecedent interventions were first implemented (posting of signs and BST education) followed by consequence based interventions (verbal-graphical feedback and probabilistic bonus). This study differed from other research studies in that the posting of signs in the immediate area was evaluated (Creedon, 2005), a relatively new type of contingency schedule (probabilistic bonus which is future oriented and uncertain) was implemented for the first time with a hand washing repertoire, reactivity has not been evaluated in hand washing adherence research to date, and finally, hand washing research has not been conducted in a group home setting.
Chapter 2:

Purpose

The purpose of the current study is to evaluate the impact of a probabilistic bonus when added to traditional behavioral interventions on hand washing behavior. Antecedent interventions were first implemented (posting of signs and BST education) followed by consequence based interventions (verbal-graphical feedback and probabilistic bonus). This study differed from other research studies in that the posting of signs in the immediate area was evaluated (Creedon, 2005), a relatively new type of contingency schedule (probabilistic bonus which is future oriented and uncertain) was implemented for the first time with a hand washing repertoire, reactivity has not been evaluated in hand washing adherence research to date, and finally, hand washing research has not been conducted in a group home setting.
Chapter 3:

Method

Participants and Setting

Two girls and two There were seven residential counselors of a non-profit agency, in Tampa, FL, participated in this study. Age range for the residential counselors was between 26 and 53 years of age. All participants obtained a minimum of a high school diploma; some had college degrees or obtained some college credit. Their tenures at the facility ranged from 6 months to 14 years. The primary researcher had the responsibility of recruiting participants.

The recruitment process included identifying potential residential counselors who worked full time with the clients in the group homes. The steps of recruitment were to ask each of the residential counselors if they would like to participate in a study on hand washing. If they were interested, the consent form was reviewed in detail and the PI allowed them 24 hr to decide. The PI was available on a daily basis to answer any questions or concerns the staff had before they sign the consent. There were thirteen employees constituted the recruitment pool at the site the study took place. The confederates were members of the behavior team and were paid employees at the site. Their role was to monitor the staff in the homes to ensure that they followed and/or implemented the behavior analysis service plans created by the behavior team. There
were five residents counselors constituted the pool at the group home in Seffner, five resident counselors constituted the recruitment pool at the second home in Tampa, FL and three constituted the pool at the third group home in Tampa, FL. Due to this study incorporating a multiple baseline, resident counselors in each home had a raffle for their house separately when they were in the probabilistic phase.

The setting for the study was a group of residential group homes for adult males with developmental disabilities throughout Tampa, FL. The group homes consisted of six clients lived together in each home. Staff were trained on behavior analytic techniques and training residents to increase their daily living skills. The participants were there to assist them with completing chores such as laundry, cleaning their rooms, hygiene, and cooking. Participants also assisted residents with first aid and medication administration. The residential counselors provided 24 hr supervision to residents. All participants worked at least 32 or more hrs per week. Participants were given information on the conditions when they should wash and re-wash their hands. Those conditions include: designated cooking training, medication administration, laundry training, first aid administration, after the use of chemicals, and when staff leave the house for any reason.

**Design**

A non-concurrent multiple baseline across houses was used to evaluate the effects of the independent variables on hand washing behavior. Data were collected on an individual basis; however, an aggregate by all participants is reported as well.
Dependent Variables and Measurement

Hand washing was evaluated in all conditions. A percentage was computed by dividing the number of times hand washing occurred by the number of times hand washing should have occurred. A second percentage was computed by dividing the number of opportunities to hand wash by the actual occurrences of hand washing. These calculations were for obtrusive and unobtrusive observations. In addition, aggregate data were computed for all obtrusive and unobtrusive observation when two participants were observed on the same day. Observation period was between 3:30pm and 7:30pm. The observation time did not exceed 4 hr for data collection. The conditions under which staff should wash their hands are delineated later in the procedure section. Hand washing behavior is defined by the World Health Organization (WHO, 2009) as:

1. Wet hands with warm water
2. Apply enough hand soap to cover all hand surfaces
3. Rub hands with palms
4. Rub hands with right palm with hands interlaced fingers and vice versa
5. Rub palm to palm with fingers interlaced
6. Rub backs of fingers to opposing palms with fingers interlaced
7. Rotational rubbing of left thumb clasped in right palm vice versa
8. Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa
9. Rinse hands with water
10. Dry hands thoroughly with a single use towel. Use another towel to turn off faucet. Your hands are now safe.
The primary researcher and confederates collected data. Data were collected on the participant’s percentage of hand washing steps completed each time a staff engaged in hand washing. Data were also collected on the opportunities to hand wash and the participant’s actual occurrence of hand washing. This measure provided integrity data, which has been found lacking in prior research on hand washing. That is, most studies simply evaluated whether individuals washed their hands. For those that did evaluate how well the individuals washed their hands, no effort was made to assess in-vivo where the behavior should have occurred. The aggregate percentage for all participants in each house was calculated as well as their individual performance on all observation days.

Hand washing occurred at the kitchen sink and observations were conducted within direct eyesight of the sink. If participants left the kitchen for a work related reason, (i.e., assisting a client or staff member), data collection ceased and continued when participants returned to the kitchen.

**Interobserver Agreement**

Two observers simultaneously but independently scored all responses on at least 33% of all observations in each condition and for each staff. An independent observation by confederates occurred on at least 30% of observations in each condition. Data were collected by opportunity and compared. That is, each instance when hand washing should occur was noted and whether the staff member washed their hands. When computing IOA, event-by-event comparisons were made and an agreement or disagreement noted. The primary researcher then divided the total number of agreements by the total number of opportunities, and multiplied by 100 (Cooper et al., 1987).
total # of agreements \( \times 100 = \% \) of agreement
\[
\frac{\text{total # of opportunities}}{\text{total # of agreements}} \times 100 = \% \text{ of agreement}
\]

To compute IOA on the integrity with which the staff engaged in the 10 steps of hand washing, the primary observer and the second observer individually observed if the participants engaged in all ten steps correctly. Each instance of hand washing was recorded in this manner to permit a step-by-step agreement calculation. In this procedure, following the observation, the primary and secondary data collectors compared step-by-step, noting agreements (both concur that the step was or was not done correctly) and disagreements for each instance of observed hand washing. IOA was computed for each hand washing occurrence by dividing agreements by total number of steps (agreements + disagreements) and multiplying by 100. Actual occurrences of hand washing and the time were calculated in the same fashion with the same formula (above). Following this, the aggregate mean was computed for each staff across all instances of hand washing. Interobserver agreement averaged 96%, 92%, 98%, 92%, 98%, 96%, and 90% for Renae, Kamille, Tyvie, Ryker, Madison, Ava and Yolanda respectively.

**Materials**

Glo-germ (Brevis Corp., Salt Lake City) kits were used to observe the permanent product of possible “simulated germs” on the participant’s hands during behavior skills training. The gel based product and a florescent light was used. The lamp illuminated the hands to show whether proper hand washing techniques were used. The Glo-germ premium kit includes a 9 LED ultra violet 1003 flashlight with battery, a 2-ounce bottle of Glo-germ gel, a 1.2-ounce Glo-germ powder, trainer’s manual and a set of activity sheets. The Glo-germ mini kit contained one 2-ounce bottle of gel, the ultra-violet
keychain light and a trainer’s manual. Other materials used included data collection forms, graphing data sheet, informational placard picture, lottery tickets and gift cards. (See Appendix A and B)

Preference Assessment

The primary investigator performed a rank order assessment with the participants in the study. The assessment was completed prior to the Probabilistic Bonus condition. It included a rank order of their preferences of a list of 6-7 gift cards. The participants ranked from highly preferred to least preferred gift cards they would like to earn for the probabilistic bonus phase. The cards were gift cards to various stores and gas stations.

Confederates

Confederates collected data for 4 hrs during designated cooking training, medication administration, laundry training, first aid administration, after the use of chemicals when cleaning, and when staff left the house to assess for reactivity to observations by the primary investigator. Confederates observed the participants covertly from an area in each house where there was a direct line of sight to the sink area. The confederates were people who were already employed at the facility and who served on the behavior team, which consisted of BCaBAs’ and BCBAs’. As they were always present in the house, it was expected that their observations were not noticed. The confederates documented on a data collection sheets whether the staff washed their hands when the situation warrants hand washing and how many opportunities the participants had to hand wash. The primary researcher trained the confederates on what opportunities
were warranted for hand washing for this study. The primary researcher also collected data but the staff was aware when she was collecting data.

As proper sanitation techniques were imperative in this environment, it was necessary for the confederates to still prompt staff to wash their hands if it was observed that they did not wash hands in one of the specific situations outlined above. Confederates were trained on hand washing techniques and all materials used and instructions prior to study being conducted.

**Procedure**

**Pre-baseline.** Observations were conducted to establish current levels of prompting of hand washing. In this phase the primary investigator observed if participants were being prompted by staff to wash their hands and the integrity in which they washed them (the 10 step checklist was used although it was obvious the staff were not trained on it yet). In this phase hand washing was not prompted unless under certain conditions. Participants were prompted to wash their hands if they were handling food or bodily fluids. The prompt was delivered within 2 min following the activity/event that required hand washing.

**Baseline.** Observations were conducted to establish current levels of hand washing. In this phase, the primary investigator observed if participants washed their hands and the integrity with which they washed them. These observations were not structured and announced, rather, the procedure looked very similar to the confederate observers who take account of instances where hand washing should occur, and
subsequently prompted it if the staff did not engage in hand washing. The prompt was
delivered within 2 min following the activity/event that required hand washing.

No feedback was provided otherwise (for instance with respect to integrity of
hand washing), and no praise was provided if staff washed hands/washed hands well. The
primary investigator and confederates recorded data and the confederates were present
during all observation periods.

**Informational placard.** In this phase, observations were conducted to determine
when staff washed their hands and how well they washed their hands after a task analysis
had been placed above the kitchen sink. Observations in this phase were identical to the
baseline phase; however, staff was informed that they needed to adhere to the task
analysis posted above the kitchen sink on correct hand washing procedure on the day that
it was posted. The placard (see Appendix B) was an 8 X 11 colored paper, laminated and
illustrated a task analysis of proper hand washing (WHO, 2009). Staff was also given
verbal prompts in this phase to wash their hands if they failed to do so prior to any
activity in which their hands could have been contaminated. The prompt was within 2
min. following the activity/event that required hand washing.

**Behavior skills training.** Participants were trained on proper hand washing
procedures using BST. The training was held at the clinical offices of the agency. The
training was separate from observation sessions. Participants were trained in three
different groups with 2-3 participants per group. Each group was staff from each group
home. Participants were trained on critical times when they should wash their hand and
the importance of hand washing. All staff demonstrated appropriate hand washing at
100% accuracy before they passed the training. Participants were given a power point
presentation of proper hand washing procedure. Before the presentation began, the primary investigator greeted all staff and thanked them for their attendance. Next, the primary investigator discussed each slide in detail. The primary investigator explained the health advantages for hand washing during a power point presentation. Next, the primary investigator showed a slide that discussed each step of the task analysis to proper hand washing. Slides were a few sentences for each step defining each step specifically with graphic illustration. See Appendix C for power point slides.

A specific task analysis was discussed and how to appropriately wash their hands was modeled. The task analysis was broken up in 10 steps provided by the World Health Organization (WHO, 2009). Once each step was thoroughly discussed, participants were asked if they had any questions.

The instructor answered all questions asked by the participants. The instructor modeled all steps and staff completed the steps once the presentation was completed. Participants were asked to get into groups of two-three and show their hands. The primary investigator then gave each participant a sample of the Glogerm gel. Approximately a dime size amount of gel was placed on the participant’s hands. The first author placed the Glogerm on her hands to demonstrate that their hands had been “contaminated” with germs. After participants’ walked into the bathroom to wash their hands the primary investigator placed a florescent light on participants’ hands to determine if they washed their hands correctly. If a participant walked out of the bathroom and his or her hands were visibly soiled on the florescent lamp, the participant was given corrective feedback to go back and wash their hands correctly until there is no
visual presence of Glo-germ gel on their hands when the florescent lamp was placed on their hands.

An informational placard of the steps was posted in the bathroom above the sink while participants washed their hands. The primary investigator supervised each group separately to ensure that the steps were carried out and participants were not coaching each other during the test out portion of the training. The primary investigator provided positive and corrective feedback to each participant regarding if each step were followed correctly. Once participants had no residue of “contamination” on their hands they passed the training. The participants then were informed that the primary investigator would be coming into the home to conduct observations randomly throughout the week to ensure that proper hand washing procedure was completed when warranted every time. Participants were reminded that hand sanitizer would not be allowed in the homes. The participants were only exposed to one behavior skills training session.

Once the entire training was completed, staff was thanked for their participation in the training and told they could leave. Criterion to complete the training was once each participant washed his or her hands using each step trained with no visible residue of Glo-germ on their hands. The primary investigator conducted several probes after behavior skills training to determine if the staff adhered to the procedures for correct hand washing. The probes were conducted in the group homes while participants were on shift. Probes were conducted at variably; about every 2-3 days. The primary investigator while working in the house greeted all participants and clients as usual while conducting probes. The primary investigator then inconspicuously in a folder had a data collection form that she documented what percentage of steps staff completed for the
observation session and opportunities to hand wash versus actual occurrences of hand washing. Once the researcher conducted probes and data collection from confederates were stable, participants moved to the graphical feedback phase.

_Treatment integrity of behavior skills training._ The primary researcher had a task analysis of what she taught in the training. This task analysis included: 1) power point slides discussing hand washing importance, 2) illustration of each hand washing step and the primary researcher modeled each step in the power point presentation. Primary investigator used Glo-germ materials to teach the training (Glo-germ gel and ultra violet light) 3) staff then practiced the steps in the bathroom with an informational placard placed in the bathroom (above the sink) showing steps that were trained in the BST class. Staff then performed the steps until each step was completed correctly.

_Verbal-graphical feedback._ Participant performance was displayed in graphical form and discussed daily after each observation session. It is important to note that these observations were conducted overtly and specific feedback was provided following each occurrence of hand washing that was observed. So too, if hand washing should have occurred but did not, staff were prompted to engage in the activity. Participants were also notified that the primary investigator was coming in to observe them for proper hand washing during selected observation times determined by the first author. A graph was provided to each staff in the house that participated and individualized feedback was provided in summary form at the end of observation period. The y-axis displayed the frequency of opportunities shown in bar graphs versus their actual instances of hand washing. A second y-axis showed the percentage of steps completed. The x-axis displayed the number of observations for each participant.
At the end of observation period, corrective feedback was provided when steps were missed and/or when hand washing did not occur under the appropriate conditions. The corrective feedback included: “Participant 1, you are below the criterion for hand washing. You missed 3 out of the 10 steps and had X percentage correct on each step. These steps are X, Y, and Z; please adhere to the steps on the informational placard above the kitchen sink for correct hand washing.” Corrective feedback was given immediately after the participant was observed not washing his or her hands in front of the primary investigator. The participant was pulled to the side, away from others and given corrective feedback. Positive feedback was: “Great job participant 1 you completed all steps correct! Keep up the great work!”

Confederates observed the participants when the primary investigator was both present and not present. This permitted for IOA data collection. Following a decrease in trend, little effect observed on level from baseline, or wide variability in the data, the Probabilistic Bonus (PB) phase was instituted.

**Probabilistic bonus.** This intervention was combined with the verbal and graphical feedback that was in place prior to this intervention. This condition added a lottery system in which staff had opportunities to earn lottery tickets when observed washing their hands under the correct conditions and when they did correctly. The primary investigator educated the participants on what a probabilistic bonus intervention entailed. A flyer was given to participants explaining probabilistic bonus and its properties. This was illustrated on a sheet of 8 X11 paper as a bulleted outline. See Appendix D for flyer. The lottery ticket was chosen each week was then exchanged for one of several gift cards chosen by the participants during the preference assessment.
lottery tickets were prepared by the primary researcher to ensure counterfeiting did not occur. During each session, the primary investigator conspicuously observed participants washing their hands throughout a 4 hr observation window. All participants received one lottery ticket by the primary investigator when participants were observed washing hands by the investigator and had completed 85% (Tyvie and Madison)-100% steps correct.

The primary investigator immediately gave the participants a ticket and the participants placed the ticket in a pouch that the primary investigator kept in her possession. The pouch was a 5.5 inches by 8.5 inches zipper translucent pouch. The pouch was at all times in the primary investigators possession. To ensure that all participants had an equal opportunity to earn tickets, participants only received tickets during conditions outlined by the primary investigator. If the primary investigator did not observe the participants hand washing at 100% correct steps they did not earn the lottery ticket. The primary investigator and confederates simultaneously but independently observed the participants for interobserver agreement during approximately 33% of the total observations in this condition.

There were also sessions when confederates observed the participants without the primary investigator present to measure hand washing at appropriate times and to assess reactivity for the same 4 hr timeframe. Every instance the participants were not observed washing their hands when warranted they were prompted to wash their hands as per regulations. The prompt was within 2 min following the activity/ event that required hand washing. The prompt delivered by the primary investigator was minimal and consisted of stating to the participant: “You are about to cook dinner, you need to wash your hands.” Specific positive and corrective feedback was provided following each instance of hand
washing with integrity, given at the end of each session by the primary investigator only. The feedback included in this condition was delivered exactly as described above in the verbal-graphical feedback phase.

A drawing was held once a week on Saturday after all observations had been completed. Only the primary investigator conducted the drawing. The first author informed everyone involved who won and asked him or her what gift card they would like. Only participants in each group home were informed about the results of their ticket drawing. Also, a debriefing meeting took place after the study for all participants. The primary investigator read the debriefing statement to each participant and in the statement included that participants will be offered the opportunity to have their data to be withdrawn if they choose.
Chapter 4:

Results

Ava

All data for Ava can be found in figure 1.

**Baseline phase.** The requirement to wash hands varied from one-to-six opportunities per day during baseline, with a total of 23 opportunities across six observations (average 3.83/opportunities). Ava washed her hands when required variably during obtrusive observations with a range of 17% to 100%, and an overall average of 53%. Ava completed 0-to-4 steps correctly on the task analysis when she did wash her hands (30%-32.5% aggregate per session) during obtrusive observations. During unobtrusive observations in baseline (sessions 3 & 6), Ava washed her hands 50% and 25% of required opportunities, respectively, with similar performance to that seen in obtrusive observations (0-to-4 steps correct).

**Informational placard phase.** The requirement to wash hands varied from two-to-five opportunities during the informational placard phase with a total of 17 opportunities across five observations (average 3.4/opportunities). Ava washed her hands when required variably during obtrusive observations with a range of 0% to 50%, with an overall average of 10% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-100%.
There was one unobtrusive probe conducted during this phase (session 9). During this session there were three required opportunities to wash hands with 0% completed. As such, hand washing integrity could not be scored.

**Behavior skills training phase.** During Behavior Skills Training phase, Ava washed her hands 100% correctly to meet criteria for the training session. Following the training, required opportunities to wash hands varied from two-to-six opportunities per session, with a total of 11 opportunities across three sessions (average 2.5/ observation). Ava washed her hands on only one occasion (17% of opportunities for that session) but did so perfectly (100% integrity). There were no unobtrusive probes during this phase due to the overall poor performance.

**Verbal and graphical feedback phase.** The requirement to wash hands varied from two-to-three opportunities during the graphical and verbal feedback phase, with a total of 20 opportunities across eight observations (average 2.5/ observation). Ava washed her hands when required variably during these observations with a range of 33% to 100% of opportunities, with an overall average of 68.6% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 70%-100%. The average of hand washing steps completed correctly during obtrusive observations was 88%. During unobtrusive observations Ava washed her hands on 33% of opportunities (sessions 18 & 20). Integrity of hand washing during these sessions occurred at 60% and 50%, respectively.

**Probabilistic bonus phase.** This phase produced the strongest performance by Ava in that all obtrusive observations resulted in hand washing when required and with perfect integrity. The requirement to wash hands varied from two-to-four opportunities
during the probabilistic bonus phase with a total of 23 opportunities across seven observations (average 3.28/observations). Ava washed her hands when required variably during these observations with a range of 33% to 100%, with an overall average of 73.7% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations was 100%. The average for obtrusive observations of hand washing steps completed correctly was 57.14%.

During unobtrusive observations, Ava washed her hands 70% and 75% of opportunities (sessions 27 & 30). Ava won the raffle for a $10 dollar gift card during sessions 26 and 29. Interestingly, Ava's hand washing integrity showed an increasing trend through unobtrusive observation sessions with integrity scores of 70%, and 75% respectively.

**Yolanda**

All data can be found in figure 2 for Yolanda

**Baseline phase.** The requirement to wash hands varied from one-to-five opportunities per day during baseline, with a total of 18 opportunities across five observations (average 3.6/observation). Yolanda washed her hands only once during obtrusive observations with a range of 0% to 25%, and an overall average of 6.25%. Yolanda completed 0-to-3 steps correctly on the task analysis when she did wash her hands (0%-30% aggregate per session) during obtrusive observations. During unobtrusive observations, (sessions 3 & 5), Yolanda washed her hands 0% of required opportunities. As such, hand washing integrity could not be scored.
Informational placard phase. The requirement to wash hands varied from three-to-five opportunities during the informational placard phase with a total of 17 opportunities across six observations (average 2.8/observation). Yolanda washed her hands when required variably during obtrusive observations with a range of 0% to 25%, with an overall average of 7.5% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-100%. There were two unobtrusive probes conducted during this phase (session 9 and 11). During both there were seven required opportunities to wash hands with 0% completed. As such, hand washing integrity could not be scored.

Behavior skills training phase. During behavior skills training phase, Yolanda washed her hands 100% correctly to meet criteria for the training session. Data presented below pertain to the three sessions following the training. Following the training, required opportunities to wash hands varied from two–to-four opportunities per session, with a total of eight opportunities across three sessions (average 2.6/observation). Yolanda washed her hands on four occasions, session 13, 25% of opportunities and session, 14, 50% of opportunities. There were no unobtrusive probes during this phase due to this training condition.

Graphical and verbal feedback phase. The requirement to wash hands varied from two to five opportunities during the graphical and verbal feedback phase, with a total of 12 opportunities across six observations (average 2.4/observation). Yolanda washed her hands when required variably during these observations with a range of 0% to 100% of opportunities, with an overall average of 37.2% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from
70%-95% (average of 78.3%). During unobtrusive observations Yolanda washed her hands on 25% of opportunities (sessions 17 & 20). Integrity of hand washing during these sessions occurred at 50% and 0%, respectively.

Probabilistic bonus phase. This phase produced the strongest performance by Yolanda in that most obtrusive observations resulted in hand washing when required and with perfect integrity. The requirement to wash hands varied from two-to-five opportunities during the probabilistic bonus phase with a total of 16 opportunities across seven observations (average 2.3/observation). Yolanda washed her hands when required variably during these observations with a range of 0% to 100%, with an overall average of 72.1% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations was 100%. The average for obtrusive observations of percentage of hand washing steps completed correctly was 100%.

During unobtrusive observations, Yolanda washed her hands 0% and 50% of opportunities (sessions 24 & 26). Yolanda won the raffle for a $10 dollar gift card during sessions 23 and 25. Interestingly, Yolanda’s hand washing integrity showed an increasing trend through these sessions with integrity scores of 0% and 60% respectively.

Ryker

All data can be found in figure 3 for Ryker.

Baseline phase. The requirement to wash hands varied from two-to-six opportunities per day during baseline, with a total of 27 opportunities across eight observations (average 3.4/observation). Ryker washed his hands on zero occurrences
during obtrusive observations. Ryker completed 0-to-5 steps correctly on the task
analysis when he did wash his hands (0%-37.5% aggregate per session) during obtrusive
observations. During unobtrusive observations in baseline (sessions 3 & 7), Ryker
washed his hands 0% of required opportunities, however, with dissimilar performance to
that seen in obtrusive observations (0 steps correct due to no hand washing observed for
required opportunities).

**Informational placard phase.** The requirement to wash hands varied from three-
to-five opportunities during the informational placard phase with a total of 22
opportunities across six observations (average 3.6 / observation). Ryker washed his
hands when required variably during obtrusive observations with a range of 0% to 20%,
with an overall average of 13.3% during this phase. Percentage of hand washing steps
completed correctly during obtrusive observations ranged from 0%-60%. There were
three unobtrusive probes conducted during this phase (sessions 10, 11, & 14). During
this session there were nine required opportunities to wash hands with 0% completed. As
such, hand washing integrity could not be scored.

**Behavior skills training phase.** During behavior skills training phase, Ryker
washed his hands 100% correctly to meet criteria for the training session. Data presented
below pertain to sessions following the training. Following the training, required
opportunities to wash hands varied from two-to-five opportunities per session, with a
total of seven opportunities across two sessions (average 3.5/ observation). Ryker
washed her hands on four occasions: session 16, 20% of opportunities; and, session 17,
0% of opportunities. There were no unobtrusive probes during this phase due to this
training condition.
**Graphical and verbal feedback phase.** The requirement to wash hands varied from two- to-five opportunities during the graphical and verbal feedback phase, with a total of 21 opportunities across eight observations (average 2.6/observation). Ryker washed her hands when required variably during these observations with a range of 0% to 100% of opportunities, with an overall average of 27.5% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-95%. During unobtrusive observations Ryker washed his hands on 0% of opportunities (sessions 20, 23, & 25). Integrity of hand washing during these sessions occurred at 0%, respectively.

**Probabilistic bonus phase.** This phase did not produce the strongest performance by Ryker in that all obtrusive observations did not result in hand washing when required. Ryker has only two data points in this phase due to his shift moving from evening to overnight shifts and then subsequently being moved to different residence locations throughout this phase. Data collection stopped at session 27. The requirement to wash hands varied from three-to-four opportunities during the probabilistic bonus phase with a total of seven opportunities across two observations (average 3.5/observation). Ryker washed her hands when required variably during these observations with a range of 33% to 75%, with an overall average of 54% during this phase. During unobtrusive observations, Ryker washed her hands on 33% of opportunities (sessions 27). Ryker won the raffle for a $10 dollar gift card during session 27. Interestingly, Ryker’s hand washing integrity showed a decreasing in level through these sessions with integrity scores of 5% respectively. While the probabilistic bonus phase shows a vast improvement in performance under the conditions of obtrusive observations, and while
data represent an increasing level of responding for session 26 although the participant did not know he was being watched, it is clear that effective transfer of stimulus control is still found deficient in that hand washing occurred on a little over half of the required opportunities in some sessions, and when it did occur, integrity was still found deficient. Also, there is no trend in Ryker’s data as he only has two data point in this phase so there is no way to determine if his hand washing behavior would have increased in this phase across several sessions.

**Tyvie**

All data can be found in figure 4 for Tyvie.

**Baseline phase.** The requirement to wash hands varied from one-to-six opportunities per day during baseline, with a total of 41 opportunities across 13 observations (average 3.2/observation). Tyvie washed her hands when required variably during obtrusive observations with a range of 0% to 33%, and an overall average of 4.1%. Tyvie completed zero-to-three steps correctly on the task analysis when she did wash her hands (0%-30% aggregate per session). During unobtrusive observations in baseline (sessions 3, 7 & 12), Tyvie washed her hands 0% of required opportunities.

**Informational placard phase.** The requirement to wash hands varied from two- to-five opportunities during the informational placard phase with a total of 16 opportunities across six observations (average 2.6/ observation). Interestingly, the posting of the placard identifying the importance of hand washing and outlining the steps required for appropriate hand washing had no demonstrative effect on hand washing or hand washing integrity. Tyvie did not wash her hands when required during obtrusive
observations with zero occurrences during this phase. There was one unobtrusive probe conducted during this phase (session 17). During this session there was one required opportunity to wash hands with 0% completed. As such, hand washing integrity could not be scored.

**Behavior skills training phase.** During behavior skills training phase, Tyvie washed her hands 100% correctly to meet criteria for the training session. Data presented below pertain to six sessions following the training. Following the training, required opportunities to wash hands varied from one-to-nine opportunities per session, with a total of 23 opportunities across six sessions (average 3.8/ observation). Tyvie washed her hands on only one occasion (25% of opportunities for session 20 with 70% integrity). There was one unobtrusive probe during this phase in session 22 with zero instances of hand washing across 9 opportunities.

**Graphical and verbal feedback phase.** The requirement to wash hands varied from one-to-six opportunities during the graphical and verbal feedback phase, with a total of 32 opportunities across eleven observations (average 2.9/ observation). Tyvie washed her hands when required variably during these observations with a range of 0% to 100% of opportunities, with an overall average of 53% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 33%-100%. The average of hand washing steps completed correctly during obtrusive observations was 65.4%. During unobtrusive observations Tyvie washed her hands on 25% of opportunities (sessions 27, 29, 31, 32, & 37). Integrity of hand washing during these sessions occurred at 0%, 60%, 100%, 25%, 0%, and 0%, respectively.
**Probabilistic bonus phase.** This phase produced the strongest performance by Tyvie in that all obtrusive observations resulted in hand washing when required and with 83% integrity. The requirement to wash hands varied from two-to-three opportunities during the probabilistic bonus phase with a total of 10 opportunities across nine observations (average 1.1/observation). Tyvie washed her hands when required during these observations with an overall average of 92.5% during this phase. Percentage of hand washing steps completed correctly when hand washing occurred during obtrusive observations was 100%. The average for obtrusive observations of percentage of hand washing steps completed correctly was 82.8%.

During unobtrusive observations, Tyvie washed her hands 100% and 33% of opportunities (sessions 40 & 42). Tyvie won the raffle for a $10 dollar gift card during session 46. Interestingly, Tyvie’s hand washing integrity showed an increasing trend through these sessions with integrity scores of 50% and 90% respectively. Probabilistic bonus phase did not show improvement in performance under the conditions of unobtrusive observations, and the data represented a decreasing trend when the participant did not know she was being watched, it is clear that effective transfer of stimulus control is still found inadequate. In sessions, 38-42, Tyvie was not able to contact the secondary reinforcer (raffle ticket) due to her not completing all steps correctly when she washed her hands. In session 43, Tyvie was informed prior to the session beginning that the gift card value had increased from ten dollars to fifteen dollars. The gift card value was increased to increase Tyvie’s integrity of hand washing and
actual occurrences of hand washing in order to access a raffle tickets to increase her probability of receiving more tickets and subsequent probability of earning the fifteen-dollar gift card during the scheduled raffle.

After session 43, Tyvie’s integrity of hand washing increased to 100% for obtrusive observations.

**Madison**

All data can be found in figure 5 for Madison.

**Baseline phase.** The requirement to wash hands varied from one-to-seven opportunities per day during baseline, with a total of 14 opportunities across ten observations (average 1.4/observation). Madison washed her hands when required variably during obtrusive observations with a range of 0% to 100%, and an overall average of 22%. Madison completed 0-to-4 steps correctly on the task analysis when she did wash her hands (0%-40% aggregate per session) During unobtrusive observations in baseline (sessions 4, 8, &10), Madison washed her hands 0% of required opportunities.

**Informational placard phase.** The requirement to wash hands varied from two-to-four opportunities during the informational placard phase with a total of 12 opportunities across four observations (average 3/observation). Madison washed her hands when required during obtrusive observations with a range of 0 to 33%, with an overall average of 11% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations had a range of 0% to 100%. There was one unobtrusive probe conducted during this phase (session 12). During this session there

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were four required opportunities to wash hands with zero completed. As such, hand washing integrity could not be scored.

Behavior skills training phase. During behavior skills training phase, Madison washed her hands 100% correctly to meet criteria for the training session. Data presented below pertain to three sessions following the training.

Following the training, required opportunities to wash hands varied from two-to-five opportunities per session, with a total of 13 opportunities across three sessions (average 4.3/observation). Madison washed her hands on only two occasions (33% of opportunities for that session) with 45% integrity.

Graphical and verbal feedback phase. The requirement to wash hands varied from two-to-seven opportunities during the graphical and verbal feedback phase, with a total of 23 opportunities across eight observations (average 2.8/observation). Madison washed her hands when required variably during these observations with a range of 0% to 66% of opportunities, with an overall average of 28.5% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 40%-100%. The average of hand washing steps completed correctly during obtrusive observations was 80%. During unobtrusive observations (sessions 20, 23, 24, & 27) Madison washed her hands on 15% of opportunities. Integrity of hand washing during these sessions occurred at 60%, 0%, 0%, and 0%, respectively.

Probabilistic bonus phase. This phase produced the strongest performance by Madison in that all obtrusive observations resulted in hand washing when required and with 55.5% integrity. The requirement to wash hands varied from one-to-four opportunities during the probabilistic bonus phase with a total of 12 opportunities across
six observations (average 2/observation). Madison washed her hands when required during these observations with 51.3% of opportunities, with an overall average of 55.5% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations was 100%. The average for obtrusive observations of percentage of hand washing steps completed correctly was 66.6%. After session 30, Madison’s integrity of hand washing increased to 83%, 90% & 100% for obtrusive observations. Madison won the raffle for a $10 dollar gift card during session 33.

During unobtrusive observations, Madison washed her hands 33% of opportunities (session 33). Interestingly, Madison’s hand washing integrity showed a decreasing trend through these sessions with integrity scores of 0% respectively. While the probabilistic bonus phase shows a vast improvement in performance under the conditions of unobtrusive observations, and while data represent an increasing trend for opportunities to hand wash, Madison did not increase her overall integrity of hand washing steps in this phase. In sessions 28 & 29, Madison was not able to contact the secondary reinforcer (raffle ticket) due to her not completing all steps correctly when she washed her hands. Prior to session 30, Madison was informed that the gift card value had increased from ten dollars to fifteen dollars. The gift card value was increased to increase Madison’s percentage of hand washing steps completed correctly to 100% to access a raffle tickets to increase her probability of receiving more tickets to increase her probability of earning the fifteen-dollar gift card during the scheduled raffle.
Renae

All data can be found in figure 6 for Renae.

**Baseline phase.** The requirement to wash hands varied from one-to-seven opportunities per day during baseline, with a total of 42 opportunities across fourteen observations (average 3/observation). Renae washed her hands when required variably during obtrusive observations with a range of 0% to 100%, and an overall average of 32.6%. Renae completed zero-to-four steps correctly on the task analysis when she did wash her hands (0%-40% aggregate per session). During unobtrusive observations in baseline (sessions 3, 6, 11, & 14), Renae washed her hands 0%, 0%, 0%, and 20% of required opportunities, respectively, with similar performance to that seen in obtrusive observations (zero-to-four steps correct).

**Informational placard phase.** The requirement to wash hands varied from two-to-six opportunities during the informational placard phase with a total of 23 opportunities across five observations (average 4.6/observation). Renae washed her hands when required variably during obtrusive observations with a range of 0% to 40%, with an overall average of 18.6% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-75%. There were two unobtrusive probes conducted during this phase (session 17 & 19). During this session there were seven required opportunities to wash hands with 0% completed. As such, hand washing integrity could not be scored.

**Behavior skills training phase.** During behavior skills training phase, Renae washed her hands 100% correctly to meet criteria for the training session. Data presented below pertain to three sessions following the training. Following the training, required
opportunities to wash hands varied from two-to-four opportunities per session, with a total of six opportunities across three sessions (average 3/observation). Renae washed her hands on only one occasion (50% of opportunities for that session) with (70% integrity). There were no unobtrusive probes during this phase due to this phase being a training condition.

**Graphical and verbal feedback phase.** The requirement to wash hands varied from two-to-five opportunities during the graphical and verbal feedback phase, with a total of 27 opportunities across eight observations (average 3.3/observation). Renae washed her hands when required variably during these observations with a range of 0% to 40% of opportunities, with an overall average of 34.3% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-75%. The average of hand washing steps completed correctly during obtrusive observations was 45.5%. During unobtrusive observations Renae washed her hands on 12.5% of opportunities (sessions 26 & 29). Integrity of hand washing during these sessions occurred at 50% and 0%, respectively.

**Probabilistic bonus phase.** This phase produced the strongest performance by Renae in that all obtrusive observations resulted in hand washing when required and with 95.8% integrity. The requirement to wash hands varied from one-to-eight opportunities during the probabilistic bonus phase with a total of 40 opportunities across nine observations (average 4.4/observation). Renae washed her hands when required variably during these observations with a range of 0% to 100%, with an overall average of 75% during this phase. Percentage of hand washing steps completed correctly during
obtrusive observations ranged from 0%-100%. The average for obtrusive observations of percentage of hand washing steps completed correctly was 98.8%.

During unobtrusive observations, Renae washed her hands 0%, 0%, and 81% of opportunities (sessions 33, 35, & 37). Renae won the raffle for a $10 dollar gift card during session 35. Interestingly, Renae’s hand washing integrity showed an increasing trend through these sessions with integrity scores of 0%, 0%, and 70% respectively.

Kamille

All data can be found in figure 7 for Kamille.

**Baseline phase.** The requirement to wash hands varied from four-to-five opportunities per day during baseline, with a total of 14 opportunities across three observations (average 4.6/observation). Kamille washed her hands when required variably during obtrusive observations with a range of 0%. During unobtrusive observations in baseline (session 2), Kamille washed her hands 0% of required opportunities, respectively, with similar performance to that seen in obtrusive observations (zero steps correct).

**Informational placard phase.** The requirement to wash hands varied from two-to-four opportunities during the informational placard phase with a total of 12 opportunities across six observations (average 2/observation). Kamille washed her hands when required variably during obtrusive observations with a range of 0% to 25%, with an overall average of 11.25% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-100%. There was two unobtrusive probe conducted during this phase (session 6 & 9). During this session
there were six required opportunities to wash hands with 0% completed. As such, hand washing integrity could not be scored.

**Behavior skills training phase.** During Behavior Skills Training phase, Kamille washed her hands 100% correctly to meet criteria for the training session. Data presented below pertain to two sessions following the training. Following the training, required opportunities to wash hands varied from four-to-five opportunities per session, with a total of nine opportunities across two sessions (average 4.5/observation). Kamille washed her hands on only one occasion (0% of opportunities for that session) with (0% integrity). There were no unobtrusive probes during this phase due to this phase being a training condition.

**Graphical and verbal feedback phase.** The requirement to wash hands varied from one-to-eight opportunities during the graphical and verbal feedback phase, with a total of 24 opportunities across twelve observations (average 2/observation). Kamille washed her hands when required variably during these observations with a range of 0% to 100% of opportunities, with an overall average of 27% during this phase. Percentage of hand washing steps completed correctly during obtrusive observations ranged from 0%-77% (average of 50.1%). During unobtrusive observations Kamille washed her hands on 6.6% of opportunities (sessions 13, 16, 18, 20, & 22). Integrity of hand washing during these sessions occurred at 0%, 0%, 50%, 0%, and 0% respectively.

**Probabilistic bonus phase.** Kamille washed her hands when required variably during these observations with a range of 0% to 100%, with an overall average of 61.5% during this phase. This phase produced the strongest performance by Kamille in that all obtrusive observations resulted in hand washing when required and with 98.5% integrity.
The requirement to wash hands varied from five-to-six opportunities during the probabilistic bonus phase with a total of 29 opportunities across nine observations (average 3.2/observation). Percentage of hand washing steps completed correctly during obtrusive observations ranged from 95%-100%. The average for obtrusive observations of percentage of hand washing steps completed correctly was 98.5%.

During unobtrusive observations, Kamille washed her hands 0%, 33%, and 0% of opportunities (sessions 27, 29 & 31). Interestingly, Kamille’s hand washing integrity showed an overall decreasing trend through these sessions with integrity scores of 0%, 10%, and 0% respectively. While the probabilistic bonus phase shows a vast improvement in performance under the conditions of unobtrusive observations, and while data represent an increasing trend although the participant did know she was being watched, it is clear that effective transfer of stimulus control is still found wanting in that hand washing occurred on slightly over 50% of the required opportunities, and when it did occur, integrity was still weak. So too, Kamille did not increase her overall integrity of hand washing when she believed she was not being observed. Kamille won the raffle for a $10 dollar gift card during sessions 26 and 28.

**House Aggregates**

The design for figure 8 is a non-concurrent multiple baseline that shows individual data aggregated by house. As with the individual graphs, the conditions are the same and in the same order, with sessions across the x-axis and percentage correct along the y-axis. Each observation session was either obtrusive, unobtrusive, or both (one staff was specifically observed while the other did not know their behavior was
being observed as well). There are two data series depicted on this graph: the first pertains to obtrusive observations where the green bars represents percentage of required opportunities where the staff washed their hands, and the green line (square data points) represents the integrity with which they washed their hands. If there is no data point for a particular observation, it is because the staff did not wash their hands and thus, there was no integrity data to record. The unobtrusive observations are represented in a similar way with the blue bars (percentage of required observations) and blue line (triangle data points representing hand washing integrity).

Baselines lasted 8, 15, and 21 days respectively with a considerable amount of variability seen in each house with regards to both dependent variables. Overall, performance during baseline was poor with most observations resulting in few instances of hand washing and weak integrity when the staff did wash hands. Integrity data can be misleading with the omission of the zero integrity data points, however. This can be seen in baseline for House 3 where the data show an increasing trend from session 7 through session 18. As noted, however, it is important to keep in mind the data gaps represent non-performance, thus it is not clear how well staff would have performed if they had washed their hands.

Initial increases in performance were observed in Houses 1 and 2 upon placement of the informational placard by the sink; however, this performance was short-lived and decreased to below baseline levels. Oddly, house 3 showed a slight increase in performance and integrity towards the end of the phase, but still below baseline levels.

The BST training occurred on different days for each house and mastery criteria were 100% integrity before ‘graduating’ to BST Probe condition. BST probes were
conducted for a short period following the training to ascertain transfer of the trained skill set to the natural environment. Initial increases in performance were observed, but little change was seen in washing hands when required. This study utilized verbal and graphical feedback to ascertain what impact this intervention would have on performance and integrity. For the first time in the study, performance improved substantially, although still variable, and integrity increased to roughly 70%-80% across houses. Integrity measures were seen to vary considerably as well. However, one positive note that is important to consider is that this condition produced the fewest number of zero data points for performance in relation to all prior conditions.

As seen in the individual graphs, the biggest impact in performance and integrity was seen when the probabilistic bonus was implemented. Though some non-performances (zero performance) were observed, they were few and far between with very strong levels of integrity. It is interesting that a contingency schedule that is uncertain and distant could have such an effect on performance from day-to-day. It is hypothesized that staff verbal behavior may have bridged the gap of time and rationalized the probability of receiving the reinforcer.

With regards to staff performance being reactive to supervisor presence (blue bar/line), it was found that no condition produced strong performance or integrity in the absence of a supervisor. Interestingly, the Probabilistic Bonus phase saw the strongest performances in the absence of the supervisor with increasing trends seen in all houses. It is not clear if the unobtrusive sessions would have shown higher performances/integrity if more time was possible, but it would be predicted to be variable and to decrease over time. As can be seen in session 67 in House 3, the final unobtrusive data point was 0%
performance; while 0% performance was observed in House 2 on three occasions during the final phase.
Figure 1. Graphical representation of Ava’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterik below the session numbers indicates when unobtrusive data were collected.
Figure 2. Graphical representation of Yolanda’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected.
Figure 3. Graphical representation of Ryker's data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected.
**Figure 4.** Graphical representation of Tyvie’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected. The black star above the black bar in session 42 indicates when change in criteria began.
Figure 5. Graphical representation of Madison’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected. The black star above the black bar in session 30 indicates when change in criteria began.
**Figure 6.** Graphical representation of Renae’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected.
Figure 7 Graphical representation of Kamille’s data. Black bars indicate percentage of required opportunities of actual hand washing. The open squares represent percentage of steps completed during obtrusive observations. The open triangles indicate percentage of steps completed during unobtrusive observations. Text boxes with numbers above each session indicates number of required opportunities to hand wash. The asterisk below the session numbers indicates when unobtrusive data were collected.
Figure 8. Graphical representation of multiple baseline of aggregate data for each house for percentage of correct steps and percentage of opportunities with hand washing. The gold triangle data stream is the obtrusive data for percentage of steps correct and blue triangles is percentage correct for unobtrusive observations. The gold bars indicate percentage of required opportunities to hand wash for obtrusive observations. The blue bars indicate percentage of required opportunities to hand wash for unobtrusive observation.
Chapter 5:
Discussion

This study sought to evaluate the efficacy of both antecedent (informational placard, behavior skills training, and graphical/verbal feedback) and contingency based interventions (probabilistic bonus with graphical/verbal feedback) on hand washing behavior in residential settings. A pre-baseline condition was conducted to evaluate important times for observation, actual levels of required hand washing on a daily basis, and whether staff were washing their hands under the appropriate conditions, as well as if they were washing them according to general hand washing criteria set forth by the organization in prior in-service trainings. It was found that the afternoon hours when many activities are occurring was the best observation window (from 3:30 p.m.-7:30 p.m.). It was also found that many required opportunities existed in this observation window, and that staff were not washing their hands much at all when required.

Following this pre-baseline, we instituted a typical baseline phase where these data were collected under research conditions. Data were collected at the individual level as well as aggregate by house (the house and all staff performances therein was the level of analysis). Similar poor performances were observed during baseline for all participants. The next condition was the informational placard phase which functioned to evaluate, as has been done extensively elsewhere in the
behavioral literature, what effects a typical in-service plus posting of signs type of intervention would have. This placard remained in place throughout all subsequent conditions of the study. It was found that typical posting of signage had little to no effect on both hand washing when required, nor on the integrity with which the staff washed their hands, although the ten required steps were posted right next to the sink and in plain view. This finding compared to previous research as were even when staff are given visual cues and prompts to hand wash it does not increase hand washing behavior (Creedon, 2005; Mathai et al., 2011; McGuckin et al., 1999).

Following this condition, an in-service was provided that utilized behavior skills training procedures. The four components of BST (instruction, modeling, role-play, and feedback) was provided to teach the 10 steps hand washing task analysis and the conditions under which hand washing should occur for all staff in each house. This one-time training lasted 1 hr and all staff were required to meet mastery of 100% performance in this analog situation (although the actual sink was used) before ending the session. All participants reached 100% mastery criterion during the training, however once BST probes were conducted following the training, participants’ integrity and actual occurrences of hand washing was similar to levels seen in the baseline and informational placard condition. During BST probe condition, participants were given a verbal prompt to remember behavior skills training they attended and complete all steps correctly.

While BST is often found to be efficacious in behavioral training situations, it is known that this training itself does not always result in skills transfer to the natural environment (Chen & Chiang, 2007; Creedon, 2005). This was found in this
study as well and as such was followed by the feedback component of BST in the form of verbal and graphical feedback (V-G FB) delivered at the end of each obtrusive observation session. This is not surprising as the BST training focused more so on integrity of hand washing and only mentioned the conditions under which staff should wash hands.

We found substantial improvement for all but one participant (Ryker) in this condition; however, the overall performance during V-G FB was still found wanting with variable performances of hand washing when required (both within participant and between); and when hand washing occurred, only moderate increases in level of integrity with a great deal of variability (both within participant and between).

The final phase of the study involved a probabilistic contingency where the potential to receive a preferred stimulus, which was assumed would function as a reinforcer, was based on the number of times participants washed their hands when required, and washed them with 100% integrity. The probabilistic bonus was added to the procedures in the prior condition (V-G FB) to capitalize on the advantages of objectively delineating performance to participants following said performance such that they were aware of conditions when they earned the ticket for the drawing, as well as what they would need to improve on in the future if their behavior was lacking in some way. The probabilistic bonus plus V-G FB condition resulted in an increase in hand washing integrity for all participants during obtrusive observations. These findings are similar to previous research (Cook and Dixon, 2005). Denser schedules of reinforcement may have attributed to the
increase in performance as well (Alavosius & Sulzer-Azaroff, 1990). Participants were given feedback on their performance daily during the V-G FB and probabilistic bonus condition. The probabilistic bonus phase had the fewest amount of zero data points. Some could argue that this effect is due to sequence effects from the ordering of prior conditions, or carry-over effects from the BST training and BST probes condition; however, both of these arguments are weak as the performance during the BST probes condition was marginally better than baseline, and returned to baseline, or sub-baseline levels very quickly. Thus, in essence, the BST Probes condition may have functioned as a return to baseline.

It should be noted that Madison and Tyvie (House 2), did not improve in hand washing when required, nor in hand washing integrity until a change in magnitude occurred with the gift cards and the criteria to earn a ticket was decreased. It seemed their behavior was not impacted by the $10 amount and as such, they were not earning tickets for the weekly drawing; thus, they were not contacting the reinforcement contingency. Due to this, the researcher interviewed them and found that while the choice of merchant gift cards was fine, the amount was not enough. As such, the researcher increased the amount to $15 (noted by a star on their individual graphs) and decreased criteria for earning a ticket to 85% (rather than 100%). Following this change, performance increased substantially for both participants resulting in 100% performance across both dependent variables for both participants. For most of the participants, excluding Tyvie, probabilistic bonus phase did not show much improvement in performance under the conditions of unobtrusive observations, and while data represent an increasing trend although
the participant did not know they were being watched, it is clear that effective
transfer of stimulus control is still found deficient in that hand washing occurred on
a quarter to less than half of the required opportunities in some sessions, and when
it did occur, integrity was still found wanting.

Reactivity data were collected across conditions and participants as a
secondary measure of performance to evaluate transfer of stimulus control from the
various interventions to the natural contingencies within the setting. Based on prior
research (Bittner et al., 2002), it was expected that the staff performance would be
weaker when they were not aware their behavior was being observed. This suggests
that a negative reinforcement contingency must be in place when staff are expected
to perform behaviors that take away from the opportunity to complete other tasks
(washing hands takes away from doing other tasks), or may require a certain level
of response effort (seen in research on safety—behaving safely tends to be response
effortful). Additionally, this may be seen in conditions that may be uncomfortable
but are necessary (wearing protective equipment is often times uncomfortable).

Additionally, no one has evaluated the effects of a probabilistic bonus
contingency schedule on transfer of stimulus control to the natural environment. It
was found that, regardless of condition, the staff performance was weak to non-
existent during unobtrusive observations. While we did not collect consistent data
within phases to evaluate variability, data suggest low levels of performance across
both dependent variables and across all participants during unobtrusive
observations. There is some evidence to suggest that one of the two dependent
variables was affected for each of the staff members in both V-G FB and probabilistic
bonus conditions, but again, performance was variable and less than necessary for a socially significant repertoire such as hand washing in human service settings.

There were several limitations to this study that should be addressed in future research. One participant dropped out of the study due to being terminated by the organization. The participant’s termination was not related in any way to his/her involvement to this study. Also, staff were frequently absent throughout the duration of the study whether for calling in sick or unavailability due to vacation days, or doctor appointments. Furthermore, data collection ceased when problem behaviors from clients arose. These interferences resulted in data gaps and difficulty in collecting enough data in each condition in a timely fashion. As a result, data gaps occur throughout when observing the data in true temporal fashion. The issue with this relates to extraneous variables that may have impacted the performance of staff irrespective of the interventions themselves. In addition, there was no maintenance procedure in this study. Future research should include follow-up data collection to determine whether hand washing performance maintains over time without a probabilistic bonus contingency in place.

When considering a future study in the area of probabilistic bonus schedules, one potential issue that pertains to the application of a probabilistic bonus schedule is the cost. While one of the main points of inclusion of the probabilistic bonus is to thin the overall delivery of reinforcers, the magnitude should be taken into account. In this study, incentives were a $10 or $15 gift card delivered to one person in each house at the end of the week (three winners each week). This magnitude of incentive can be expensive to a company with a strict
budget and even less monetary resources to maintain such an expensive incentive program. Future studies might look into other, less expensive stimuli to be used in the contingency schedule.

The observation window was four hours due to the need to capture as many required hand washing opportunities as was possible. Supervisors unfortunately do not have the resources in place to observe this much across all employees. Future research could look into a time sampling format that would decrease the response effort of those supervising and permit a more efficient, but accurate, evaluation of hand washing behaviors

This study was focused on hand washing of the staff in the residential facilities. Data for hand washing behaviors of clients living in the residential facilities were not collected, however. Future research might look into hand washing behavior of clients as well—especially those who may be afflicted by an intellectual disability. Additionally, researchers may be interested in observing the conditions under which a generalization effect may be produced through staff washing their hands often in the environment and providing discriminative cues to help prompt the clients' hand washing behavior in the natural environment.
Chapter 6:

References Cited


Glo-Germ: The # 1 product for teaching hand washing, isolation techniques, aseptic techniques, and general infection control. Retrieved from http://www.glogerm.com/


Retrieved from www.who.int/
Appendices
Appendix A

Participant/House:  
Date:  
Phase:  
Location (what house):  

Opportunities:  

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<th>Step # (below)</th>
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* NOTE: Please circle Y (Yes) if they washed their hands when warranted and circle N (No) if they did not wash their hands when warranted. Also, please prompt hand washing for the highlighted opportunity codes (before and after). Next to written opportunity type please write a P if you needed to prompt the opportunity for hand washing.

OPPORTUNITY TYPE CODES:  
- FA = first aid  
- MA = medication administration  
- CT = cooking training  
- LT = laundry training  
- ACC = after use of cleaning chemical  
- LH = leaving house
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OPPORTUNITY TYPE CODES: FA = first aid; MA= medication administration; CT= cooking training; LT= laundry training; ACC= after use of cleaning chemical; LH= leaving house for more than 2 min.
Appendix B

Informational Placard

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

1. Wet hands with warm water
2. Apply enough hand wash to cover all hand surfaces
3. Rub hands with soap
4. Rub hands with soap
5. Rub palms together with fingers interlaced
6. Pull back of fingers to cover all hand surfaces
7. Rub back of hand with fingers interlaced
8. Rub between fingers and around nails
9. Pull back of fingers to cover all hand surfaces
10. Rinse hands with soap

Save Lives
Clean Your Hands
Appendix C

• Behavior Skills Training for Correct Hand Washing

Tamika Rickerson, B.A., BCaBA

• BST for Hand Washing

• Hand washing is essential to decrease chances of germs being spread from person-to-person and object-to-object (Centers for Disease Control and Prevention, [CDC] 2011).

• Why should you wash your hands?

• You must wash your hands to protect you and others against harmful germs carried on your hands or present on your hands.

• You must protect yourself and your working environment from harmful germs that may be spread to others.

• When should you wash your hands?

• Before:

• During, and after preparing food

• Eating food

• After:

• Caring for someone who is sick

• Treating a cut or wound
• Leaving the house (going back and forth, coming in from outside)
  • Using cleaning chemicals
  • Using the bathroom (toilet)
  • Blowing your nose, coughing, or sneezing
  • Touching an animal or animal waste
  • After touching garbage or garbage can

• What is the correct way to wash your hands?

  Step 1:
  Wet hands with warm water

• What is the correct way to wash your hands?

  Step 2:
  Apply enough hand soap to cover all hand surfaces

• What is the correct way to wash your hands?

  Step 3:
  Rub hands with palms
  *Instructor will illustrate...

• What is the correct way to wash your hands?

  Step 4:
  Rub hands together with right palm with hands interlaced fingers vice versa

  *Instructor will illustrate...
• What is the correct way to wash your hands?

Step 5:
Rub palm to palm with fingers interlaced

*Instructor will illustrate...

• What is the correct way to wash your hands?

Step 6:
Rub backs of fingers to opposing palms with fingers interlaced.

*Instructor will illustrate...

• What is the correct way to wash your hands?

Step 7:
Rotational rubbing of left thumb clasped in right palm and vice versa

*Instructor will illustrate...

• What is the correct way to wash your hands?

Step 8:
Rotational rubbing backwards and forwards with clasped fingers of right hand in left palm and vice versa

*Instructor will illustrate...

• What is the correct way to wash your hands?
Step 9:

Rinse hands with water

• What is the correct way to wash your hands?

Step 10:

Dry hands thoroughly with a single use towel.

Use another towel to turn off faucet.

Your hands are now safe.....

• Questions????

Instructor will answer any questions or concerns...

• BST for Hand Washing

NOW LET’S PRACTICE!!!!

You must have 100% correct steps during test out portion to “finish” the class....
Appendix D

Probabilistic Bonus Phase Information Sheet

**Question:** What is a Probabilistic Bonus (PB)?
**Answer:** A lottery system that increases the likelihood that you will receive a preferred tangible.

**Question:** So how does it work?
**Answer:** You will earn “lottery” tickets when you are observed engaged in correct hand washing steps. The PI will give you a ticket immediately after observing you washing your hands correctly and when hand washing is warranted.

**Question:** What could I earn?
**Answer:** You can earn store and gas station gift cards worth ten dollars.

**Question:** Do I get to keep the tickets?
**Answer:** No, the PI will keep the tickets in a pouch that she will keep in her possession.

**Question:** How will I know how many tickets I have?
**Answer:** The PI will keep track of your tickets and inform you of how many tickets you have earned.

**Question:** When will I get to raffle the tickets?
**Answer:** After the end of each work week (Saturday) there will be a raffle given by the PI ONLY....

**Question:** What if I think I should have received a ticket but the PI did not observe me engaged in hand washing.
**Answer:** If PI did not observe you wash your hands you will not receive a ticket.

Please feel free to ask any questions you may have... 😊