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Social Influence in Child Care Centers: A Test of the Theory of Normative Social Behavior

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Child care centers are a unique context for studying communication about the social and personal expectations about health behaviors. The theory of normative social behavior (TNSB; Rimal & Real, 2005) provides a framework for testing the role of social and psychological influences on handwashing behaviors among child care workers. A cross-sectional survey of child care workers in 21 centers indicates that outcome expectations and group identity increase the strength of the relationship between descriptive norms and handwashing behavior. Injunctive norms also moderate the effect of descriptive norms on handwashing behavior such that when strong injunctive norms are reported, descriptive norms are positively related to handwashing, but when weak injunctive norms are reported, descriptive norms are negatively related to handwashing. The findings suggest that communication interventions in child care centers can focus on strengthening injunctive norms in order to increase handwashing behaviors in child care centers. The findings also suggest that the theory of normative social behavior can be useful in organizational contexts.

Approximately 3.74 million children per year attend public child care centers (CCCs) in the United States (U.S. Department of Health & Human Services, 2010). There are a number of hazards in the CCC environment that pose risks to workers and children, including injuries, infectious diseases, stress, and chemical contaminants (for a review see Bright & Calabro, 1999). Specifically, there is a high rate of infectious illness in such public CCCs (Nafstad, Hagen, Oie, Magnus, & Jaakkola, 1999), ranging from the common cold to more severe ailments like stomach viruses and respiratory infections, many of which can be prevented by proper handwashing procedures (CDC, 2009).

When children who attend CCCs exhibit symptoms of illnesses, state regulations require parents to remove their children from the center; often this requires parents to leave work, costing American businesses more than $3 billion annually, and taking a significant toll on the families (Shellenback, 2004). One of the best ways to prevent these costly infections is to maintain cleanliness and hygiene in CCCs through effective handwashing (CDC, 2009). State child care licensing divisions have specific hand hygiene
and cleaning policies for licensed CCCs designed to prevent the spread of illness; however, workers do not consistently follow these policies (Aronson et al., 2002).

Because policy alone does not result in adequate handwashing, other drivers of behavior must be explored in order to understand how to improve this behavior. From a communication standpoint, handwashing compliance may be influenced through interventions to improve handwashing (Botta, Dunker, Fenson-Hood, Maltarich, & McDonald, 2008) or through informal communication that results in functional social norms about the behavior (Pittet et al., 2004). Indeed, Pittet et al. (2004) found that descriptive and subjective norms for handwashing behavior were positive predictors of handwashing among physicians in hospitals. Using the theory of normative social behavior (TNSB; Rimal & Real, 2005), this study examines the relationship between social norms and handwashing behavior in child care centers. Normative influence on this behavior in this context is expected based on the close, intimate working conditions (Murray, 1998) and the fact that handwashing occurs throughout a child care worker’s (CCW’s) typical workday (Aronson et al., 2002).

THEORY OF NORMATIVE SOCIAL BEHAVIOR

The theory of normative social behavior (Rimal & Real, 2005) describes and predicts the effects of social norms on behaviors. The theory conceptualizes social norms as a function of communication about behavior, among a group of people, in a particular context (Lapinski & Rimal, 2005). That is, social norms concerning health behaviors are developed through interpersonal communication about those behaviors (Hogg & Reid, 2006; Lapinski & Rimal, 2005). Because the TNSB is concerned with perceptions of socially normative behavior, rather than the socially normative behavior itself, it highlights the communicative nature of socially normative belief development. Such interpersonal communication can occur between coworkers. For example, Stephenson et al. (2009) found that after exposure to a campaign about hearing loss, coal miners talked to one another about behaviors that could reduce hearing loss on the job. This communication has the power to influence normative perceptions about both the prevalence of prevention behaviors and the beliefs of coworkers about these behaviors. Child care workers are also influenced by center designs that allow workers to observe each other (Twardosz, Cataldo, & Risely, 1979), making their behavior available for scrutiny. This provides substantial available normative information that is shared through indirect communication (Lapinski & Rimal, 2005).

The core of the TNSB is the relationship between perceived descriptive norms and behavior and the four perceptual variables that moderate that relationship. The variables that moderate the relationship between perceived descriptive norms and behaviors are perceptions of injunctive norms, outcome expectations, group identity, and ego involvement.

In various tests and extensions of the theory, research has demonstrated that the theory of normative social behavior variables predict behaviors in the contexts of college student drinking behavior, beginning yoga, and water conservation (for a review see Mollen, Rimal, & Lapinski, 2010). The current study extends work with this theory by testing its predictions in the context of child care worker handwashing behavior; it also examines whether the perceived public scrutiny of a behavior makes it more susceptible to normative influence (Lapinski & Rimal, 2005).

Descriptive Norms

The TNSB postulates direct and moderated relationships between descriptive norms and behavior. Descriptive norms are conceptualized in the TNSB as perceptions about the prevalence of a behavior among members of a referent group (Cialdini, Reno, & Kallgren, 1990). These perceptions are formed through observation of, and interpersonal communication about, behaviors. Descriptive norms had a positive effect on handwashing in a sample of hospital physicians (Pittet et al., 2004); additional research demonstrates that they can have direct effects on other health behaviors and behavioral intentions (Rimal, 2008). In the current study, descriptive norms refer to child care workers’ perceptions of the prevalence of compliant handwashing behavior among their coworkers. Importantly, perceived descriptive norms may or may not be congruent with actual prevalence of the behavior, a phenomenon termed normative misperception (Perkins, Meilman, Leichliter, Cashin, & Presley, 1999). However, perceived norms are important in this case because they have an established link with behaviors (Lapinski, Rimal, DeVries, & Lee, 2007).

Compliant handwashing behavior was conceptualized in this study as consistently washing one’s hands in three child care situations where there is high potential for disease transmission: before preparing food, after helping a child toilet or diaper, and after wiping a child’s nose. Consistent with the TNSB, the more child care workers perceive handwashing compliance is prevalent, the more likely they are to enact compliant handwashing behavior. Thus, the following hypothesis is advanced:

H1: Descriptive norms about handwashing will be positively related to reported handwashing behavior.

Injunctive Norms

Injunctive norms moderate the relationship between descriptive norms and behaviors and are distinct from descriptive norms. Descriptive norms refer to beliefs about what is done by others in a referent group, whereas injunctive norms refer to beliefs about what ought to be done by others.
Thus, the following hypothesis is advanced:

H2a: Injunctive norms about handwashing will be positively related to reported handwashing behavior.

TNSB predictions indicate that the main effect of injunctive norms on behavior can be subsumed by an interaction with descriptive norms (Lapinski & Rimal, 2005; Rimal & Real, 2005). When injunctive norms interact with descriptive norms, they heighten the effect of descriptive norms on behavior. In a study of college drinking behavior, Rimal (2008) found that the interaction between descriptive and injunctive norms accounted for a small, but statistically significant, percentage of total variance in drinking behavior. In CCCs, it is predicted that an interaction between perceived prevalence of compliant handwashing behavior and belief in social sanctions associated with violating that norm should be associated with that worker’s handwashing behavior. Therefore, the following hypothesis is proposed:

H2b: The relationship between descriptive norms and reported handwashing will increase in magnitude as injunctive norms about handwashing become stronger.

Group Identity

Group identity also moderates the relationship between descriptive norms and behaviors. Group identity refers to feelings of affinity with one’s social group and the desire to be connected to that group (Rimal & Real, 2005). The concept of group identity is based on the social identity perspective (Tajfel, 1981), which asserts that individuals develop at least part of their self-concept from their communication with social groups and subsequent self-categorization into certain groups—such as the group “child care workers.” Hogg and Reid (2006) argue that self-categorization into a group can affect normative behavior, but in order to do so, the group identity must be salient to the individual. When group identity is salient, it motivates normative behavior, because individuals experience positive affect when they behave normatively (Christensen, Rothberger, Wood, & Matz, 2004). Salient group identity also motivates normative behavior because individuals are aware that others in the group will endorse their compliance with those norms (Lapinski & Rimal, 2005). Thus, the TNSB posits that when group identity is strong, the influence of group norms will be heightened (Rimal & Real, 2005).

In the context of a CCC, group identification as a child care worker might directly influence handwashing, because handwashing is a key element of the daily routine of child care workers and part of state and national licensing and accreditation guidance. In centers with accreditation from a body like the National Association for the Education of Young Children (NAEYC), guidelines for proper handwashing must be followed in order for the center to remain accredited (NAEYC, 2011). Yet not all child care workers strongly identify with child care workers as a group. Thus, the TNSB posits that handwashing will be greatest when individual child care workers identify with, and have a desire to be connected to, the group “child care workers” and there is also a strong sense of the perceived prevalence of the behavior. Therefore, the following hypotheses are advanced:

H3a: Group identity as a child care worker will be positively related to reported handwashing behavior.

H3b: The relationship between descriptive norms and reported handwashing will increase in magnitude as group identity as a child care worker increases.

The development of a social identity linked with child care workers as a social group has been demonstrated in research that shows workers see child care as a career, rather than simply a form of employment (Phillips, Howes, & Whitebook, 1991), and see their center as a core ingroup (Murray, 1998). Many of the workers have received specialized training in this field, go through additional training at their workplace, and spend the majority of their time both inside and outside of working hours caring for children (NACCRRRA, 2010). However, for some child care workers, being a child care worker is just a job, and for various reasons, they do not personally identify with other child care workers as a group (Phillips et al., 1991). Thus, it is expected that group identity with the group child care workers—specifically, coworkers at CCCs—will impact normative behavior and will differ between individuals. Given previous research indicating the importance of group identity in response to information about social norms (e.g., Lapinski et al., 2007), any strategic communication about social norms must take this variable into account. However, the typical level of identification for child care workers

1Many child care workers are also mothers of young children; thus, their child care duties extend beyond working hours.
with their group has not been studied specifically; thus, the following research question is proposed:

RQ1: What is the level of group identity of child care workers?

Motivation to Comply

Evidence suggests that child care workers’ perceived level of group identity will influence behavior, but theories of normative influence also predict that motivation to comply (MTC) with particular referents will also impact behavior (Ajzen & Fishbein, 1980). Indeed, the theory of reasoned action (TRA; Ajzen & Fishbein, 1980) conceptualizes subjective norms as having two components: the perceived behavioral beliefs of referent others, and a person’s MTC with those referent others. Motivation to comply with referent others refers to how important the referent others’ beliefs about their behaviors are to the CCC workers and how important it is to act in accordance with those beliefs (Fishbein & Ajzen, 2010). Thus, accounting for one’s MTC with referent others enhances the predictive power of subjective norms. However, the conceptualization of norms in the TNSB differs from that in the TRA. The TNSB includes both descriptive and injunctive norms, and considers subjective norms as a type of injunctive norm. It may be the case that MTC with referent others enhances the effect of descriptive norms on behavior. The relationships between MTC with referent others, descriptive norms, and behavior are not closely considered in the TNSB. Thus, the following research question is advanced:

RQ2: Does motivation to comply with child care workers interact with perceived descriptive norms to influence reported handwashing behaviors?

In CCCs, multiple referent groups (coworkers, lead teachers, parents, and children) are present and act as key referents (Murray, 1998). In terms of coworkers and lead teachers, Murray (1998) found that coworkers shared social norms for behavior in the classroom. In addition, lead teachers or other supervisors directly observed and reviewed workers’ behavior. Child care workers may also experience a very close relationship with the families they serve—both parents and children (Murray, 1998). Also, child care workers can serve as role models for children (Bertcher, 1973), motivating the workers to behave in ways that are consistent with the expectations of the children. Because these multiple groups are present, and child care workers may be differentially motivated to comply with each group, the following research question is advanced:

RQ3: With which referent group do child care workers exhibit the greatest motivation to comply?

Outcome Expectations

Outcome expectations also moderate the relationship between descriptive norms and behavior. Outcome expectations refer to one’s belief that enacting a given behavior will confer desired results (Bandura, 1986). Like previous theories, the TNSB includes outcome expectations as direct predictors of behavior, but it also links outcome expectations with normative influences by positing an interaction between outcome expectations and descriptive norms (Lapinski & Rimal, 2005). In previous studies, outcome expectations were operationalized to include two factors: perceived benefits and anticipatory socialization (Rimal, 2008; Rimal & Real, 2005). Perceived benefits are those things that accrue to a person as a result of enacting a behavior, for example, preventing the spread of disease through handwashing. Anticipatory socialization has been used in studies of college student alcohol use, to refer to participants’ beliefs that engaging in that behavior will lead to increased socialization with their referent group (Rimal, 2008; Rimal & Real, 2005).

Since increased handwashing compliance is not likely to be seen as a mechanism for engaging in increased socialization with one’s coworkers at a CCC, outcome expectations in this study only include the perceived benefits of performing the behavior. Therefore, this study is interested in the direct relationship between outcome expectations (i.e., perceived benefits of handwashing) and handwashing behavior, as well as interactive effects of outcome expectations and descriptive norms on handwashing behavior. Thus, the following hypotheses are presented:

H4a: Outcome expectations about handwashing will be positively related to reported handwashing behavior.

H4b: The relationship between descriptive norms and reported handwashing will increase in magnitude as outcome expectations about handwashing become more positive.

Ego Involvement

Ego involvement also moderates the relationship between descriptive norms and handwashing behavior. Ego involvement refers to the extent to which a person connects his or her self-concept with a given attitude object (Johnson & Eagly, 1989; Lapinski & Boster, 2001; Sherif & Hovland, 1961). People may feel highly ego-involved with certain behaviors if those behaviors are closely tied with their self-concept (Lapinski & Boster, 2001). In the case of child care workers, handwashing behavior is a critical component of their job performance, and, as discussed earlier, many workers may derive a portion of their personal identity from identification with this career. In other words, since group

2Health belief model (HBM, Janz & Becker, 1984), theory of reasoned action (TRA, Ajzen & Fishbein, 1980), and social cognitive theory (SCT, Bandura, 1986).
identity as a child care worker may be operating for many child care workers, behavioral aspects of the job (such as handwashing) may be seen as an extension of their personal identity. Greater ego involvement with a given behavior is directly linked to enactment of that behavior (Johnson & Eagly, 1989), and Lapinski and Rimal (2005) posit that ego involvement with a behavior enhances the effect of descriptive norms on that behavior. Thus, the following hypotheses are advanced:

H5a: Ego involvement with handwashing will be positively related to reported handwashing behavior.

H5b: The relationship between descriptive norms and reported handwashing will increase in magnitude as ego involvement with handwashing increases.

Publicness

A final aspect of the influence of social norms on behavior identified by Lapinski and Rimal (2005) is that of the perceived publicness of the action. Normative influences are believed to differ according to the extent to which the actions under consideration may be open to public scrutiny. Behaviors enacted in a public setting have more potential to be influenced by social norms because those behaviors carry a greater risk of invoking interrogation from important others (Lapinski & Rimal, 2005). In other words, people enacting public behaviors are at greater risk of receiving social sanctions for noncompliance than those enacting private behaviors. Handwashing behavior is very public in most classrooms in the CCCs included in this study; all workers in a classroom can observe the behavior.3 Thus, to the extent that child care workers perceive handwashing to be a public behavior, it is likely to be strongly influenced by normative forces. Therefore, the perceived publicness of a behavior interacts with descriptive norms to affect behavior. This relationship is presented in the following hypothesis:

H6: The relationship between descriptive norms and reported handwashing will increase in magnitude as perceived publicness of handwashing increases.

METHOD

Sampling and Participants

The study included 21 child care centers in a 40-mile radius of a medium-sized Midwestern city; the centers agreed to take part in the study prior to receipt of funding for the project. All study procedures were approved by the university institutional review board, center administrators, and CCC advisory boards prior to initiation of the project. Center directors were contacted via telephone by the research team and provided consent for their centers to be included in the study.

All child care workers in the centers were provided an opportunity to complete the survey, and workers gave their individual consent to participate. A total of n = 201 child care workers, representing all 21 CCCs, completed the survey, resulting in a 51% response rate across centers. The sample was predominantly female (97%) and White (89.2%). Participants also reported their ethnicity as African American (9.7%), Latino (3.1%), Asian (2.6%), and Other (5.1%). On average, participants were 33.78 years old (SD = 11.3 years), most (69.2%) had earned either an associate’s (20.9%) or bachelor’s degree (44.7%), and on average they had worked at their current job for 5.44 years (SD = 5.14 years). Participants had worked an average of 10.7 years in the child care field (SD = 7.44 years).

Demographically, these data are similar to national data on child care workers in terms of gender distribution, but not racial makeup or educational attainment. Of the 2.1 million child care workers in the United States, including informal and home-based child care provided by relatives, 94.6% are female, 16% are African American or Black, and 16.8% are Hispanic. Nationally, only 12% of center assistants have completed a college degree, and 45% of center assistants have completed some college (NACCRRA, 2010). Thus, our sample is less diverse and more educated than the general population of child care workers, a factor that might limit the generalizability of these findings.

Procedure

Once the directors were contacted via telephone, the survey was mailed or taken to the directors, who distributed it to center workers. Workers completed the self-administered surveys during routine center-wide staff meetings, for which their time is compensated. Several precautions were used to protect against the possibility of a social desirability bias and other threats to validity of the design. First, workers were not required to complete surveys; they were compensated for attending the regularly scheduled meetings regardless of their participation in the study. Second, workers did not sign a consent form (instead, they indicated consent by reading the consent document and completing the survey). Third, workers never provided their names or other unique identifying information on the surveys, so they could not be linked with their responses by their coworkers, their supervisors, or the researchers.

The survey included items measuring demographics, reported handwashing behavior, descriptive norms, injunctive norms, outcome expectations, group identity, ego-involvement, and publicness. These items are presented in the appendix, and the full questionnaire is available from the first author. The survey data were collected as part of a larger study; director interviews, behavioral observation,
and microbial swab data were collected prior to administering the survey, but these findings are beyond the scope of the present analysis. All study activities were kept distinct from one another and participants were not informed of a link among these data collection activities.

**Pilot Study**

A pilot study was conducted with a child care center that was not included in the final sample. The pilot child care center participated in all stages of data collection included in the larger study. In total, \( n = 24 \) child care workers completed the survey and provided informal feedback on it. The survey design and research procedure were refined as a result of workers’ informal feedback and other data collected during the pilot. Data from the pilot were not included in the final results.

**Measures**

Unless otherwise noted in the following, the scaled items were derived from previous work with the TNSB (Lapinski et al., 2007; Rimal & Real, 2005). Since the items were either modified or created specifically for the context of child care centers, the psychometric properties of all scales were retested separate from formal tests of hypotheses. Each scale with at least four items was subjected to confirmatory factor analysis (CFA) with AMOS. Poor items were removed from the analysis in order to obtain sufficient goodness of fit, items forming unidimensional scales were summed, and Cronbach’s alpha was calculated for each scale using the retained items. All items were scored using Likert-type response scales (1 = strongly disagree, 5 = strongly agree), in which higher scores indicated greater agreement or higher levels of the variable. The number of items used to measure each dimension was limited in order to increase response rate levels of the variable. The number of items used to measure each dimension was limited in order to increase response rate.

**Handwashing behavior** was assessed with five questions. CFA indicated the data were consistent with a unidimensional factor structure (comparative fit index [CFI] = .96, root mean square residual [RMR] = .03); the scale was reliable \( \alpha = .85 \). **Descriptive norms** were measured with four questions. CFA indicated the data were consistent with a unidimensional factor structure (CFI = .93, RMR = .02), and the scale was reliable, \( \alpha = .93 \). **Injunctive norms** were measured with four questions. CFA indicated the data were consistent with a unidimensional factor model (CFI = .95, RMR = .04), and the scale was reliable, \( \alpha = .82 \). **Group identity** was measured with two items designed to assess similarity and aspiration; the scale was reliable (\( \alpha = .82 \); inter-item correlation, \( r = .70, p < .001 \). **Motivation to comply** was assessed with a single item for each referent group considered in the study (i.e., coworkers, lead teachers, parents, children at the center). These items were developed based on Fishbein and Ajzen’s (2010) recommendations for measuring MTC. **Outcome expectations** were measured with six questions. After dropping two items to improve fit, data were consistent with a unidimensional factor model (CFI = .82, RMR = .05), and the scale was moderately reliable, \( \alpha = .70 \). **Ego involvement** in being a child care provider was measured with two items; the scale was reliable (\( \alpha = .86 \); inter-item correlation, \( r = .75, p < .001 \). **Publicness** was measured with three items designed specifically for this investigation. One item was dropped to improve reliability, and the scale was still not reliable (\( \alpha = .36 \); inter-item correlation, \( r = .22, \text{n.s.} \)). Therefore, **publicness** was not included in the remaining analyses, and there was no test of H6.

**RESULTS**

**Preliminary Analysis**

Prior to testing the hypotheses, the data were examined for effects of demographic factors on both independent and dependent variables. Because of the small number of men in the sample (\( n = 6 \)), sex was not considered in the analyses. There was no effect for ethnicity on handwashing behavior or on any of the independent variables, so ethnicity was not included in additional analysis. One-way analyses of variance (ANOVAs) revealed marginal differences in descriptive norms with respect to educational attainment (\( p = .05 \); partial \( \eta^2 = .06 \)). Next, correlations among the continuous demographic variables (age, years worked at the center, and years worked in child care) and all other theoretical variables were examined to determine whether these factors should be considered as controls in tests of the hypotheses. Based on these analyses, years in the child care field was included as a control variable in subsequent analyses. This decision was based on Tabachnick and Fidell’s (1996) recommendations for inclusion of covariates. See Table 2 for the full correlation matrix.

In addition to potential individual-level covariates, potential center-level covariates were also considered prior to conducting tests of hypotheses. Center directors provided

<table>
<thead>
<tr>
<th>Variable</th>
<th>( n )</th>
<th>( M )</th>
<th>SD</th>
<th>( \alpha )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive norms</td>
<td>195</td>
<td>4.31</td>
<td>0.64</td>
<td>0.93</td>
</tr>
<tr>
<td>Injunctive norms</td>
<td>190</td>
<td>4.38</td>
<td>0.62</td>
<td>0.82</td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>200</td>
<td>4.72</td>
<td>0.41</td>
<td>0.70</td>
</tr>
<tr>
<td>Group identity</td>
<td>191</td>
<td>3.59</td>
<td>0.88</td>
<td>0.82</td>
</tr>
<tr>
<td>Ego involvement</td>
<td>198</td>
<td>4.11</td>
<td>0.88</td>
<td>0.86</td>
</tr>
<tr>
<td>Publicness</td>
<td>198</td>
<td>3.39</td>
<td>0.77</td>
<td>0.36</td>
</tr>
<tr>
<td>Handwashing</td>
<td>187</td>
<td>4.57</td>
<td>0.66</td>
<td>0.85</td>
</tr>
</tbody>
</table>
information regarding center hand hygiene policies and procedures. All centers had policies that required thorough handwashing before and after specific events (e.g., food preparation or diaper changing); all CCWs received training on these policies and reported awareness of those policies at the time of the survey data collection. Director interviews indicated enforcement of these policies varied from little to no surveillance and/or feedback to formal rules for surveillance and sanctions for noncompliance with policies; these policies and enforcement did not affect handwashing behavior. Because neither policies nor enforcement significantly impacted behavior, examining the potential influence of social norms on this behavior seemed especially well suited for understanding this behavior in this context.

In order to test the study hypotheses, hierarchical regression analyses were conducted with reported handwashing behaviors as the outcome variable. After introducing the control variable (years in the child care field) in the first block of the regression model (Aiken & West, 1991), main effects were included in the second block (i.e., descriptive norms, injunctive norms, group identity, MTC with coworkers, outcome expectations, and ego involvement). In the third block, the Descriptive Norms × Normative Mechanism interaction term was added. Each interaction effect was tested in a separate regression analysis, and this procedure was repeated until the effects of all normative mechanisms were tested. Hypothesis testing was done by evaluating the significance of the incremental change in explained variance. Following Aiken and West’s (1991) recommendations, variables were centered on their mean and unstandardized beta coefficients were used in interpreting the outcomes. Simple slope analysis was conducted to examine the nature of significant interactions. See Table 3 for a summary of the regression results for each model. Recall that tests of H6 could not be conducted due to a failed measurement model for the measure of perceived publicness of the behavior. The tests of the hypotheses are presented next, followed by results for each research question.

**Hypotheses Tests**

Examination of the unstandardized coefficients for the variables in Block 2 indicates that there was a significant direct effect of injunctive norms (H2a), but that the other direct effects were not statistically significant predictors of handwashing (H1, H3a, H4a, H5a). Thus, the data were consistent with H2a, but were not consistent with the other predicted direct effects. The nature of the effect was such that as perceptions of injunctive norms got stronger, greater handwashing was reported. The significant $R^2$ change from Block 1 to Block 2 is due largely to the influence of injunctive norms $[R^2 = .17, \Delta R^2 = .17, p < .001]$. The findings regarding this main effect were subsumed by a significant interaction effect.

Hypothesis 2b predicted that the relationship between descriptive norms and reported handwashing would increase in magnitude as injunctive norms about handwashing became greater. The data indicated that the beta coefficient corresponding to the Descriptive Norm (DN) × Injunctive Norm (INJ) interaction was significant ($\beta = -0.17, t = -4.39, p < .01$) and the addition of this term yielded a significant change in $R^2$ $[R^2 = .26, \Delta R^2 = .09, p < .001]$. Examination of the simple slopes indicated that rather than moderating the strength of the relationship between descriptive norms and behavior, injunctive norms moderated the direction of the relationship (see Figure 1). The relationship between descriptive norms and reported handwashing
TABLE 3
Regression of Handwashing Behavior on Predictor Variables

<table>
<thead>
<tr>
<th>Block</th>
<th>r^a</th>
<th>β^b</th>
<th>t</th>
<th>Block ΔR^2</th>
<th>Total R^2</th>
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</thead>
<tbody>
<tr>
<td>Block 1</td>
<td>.02</td>
<td>0.003</td>
<td>0.41</td>
<td>0.001</td>
<td>0.001</td>
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<tr>
<td>Years in field</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block 2</td>
<td>Descriptive norms</td>
<td>0.31**</td>
<td>0.03</td>
<td>0.41</td>
<td>0.17**</td>
</tr>
<tr>
<td></td>
<td>Injunctive norms</td>
<td>.39**</td>
<td>0.24</td>
<td>3.47**</td>
<td></td>
</tr>
<tr>
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<td>Group identity</td>
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<td>0.08</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivation to comply</td>
<td>.11</td>
<td></td>
<td>-0.06</td>
<td>-0.89</td>
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<tr>
<td></td>
<td>Outcome expectations</td>
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<td>0.09</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ego involvement</td>
<td>.13</td>
<td></td>
<td>-0.08</td>
<td>-1.24</td>
</tr>
<tr>
<td>Model 1</td>
<td>Descriptive norms × INJ</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>-0.17</td>
<td>-4.39**</td>
<td>0.09**</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>Descriptive norms × GID</td>
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<td></td>
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<tr>
<td></td>
<td>-0.19</td>
<td>-4.02**</td>
<td>0.07**</td>
<td>0.25</td>
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<td>Model 3</td>
<td>Descriptive norms × OE</td>
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<tr>
<td></td>
<td>-0.16</td>
<td>-2.46*</td>
<td>0.03*</td>
<td>0.20</td>
<td></td>
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<td>Model 4</td>
<td>Descriptive norms × EI</td>
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<td></td>
<td>-0.01</td>
<td>-1.96†</td>
<td>0.02†</td>
<td>0.19</td>
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<td>Model 5</td>
<td>Descriptive norms × MTC</td>
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<td>-0.05</td>
<td>-0.98</td>
<td>0.01</td>
<td>0.17</td>
<td></td>
</tr>
</tbody>
</table>

*aPearson correlation between predictor and reported handwashing behavior.
*bUnstandardized β from regression equations.
†p = .05, *p < .05, **p < .01.

FIGURE 1 Interaction between descriptive norms and injunctive norms on handwashing behavior. Note: Low injunctive norms = M – 1SD, high injunctive norms = M + 1SD. Handwashing reported on a scale from 1 to 5 (higher scores indicate greater handwashing).

Hypothesis 3b predicted that the relationship between descriptive norms and reported handwashing would increase in magnitude as group identity with the child care workers increased. The data indicated that the addition of Descriptive Norm (DN) × Group Identity (GID) interaction yielded a significant change in R^2 [R^2 = .25, ΔR^2 = .07, p < .001]. The simple slope analysis indicated that group identity moderated the magnitude of the effect of descriptive norms on reported handwashing behavior such that the association between descriptive norms and reported handwashing behavior was stronger at high levels of group identity than at low levels of group identity (see Figure 2). This indicates that the more a CCC worker identified with the group, the stronger was the normative influence of that group. Thus, the data were consistent with Hypothesis 3b.

FIGURE 2 Interaction between descriptive norms and group identity on handwashing behavior. Note: Low group identity = M – 1SD, high group identity = M + 1SD. Handwashing reported on a scale from 1 to 5 (higher scores indicate greater handwashing).
The second research question dealt with the effects of the Descriptive Norms (DN) × Motivation to Comply (MTC) interaction on handwashing behavior. These data indicated that the addition of the DN × MTC interaction into the full regression model did not yield a significant change in $R^2$ [$R^2 = .17, \Delta R^2 = .01, p = .27$]. See Table 3 for full regression results.

The third research question dealt with differences in child care workers’ MTC with different referent groups. Motivation to comply was measured with four questions—one question for each referent group.\(^5\) Workers reported greatest MTC with children ($M = 4.33, SD = .75$), then parents ($M = 4.08, SD = .78$), then lead teachers ($M = 4.04, SD = .84$), and finally coworkers ($M = 3.43, SD = 1.04$). Single-sample $t$-tests indicated that MTC with each referent group is significantly above the midpoint of the scale ($3; p < .05$). Scores on these items were also compared with each other using a series of $t$-tests. Workers’ MTC levels with parents and lead teachers were not significantly different from one another ($t = .65, n.s.$). However, MTC with children was greater than MTC with coworkers ($t = –12.16, p < .001$), parents ($t = –4.59, p < .001$), and lead teachers ($t = –4.69, p < .001$). Compared to MTC with coworkers, workers were more motivated to comply with parents ($t = –8.78, p < .001$) and lead teachers ($t = –8.25, p < .001$). Taken as a whole, results from these analyses indicate that—for handwashing behavior—workers are most motivated to comply with children, rather than other referent groups, but MTC was strong for each referent group.

Post Hoc Analysis

To further explore the nature of the relationships among the TNSB variables, structural equation modeling was used to test for additional relationships among the variables. Several alternative models were tested, including a possible mediational role of injunctive norms in the descriptiive norm-behavior relationship. The data were consistent with this model. Specifically, the data provided a good fit for the simple string model in which perceived injunctive norms mediate the relationship between perceived descriptive norms and reported handwashing behavior, $\chi^2(1, 175) = .85, p = .36, \text{RMSR} = .02, \text{SRMSR} = .02, \text{CFI} = 1.00$. Data were not consistent with other tested models; these results are available from the first author.

DISCUSSION

This study was designed to examine the social context of, and motivations behind, handwashing behavior in CCCs. Good handwashing behavior is a powerful tool for disease prevention (CDC, 2009), and functional norms, when shared through communication among members of a group, can have an important influence on behaviors. This study utilized

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\(^5\)The reliability of single-item measures cannot be calculated. Thus, any findings for MTC should be interpreted with this caveat in mind.
the TNSB as a theoretical framework to better understand the effects of social norms on handwashing behavior in CCCs. The results of this study provide mixed findings for the theoretical framework and important lessons for practical application.

Hypotheses 1 and 2 were concerned with main effects for descriptive and injunctive norms on reported handwashing behavior, respectively. The data were consistent with the second, but not the first, prediction. In terms of H2a, stronger perceptions of injunctive norms were associated with greater reported handwashing. In other words, as the strength of perceived injunctive norms increased, reported handwashing also increased. Since the data analyzed here are cross-sectional, causal order cannot be definitively established. The findings of this study support the prediction that injunctive norms explain a significant amount of variance in reported handwashing, but they cannot establish that normative perceptions predict (or precede, in time) handwashing behavior. The same caveat on the interpretation of effects holds for all relationships observed in this study.

Perceived injunctive normative beliefs explained a substantial amount of variance in reported handwashing, but this main effect was subsumed by an interaction between injunctive and descriptive norms. Rather than acting as a magnitude moderator, as predicted by the TNSB, injunctive norms moderated the direction of the relationship between descriptive norms and reported handwashing. This unexpected moderating effect of injunctive norms is important to consider in the CCC environment, because handwashing is so critical to preventing the spread of disease. When injunctive norms were weak, prevalence perceptions were negatively related to handwashing behavior.

Thus, workers who perceived a weak sense of coworker approval of handwashing, and perceived that many other coworkers wash their hands appropriately, reported less frequent handwashing than workers who perceived a strong sense of coworker approval and perceived that the behavior was common. To illustrate with an example, suppose a worker observes most other coworkers washing their hands after they clean up from lunch. In an environment where injunctive norms are weak, that worker might think that there is no need to wash his/her hands (e.g., “Most everyone else has washed their hands—making our environment generally clean. And since no one cares whether I wash my hands or not, I don’t need to.”). In an environment where injunctive norms are strong, a CCW feels compelled to wash his/her hands (e.g., “Most everyone else has washed their hands—making our environment generally clean. And since most people care whether I wash my hands or not, I should also wash my hands.”). This situation is similar to the social loafing effect seen in small-groups experiments (e.g., Harkins & Petty, 1982) where in the absence of social pressure to conform to the descriptive norm, a person decides that it is not necessary for him/her to engage in the behavior.

Importantly for the theoretical development of the TNSB, we found support for a mediational role of injunctive norms in the descriptive norm-behavior relationship. That is, injunctive norms appear to both mediate and moderate the relationship between perceived prevalence and reported behaviors. In this study, more positive perceptions of descriptive norms were associated with enhanced perceptions of injunctive norms and injunctive norms were positively associated with behaviors. This finding, when contextualized in the work of Rimal (2008), suggests a need for additional conceptual refinement of the theory to account for this mediation effect. Future research could probe conditions under which injunctive norms act as a mediator in the descriptive norm-behavior relationship. For example, this effect may be seen when people are highly motivated and able to process information about behavior prevalence; this prevalence information then results in people thinking more carefully about injunctive norms, which, in turn, affect behavior.

Consistent with other research on social norms and behavior (e.g., Lapinski et al., 2007), findings from this study indicated that CCWs who strongly identified with their coworkers (i.e., who reported high group identification) reported greater handwashing in the presence of strong descriptive norms than those who did not strongly identify with their coworkers (H3b). That this sample of CCWs strongly identified with their coworkers is not surprising, given the nature of their work environment (Murray, 1998). The usefulness of this finding for intervention design is discussed in the next section.

Hypothesis 4b examined the relationship between descriptive norms and outcome expectations. Consistent with previous TNSB research (e.g., Rimal et al., 2005), these analyses suggest that descriptive norms explain more variance in reported handwashing when strong positive outcome expectations are reported. Thus, when workers report observing many others washing their hands consistently (i.e., strong descriptive norms), those who report positive outcome expectations report more consistent handwashing behavior than those who do not report positive outcome expectations (i.e., benefits for themselves and children at the center).

The data were not consistent with some of predicted main and moderating effects specified by the TNSB. For example, ego involvement with the behavior did not significantly interact with descriptive norms to explain variance in reported handwashing behavior. This may have occurred because child care workers do not consider handwashing to be a salient aspect of their professional identity, and thus a significant relationship between the two was not observed. Measuring ego involvement with a behavior and measuring ego involvement with an aspect of self-concept are both consistent with the TNSB, although the former more often yield results consistent with the theory (e.g., Rimal, 2008). Ego involvement with a role was used in this study because it...
is consistent with previous work on the ego-defensive function of attitudes (Lapinski & Boster, 2001) and because items asking about ego-involvement in handwashing did not have face validity. However, future studies should attempt to measure the effect of ego-involvement with handwashing on reported handwashing behavior among CCWs since it may have an effect that could not be observed here.

Motivation to comply (MTC) with coworkers was not significantly related to reported handwashing. This is likely explained by the particular context of the study, given that workers felt that children’s perceptions of them were more important the coworkers’ perceptions of them. Workers reported the highest levels of MTC with children, rather than other suggested referent groups (i.e., coworkers, lead teachers, parents). The fact that children appeared to be the most powerful referent group is somewhat intuitive, but runs counter to the current study’s focus on understanding how the normative power of other workers might serve as a powerful motivator for handwashing in these settings. Determining and acknowledging that children are the salient referent group for CCWs allows for the development of targeted normative messaging strategies to improve handwashing in CCCs.

Applications for Health Communication Interventions

These data provide a useful starting point for the development of a communication intervention based on social norms to increase handwashing behaviors in child care centers. However, the external validity caveats of this must be carefully considered. In terms of message development, the findings of this study suggest that interventions might focus on developing messages to strengthen injunctive norms at a given center. Similar to the situation in hospitals and food preparation contexts (Creedon, 2005; Michaels et al., 2004; Pittet, 2001), hand hygiene policies and enforcement in child care centers did not explain significant variance in reported handwashing. Thus, this study focused on the influence of social norms on reported handwashing, and found significant effects. These results suggest that successful interventions to improve handwashing in this context should focus on influencing norms, rather than simply providing information about handwashing policy or technique (e.g., Coignard et al., 1998).

Though messages might also address the other moderating variables specified by the TNSB, the focus of the messages should be the increased salience of injunctive norms, because data correspondent to H2 suggest that weak injunctive norms in the presence of strong descriptive norms are associated with less consistent handwashing. Importantly, our data showed that variability in policy enforcement had little impact on reported handwashing quality, demonstrating the importance of understanding the influence of norms and other social–psychological drivers on handwashing. Consistent with data from other organizational contexts, persuasion may influence handwashing behaviors more than compliance gaining (e.g., through policy enforcement).

One way to create an intervention based on injunctive norms might be to bring the injunctive norms into focus (e.g., Cialdini et al., 1990). For example, a campaign could suggest that “most workers at this center think other workers should wash their hands thoroughly and frequently throughout the day.” Another messaging strategy may highlight children’s ability to observe the child care workers’ behavior, since analyses correspondent to RQ3 found that child care workers were most motivated to comply with children as compared with other suggested referent groups. A message highlighting children as the referent group may imply, “Little eyes are watching you.” These types of messages highlight the salience of normative pressure and imply potential rewards or sanctions for behavior that is consistent or inconsistent, respectively, with normative expectations.

Strengthening perceptions of injunctive norms through persuasive messaging should be done with extreme sensitivity for several reasons. First, there is some experimental evidence to suggest that normative restructuring around injunctive norms is challenging (e.g., Lapinski et al., 2007). Moreover, applications that develop an intervention to increase social pressure to perform a behavior may potentially create a hostile working environment or elicit extreme social sanctions for noncompliance. This is an especially salient concern in child care centers where workers strongly identify as child care providers, and therefore social normative forces can be quite strong. In order to guard against the creation of extreme social sanctions for noncompliance, formative campaign research should include careful message testing with the target population. This work should allow a researcher to determine the threshold at which a message prompts stronger perceptions of injunctive norms without creating a hostile work environment.

Normative message development should also pay particular attention to the referent group used in such messaging. As suggested in the discussion of findings with respect to RQ3, the findings from this study suggest that children, rather than coworkers, are the group with whom child care workers are most motivated to comply. This would suggest that messages that include children as the salient referent group would be most effective with this population. Worth considering is whether or not the influence of children in this setting is truly “normative” as it is traditionally defined, or whether this influence is derived from a different basis of power (French & Raven, 1959). Research-based interventions could examine the differential effectiveness of messages that utilize coworkers as the salient referent group versus those that use children as the salient referent group.

In addition to using the TNSB to shape handwashing interventions at CCCs, it could also be used to examine the influence of social norms in other workplace settings, because it accounts for multiple social forces that influence behavior. The TNSB highlights the fact that, unlike...
supervisors, the power of coworkers emanates from a referent, rather than a reward, basis of power (French & Raven, 1959). The current study suggests that employees’ behaviors are associated with observing coworkers’ behavior, perceiving social rewards and sanctions for such behavior, and believing that said behaviors are associated with positive outcomes. Meanwhile, hand hygiene policy and enforcement did not explain significant variance in handwashing behavior. Additionally, in this study, employees were more motivated to comply with their “clients” (i.e., the children) than with coworkers when it came to a key job-related behavior (e.g., handwashing). Future studies should examine the differential influence of key referent groups on employee behavior and how such influence interacts with other normative forces.

Limitations

The findings in this study were limited in several ways. First, as has been discussed, the study findings are limited by the evidence that child care workers are most motivated to comply with children in the centers, rather than with coworkers. Since measures of normative influences (e.g., descriptive and injunctive norms) were based on coworkers as the referent group, these data should be interpreted with this in mind. These data represent only a part of the complex relationship between normative influence and handwashing behavior in this setting.

This study was a first attempt at examining the extent to which one perceives a behavior as public and the normative effects of this perception. Previous research has manipulated publicness, and found that it interacts with social norms to affect behavior and behavioral intentions (Bagozzi, Wong, Abe, & Bergami, 2000; Cialdini et al., 1990; Gerber, Green, & Larimer, 2008; Kallgren, Reno, & Cialdini, 2000; Lewis-Persky, 2010). But since no previous studies have measured perceived publicness, that measure was developed specifically for this study. Unfortunately, data indicated that this measure was unreliable; therefore, the hypotheses about this variable could not be tested. Since perceived publicness of behavior is hypothesized to play a significant role in the relationship between TNSB factors and behavior (Cialdini & Rimal, 2005), it is unfortunate that this study could not provide data to test this claim. Future studies should work on the development and validation of measures of perceived publicness, and then test the potential for publicness to affect the relationship between norms and behavior. It is also worth noting that the mean scores and standard deviations of the scales measuring TNSB variables indicate the potential for a ceiling effect. This restriction in variance generally limits the ability to detect relationships between variables, but significant covariance was observed among many study variables. Thus, restriction in range did not affect the ability to observe relationships between variables or to interpret those relationships.

This study used the TNSB as a framework for understanding the influence of social norms on behavior in this context, but other social norms theories and constructs may also provide useful information about the nature of social norms and behavior in this context. Cialdini and his colleagues have discussed the concept of a personal norm, (e.g., Cialdini & Goldstein, 2004; Kallgren et al., 2000), or sense of personal obligation to perform a behavior. Previous research has shown that when personal awareness is activated, personal norms can explain some variance in behavior (Cialdini & Goldstein, 2004; Kallgren et al., 2000). However, Lapinski and Rimal (2005) do not specify personal norms as an element of the TNSB. Given the fact that personal norms were not specified in the TNSB, they were not included in the current application and test of that model. In addition, it could be argued that such personal dispositions may not qualify as “norms” per se, which are, according to most definitions, social and, as such, shared. Yet there may be individual difference variables that could contribute to explaining variance in handwashing behavior. Thus, future studies could include individual difference variables, other than those studied here, alongside normative perceptions as they examine the ways that social norms influence behavior.

Despite the fact that the data reported here were collected from child care workers across 21 different centers, the external validity of the study findings is limited since the sample characteristics were different from the general population of child care workers in the United States. In general, the sample for the current study was less diverse and more educated than typical child care workers. Because ethnicity was not significantly related to any of the study variables, the limited diversity of the sample should not have obscured the results. Second, though education was marginally related to the descriptive norm variable, it was not significantly related to reported handwashing behavior, and therefore should not have obscured the results. These generalizability issues are most important to consider when adapting the findings of this research to interventions for child care workers.

In sum, this study reports on findings with both theoretical and practical import. It answers a number of questions about normative influences in child care centers and opens the door for additional inquiry into the appropriate application of TNSB to other organizational contexts.

ACKNOWLEDGMENTS

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REFERENCES


### APPENDIX: SCALE ITEMS

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwashing</td>
<td>When I wash my hands at work, I always use soap.</td>
</tr>
<tr>
<td></td>
<td>When I wash my hands at work, I always dry them thoroughly.</td>
</tr>
<tr>
<td></td>
<td>Before preparing food, I always wash my hands thoroughly.</td>
</tr>
<tr>
<td></td>
<td>After changing a diaper or helping a child toilet, I always wash my hands thoroughly.</td>
</tr>
<tr>
<td></td>
<td>After wiping a child’s nose, I always wash my hands thoroughly.</td>
</tr>
<tr>
<td>Injunctive norms</td>
<td>Thorough handwashing is something that most coworkers in my classroom think you should do.</td>
</tr>
<tr>
<td></td>
<td>The coworkers who usually work in my classroom endorse thorough handwashing.</td>
</tr>
<tr>
<td></td>
<td>Coworkers in my classroom may judge me based on whether or not I wash my hands thoroughly.</td>
</tr>
<tr>
<td></td>
<td>I feel like coworkers in my classroom would think less of me if I didn’t wash my hands thoroughly.</td>
</tr>
<tr>
<td>Descriptive norms</td>
<td>Most coworkers in my classroom wash their hands thoroughly.</td>
</tr>
<tr>
<td></td>
<td>Most of the coworkers in my classroom engage in thorough handwashing.</td>
</tr>
<tr>
<td></td>
<td>Most of the coworkers in my classroom wash their hands as thoroughly as they are supposed to.</td>
</tr>
<tr>
<td></td>
<td>The majority of the people in my classroom wash their hands thoroughly.</td>
</tr>
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<td>Group identity</td>
<td>I see myself as similar to other staff at my Center.</td>
</tr>
<tr>
<td></td>
<td>I want to be like other staff at my Center.</td>
</tr>
<tr>
<td>Motivation to comply (coworkers)</td>
<td>It is important for me to do what my coworkers at my Center think I should do.</td>
</tr>
<tr>
<td>Motivation to comply (parents)</td>
<td>What parents at my Center think I should do is important to me.</td>
</tr>
<tr>
<td>Motivation to comply (lead teachers)</td>
<td>What the lead teachers at the Center think about what I do is important to me.</td>
</tr>
<tr>
<td>Motivation to comply (children)</td>
<td>What children at the Center think about my behaviors is important to me.</td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>I feel that washing my hands thoroughly in front of the children sets a good example.</td>
</tr>
<tr>
<td></td>
<td>Washing my hands thoroughly could prevent a child from getting sick.</td>
</tr>
<tr>
<td></td>
<td>I am less likely to spread diseases to others if I wash my hands thoroughly.</td>
</tr>
<tr>
<td></td>
<td>I will be less likely to get sick if I wash my hands regularly.</td>
</tr>
<tr>
<td></td>
<td>I feel that washing my hands thoroughly will result in my boss thinking more highly of me.*</td>
</tr>
<tr>
<td></td>
<td>My skin gets dry when I wash my hands thoroughly.*</td>
</tr>
<tr>
<td>Ego involvement</td>
<td>Being a childcare provider is an important part of my identity.</td>
</tr>
<tr>
<td>Publicness†</td>
<td>My coworkers can see how thoroughly I wash my hands.</td>
</tr>
<tr>
<td></td>
<td>My coworkers do not pay attention to how thoroughly I wash my hands.</td>
</tr>
<tr>
<td></td>
<td>I only wash my hands thoroughly when I know a coworker is watching.</td>
</tr>
</tbody>
</table>

*Item dropped to improve factor model fit. †Scale not used for analysis due to low reliability.*