

Comparing and Contrasting Consumer Risk Perception and Their Food Safety Practices

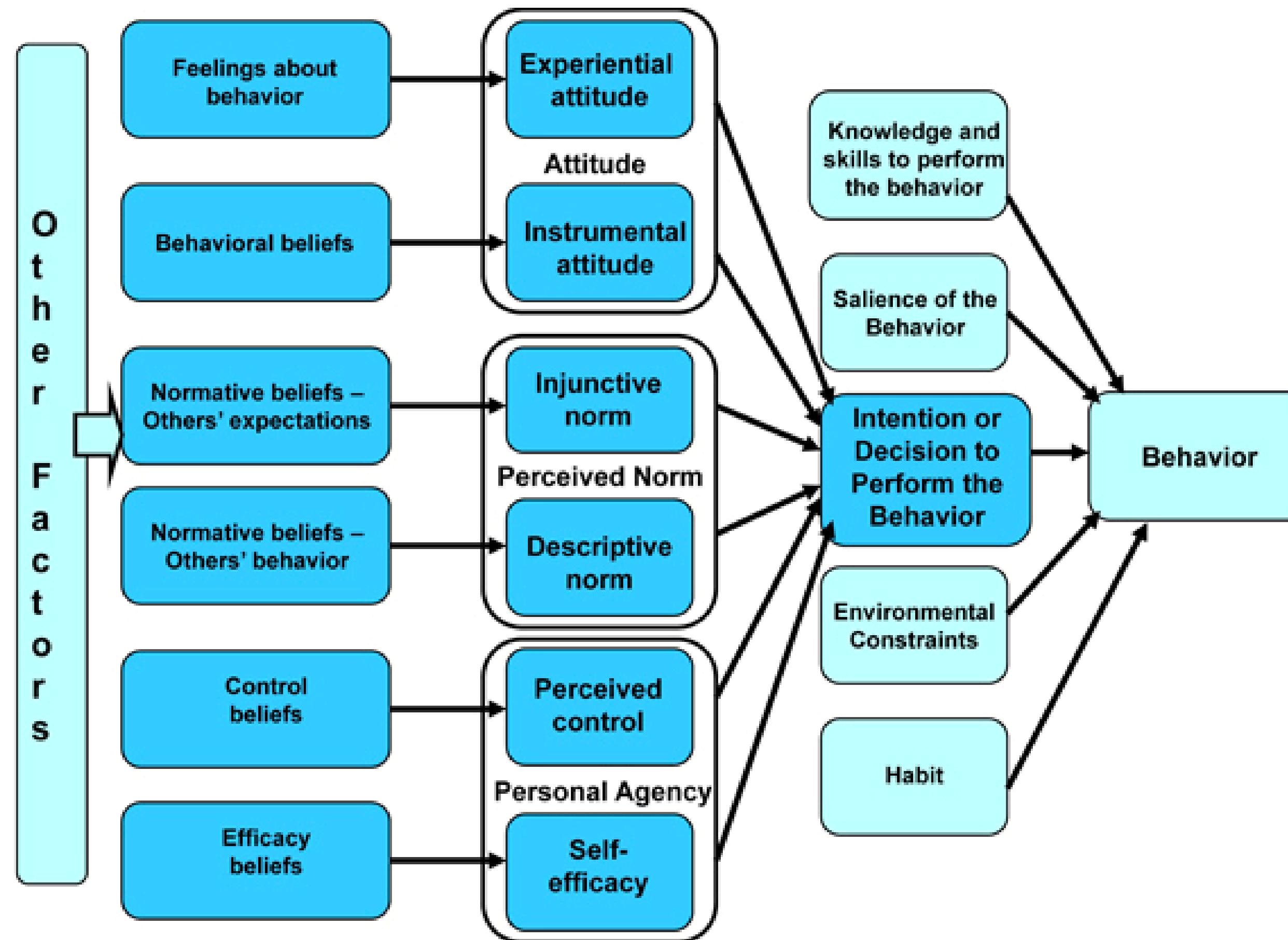


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Employer	NC State University

Its more than just behavior (and it gets complicated)



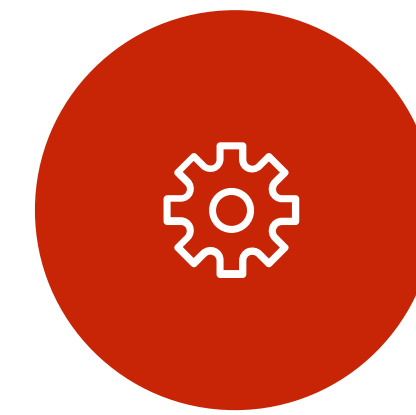
What we do...



**Observational
Studies**



**Microbiological
Studies**



Modeling



**Existing Datasets
and Literature
Reviews**



**Surveys, Interviews,
and Focus Groups**



**Innovative Research
Design and
Evaluation**

Most of our projects include multiple methods as part of the research design.

Where we do it...

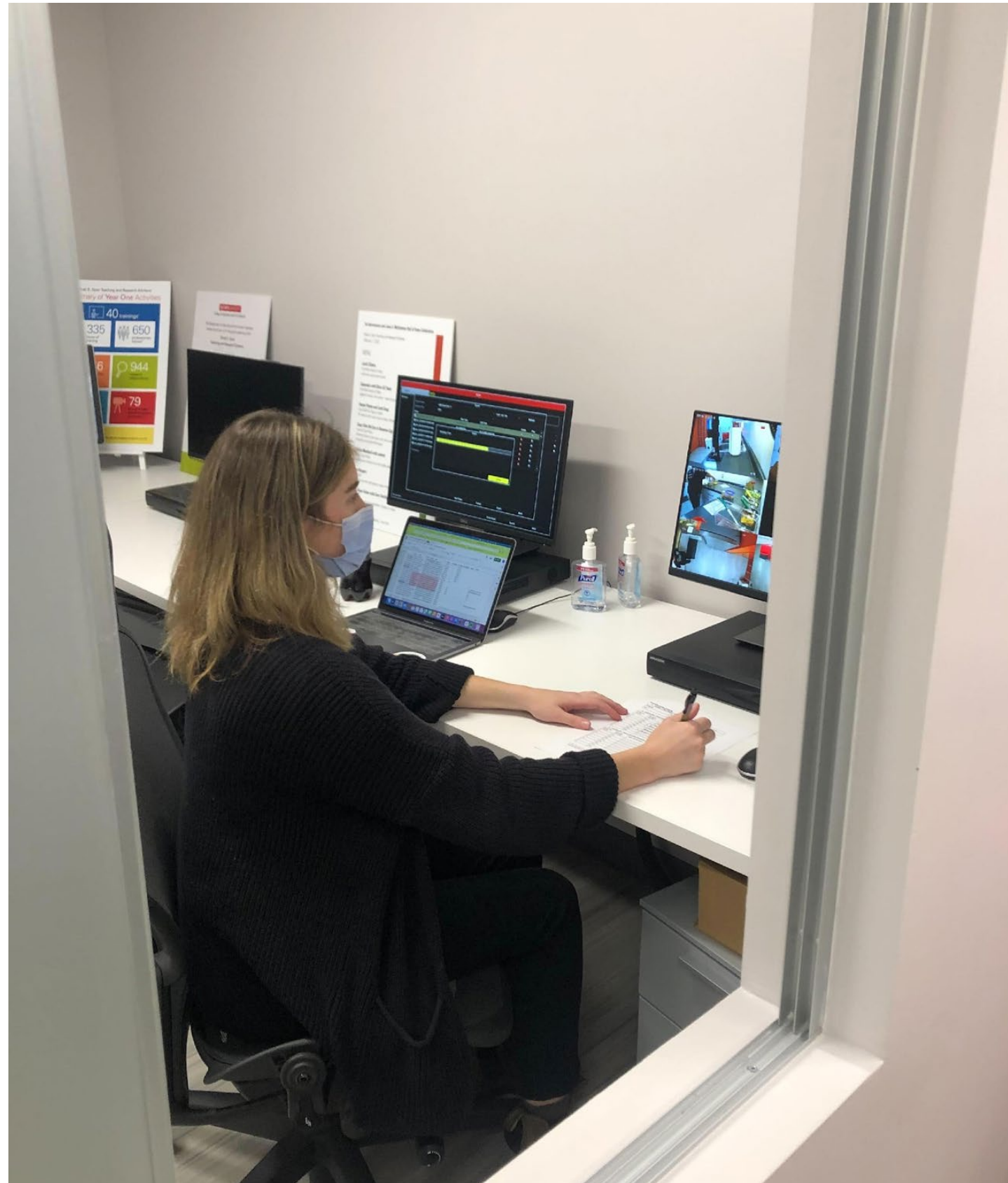


North Carolina State University



One of three home-style research kitchens.

How we do it...



Observation room; monitor behaviors in real time.



One of eight cameras used to record each observation.



Multiple angles help capture proper sequence of events.

Observations and consumer practices



Over the years, we have looked at thermometer use, cleaning and sanitizing, and poultry washing in addition to handwashing.



Self-reported perceptions



What have we learned so far?

What people say they do, and what they actually do, are very different

Handwashing Awareness: Most participants self-reported that they typically wash their hands before cooking, but observed rates of handwashing during food preparation were much lower. This discrepancy highlights a tendency for self-reporting bias regarding food safety behaviors.

Thermometer Usage: A notable proportion of participants in the treatment groups report using a food thermometer when food safety instructions were present. However, many also indicated this was not their usual practice.

COVID-19 Influence on Hygiene: Around 62% of study participants reported changes in their handwashing habits due to the COVID-19 pandemic, becoming more conscious of hand hygiene, especially before food preparation.

Recipe Awareness: A majority of participants in recalled noticing the food safety instructions in the recipes (in studies) where recipes were provided), and about two-thirds stated that this information would influence their future cooking behavior, particularly in thermometer use and handwashing practices.

Handwashing



What have we learned so far?

Hands are a source of crosscontamination in the kitchen.

After handling raw meat/poultry consumers wash hands only about 30% of the time.

Very few consumers (~1.2%) meet CDC handwashing recommendations

- Wet hands with water
- Rub hands with soap for at least 20 seconds
 - *Most common point of failure*
- Rinse hands with water
- Dry hands using a clean, one-use towel

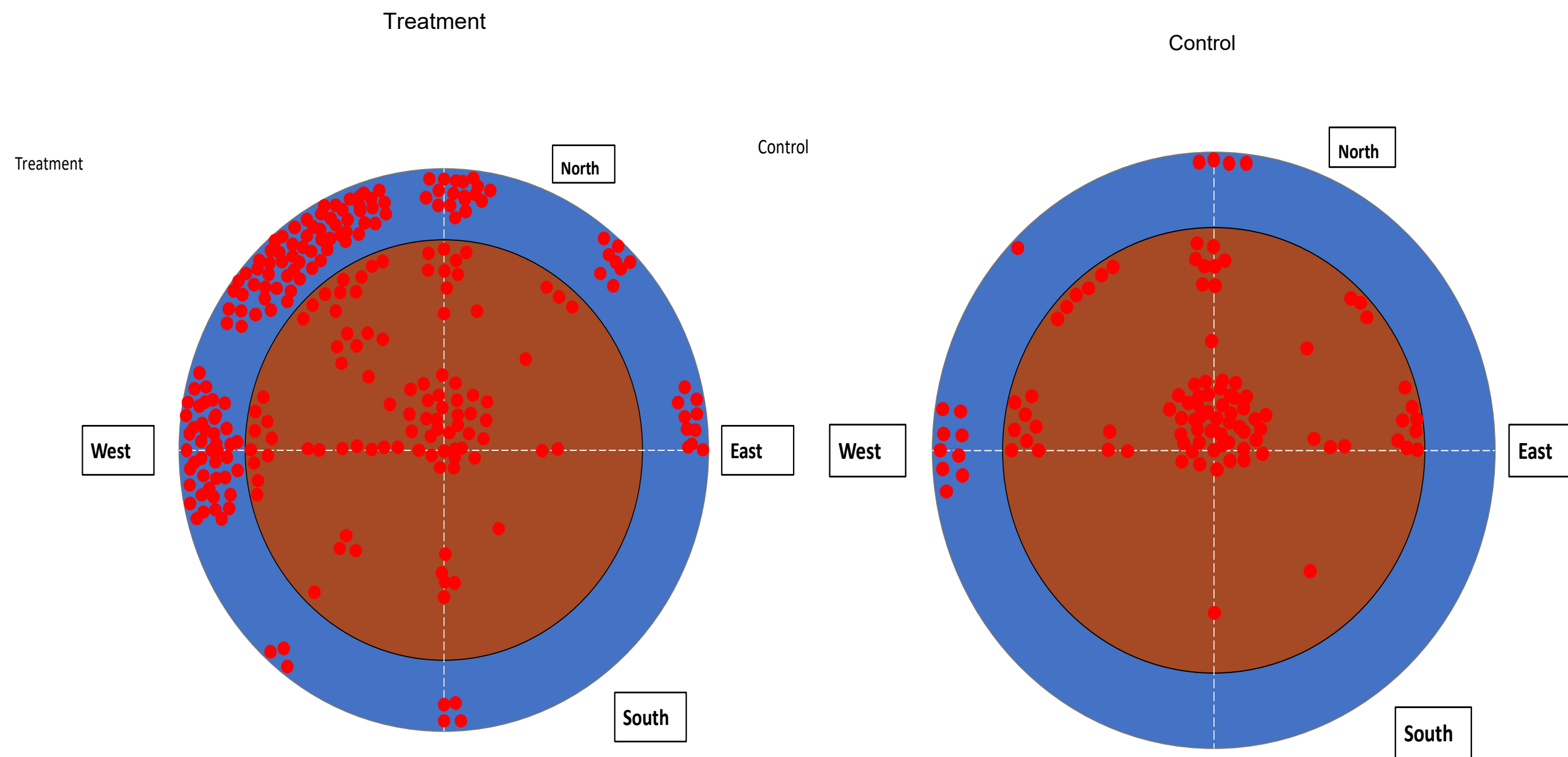
Thermometer use

Ground turkey patty cooking (n=400)

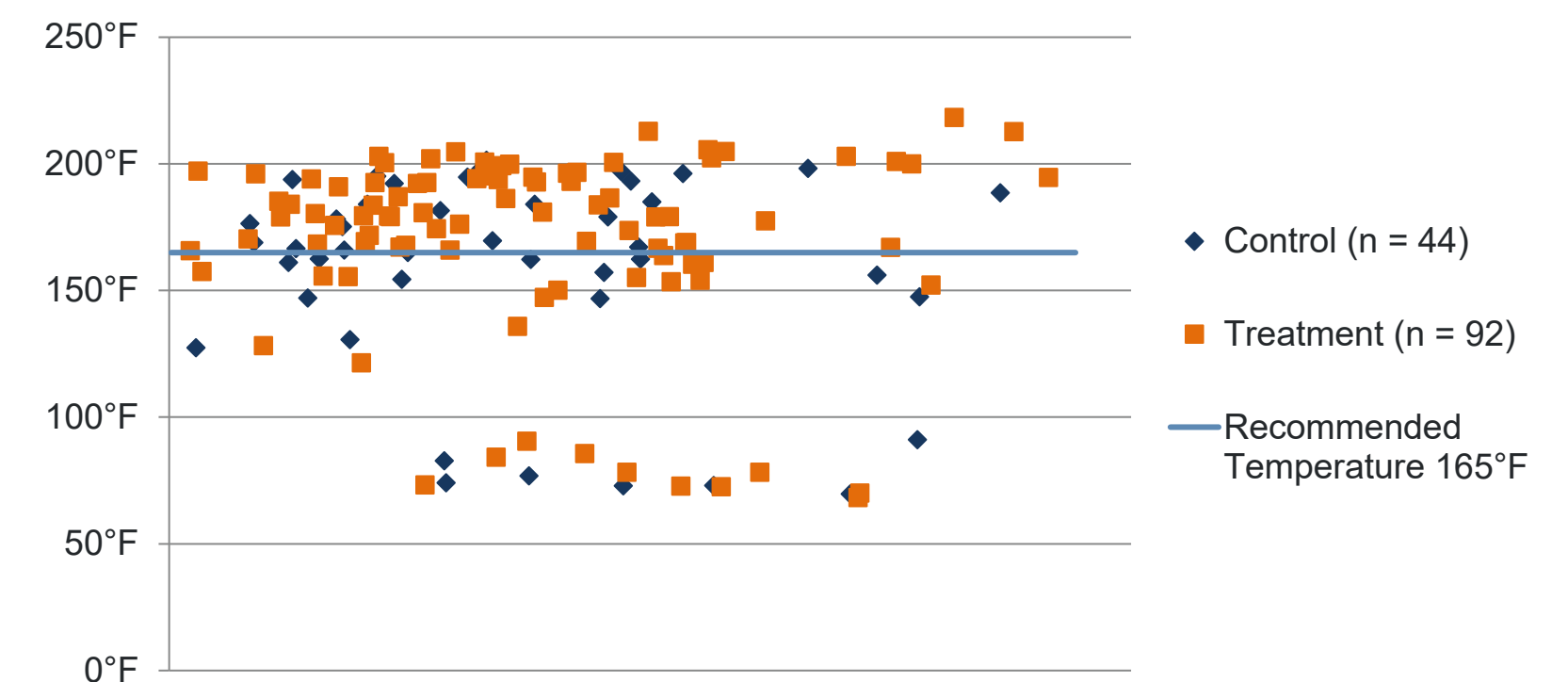
Study Design

Participants were observed preparing ground turkey patties in test kitchens, with cameras recording their actions throughout the process.

The study focused on measuring the correct use of thermometers for checking the doneness of the patties, with the treatment group showing a higher likelihood of using the thermometer correctly.



Results: Final Temperatures of Patties



Cross-contamination

Poultry washing study (n=300)

Low Cleaning Success Rates: Only 4% of participants successfully cleaned and sanitized the sink after washing chicken, and most attempts were incomplete, with many participants either cleaning with water only or failing to sanitize surfaces properly.

While 61% of the control group washed the chicken, only 7% of the treatment group (who received food safety messaging) did the same, demonstrating a significant behavioral change in response to the intervention

Kitchen Counter Cleaning: After washing poultry, 65% of participants did not attempt to clean the kitchen counter, and successful cleaning and sanitizing were observed in only 5% of cases, indicating widespread neglect in following proper surface cleaning protocols.

Despite the intervention, both washers and non-washers experienced significant cross-contamination, particularly in the sink.

Shumaker, E. T., Kirchner, M., Cates, S. C., Shelley, G., Gulner, R., Goodson, L., Bernstein, C., Lavalley, A., Jaykus, L., and Chapman, B. 2022. Observational study of the impact of a food safety intervention on consumer poultry washing. J. Food Prot. 85:615-625. <https://doi.org/10.4315/JFP-21-397>.



Of the participants who washed their raw poultry, 60% had surrogate bacteria in the sink after washing or rinsing the poultry. Even more concerning is that 14% still had the surrogate in their sinks after they attempted to 'clean' the sink.

26% of participants that washed raw poultry transferred bacteria from that raw poultry to their ready to eat salad lettuce

Impacting behaviors is hard



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160isGood.com

brought to you by the STEC CAP grant

160 Is Good project (n= 305)

in Fayetteville, NC, pop 210,000.

Radio: aired 2,292 public service announcements on the top 7 radio, generating an estimated 8,328,300 radio impressions, reaching 73% of the market.

Digital Advertising: 3,174,418 digital impressions through online banner ads, video ads, and a mobile music app.

Movie Theater Ads: A 30-second pre-roll advertisement at 75 movie screens

total cost was approximately \$200,000, with \$83,000 allocated to content development, and \$117,000 towards media purchases.

The campaign generated a total of 11,502,718 impressions across various media platforms.

Post-campaign surveys showed a modest increase in thermometer usage, with 16% of respondents using a thermometer to determine burger doneness, up from 14% precampaign.

Only 24% of post-campaign respondents recalled hearing or seeing the "160 is Good" message specifically

Cope, S. J., PorteFett, A. C. S., Luchansky, J. B., Hochstein, J., and Chapman, B. 2020. Utilization of quantitative and qualitative methods to investigate the impacts of a pilot media campaign targeting safe cooking techniques and proper thermometer use. Food Prot. Trends 40(5):332348.

Research needs and gaps



Asking people what they do only has limitations, we must use mixed methods approaches including observation and microbiology



Quicker, AI/machine learning for sensors to generate more practice data



Very few research groups are doing this work, so most of what we know comes from self-reported retrospective data

For more details

Shumaker, E., Shelley, L., Cates, S., Lavallee, A., Bernstein, C., Goulter, R., Goodson, L., Jaykus, L., and Chapman, B. 2019. Food safety consumer research project: Year 2 final report. Prepared for the USDA FSIS by RTI International, Research Triangle Park, NC. 94 pages.

Shelley, L., Shumaker, E., Cates, S., Lavalée, A., Bernstein, C., Goulter, R., Goodson, L., Jaykus, L., and Chapman, B. 2020. Behavior change study: Safe handling instructions (SHI) behavior change study final report. Prepared for the USDA FSIS by RTI International, Research Triangle Park, NC. 87 pages.

Shumaker, E. T., Kirchner, M., Cates, S. C., Shelley, L., Goulter, R., Goodson, L., Bernstein, C., Lavallee, A., Jaykus, L., and Chapman, B. 2022. Observational study of the impact of a food safety intervention on consumer poultry washing. *J. Food Prot.* 85:615-625. <https://doi.org/10.4315/JFP-21-397>.

A close-up photograph of a person's hands being washed under running water in a stainless steel kitchen sink. The person is wearing a white long-sleeved shirt. The background is slightly blurred, showing a window with greenery outside. The image is part of a larger graphic with a white background and a thin black border.

Food Safety Talk





Would like to recognize:

Dr. Catherine Gensler, Dr. Gaby Arteaga,
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