Motivated Reasoning, Biased Beliefs, and Consumer Valuations of Vegetable Labels in Vietnam

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Approximately 80% of individuals in Vietnam do not meet the World Health Organization's (WHO) standard for daily consumption of fruits and vegetables. Consumer confidence in the safe production of vegetables is low (Bui et al., 2016) and chemical residues from pesticide use are of particular concern to many consumers (Hoi et al., 2009). In 2008, the Vietnamese government developed nationwide certification standards for safe vegetable production practices. This program, known as VietGAP (Vietnamese Good Agricultural Practices), follows quality and safety standards developed by the regional intergovernmental organization ASEAN (Association of Southeast Asian Nations) and accounts for all food safety dimensions in the production, transportation, and handling of vegetable products. Vegetables produced under this process are labeled with a certified seal that signals a high food safety standard. To date, vegetables carrying a VietGAP label are widely available in modern retail markets in Vietnam. Yet, vegetable consumption remains insufficient and food safety concerns continue to persist (Ngo et al., 2020).

Prior experiences can bias consumers' beliefs about the expected quality of vegetables in retail environments in Vietnam. In the absence of labels, those with biased beliefs may not purchase vegetables when food safety quality cannot be distinguished. Additionally, when labels are present and allow consumers to differentiate products along food safety dimensions, prior purchasing decisions and biased beliefs may prevent consumers from engaging with food safety information and correctly updating their beliefs. Labels as informative signals can address this market failure and reduce information asymmetries. How information is provided on a label, the credibility of the information provided, but also how consumers engage with introduced labels in a specific market setting will determine whether labels can reduce or exacerbate existing information asymmetries.

We consider that the information provided by labels can vary along two basic dimensions, comprehensiveness and accessibility. Comprehensiveness is the extent to which all elements of a quality dimension like food safety are credibly and verifiably communicated by the label. The simplicity and intuitiveness of the information provided by a label determine how accessible this information is to consumers. From a policy perspective, there may be an inherent trade-off between these two dimensions if the goal is not just to accurately inform the consumer but also to increase consumption of a labeled good, especially if biased beliefs prevent consumers from optimally adjusting their purchasing decisions in the absence of labels.

We conduct a lab-in-the-field experiment in Hue City, Vietnam to assess the belief updating process for consumers when presented with varying labeling schemes that communicate food safety information in retail markets for vegetables. Vietnam offers a unique setting to evaluate how individuals update beliefs over time through consumer internalization of labeling information for several reasons. First, consumers may have had emotionally intense prior experiences that make them more likely to form biased beliefs about the overall quality of vegetables in retail markets. Two emotionally intense experiences are pertinent to this study 1) illness stemming from the consumption of contaminated vegetables and 2) exposure to chemical defoliants (e.g. Agent Orange) deployed during the Vietnam War. Consumers might have become ill from consuming vegetables with high levels of pesticide residue or vegetables that were otherwise contaminated. Between 2011 and 2016 over 4 million illnesses were reported stemming from foodborne diseases in Vietnam (The World Health Orgnaization, 2023). Individuals who were exposed to chemical defoliants (i.e. herbicides) during the Vietnam War might be particularly concerned about

pesticide use and have even stronger biased perceptions of food safety quality in retail markets. It may even be that those with close ties to individuals exposed to chemical defoliants may develop similarly biased perceptions of food safety quality. It is believed that approximately 4.8 million Vietnamese people were affected by the herbicides employed during the Vietnam War in the U.S. military operation known as Operation Ranch Hand (Stellman et al., 2003). The long-term effects of exposure to these chemical defoliants are still not well understood. However, exposure has been linked to birth defects in children such as cleft lip and spina bifida (Stellman and Stellman, 1986), and a myriad of acute and chronic health outcomes including cardiovascular disease mortality (Humblet et al., 2008) and several forms of cancer (Bertazzi et al., 2001). Individuals with these types of experiences may have formed biased beliefs about the quality of vegetables in the market and employ cognitive strategies such as biased memory formation, which inhibits the updating process when presented with information that conflicts with their prior beliefs. Second, relatively few labels currently exist to signal credence qualities in Vietnam's retail market. The relative absence of labels (compared to e.g., the U.S.) allows for a more concise analysis of label effects. Three labeling schemes are of interest to this study: 1) no labels are available to signal differences in quality or food safety in modern supermarkets, 2) vegetables are differentiated by a 'pesticide-free' voluntary, private label, and 3) vegetables are differentiated by the VietGAP-certified label.

We collect data through an experimental framework over two waves of survey responses. In the first wave, survey responses were collected in parallel with a choice experiment. In the second wave, responses were captured in a follow–up phone survey. The choice experiment and first wave of surveys were conducted at a central administrative location within each of the 22 wards randomly selected within Hue City. Conducting the experiment in this setting, rather than directly at retail markets, is important in order to capture individuals who despite having access to retail markets, do not purchase vegetables there. 1,021 households were invited to participate. Participants were assigned to two control and two treatment groups. Participants in the control groups compared an unlabeled vegetable to a labeled vegetable (VietGAP or pesticide-free label), while participants in the treatment groups were provided with the labels and their exact definitions. The definition removes all uncertainty about the quality of the labeled good. Each participant was endowed with a sufficient amount of money to compensate them for their time and to be able to purchase their preferred choice of vegetable. Individuals were asked to rank both vegetables and the outside option of not consuming either in terms of food safety (on a 0 to 10 scale) and provide their willingness-to-pay (WTP) to capture the intensity of preference for each good. They were then asked to make a purchasing choice or to keep the full amount of money. Labels were then introduced and participants were asked to reevaluate their ranking, WTP, and purchase choice. In addition to collecting general socio-demographic information (e.g., age, gender, marital status, years of schooling) the survey assessed participants' knowledge of food safety and food safety label definitions and asked them about their prior experiences relating to illnesses stemming from vegetable consumption and exposure to chemical defoliants. All participants were shown the different labeling options and definitions at the end of the experiment.

In the follow-up survey conducted approximately a month after the completion of the experiment, participants were asked to recall their beliefs or rankings of the goods after the labels (and accompanying definitions if appropriate) were introduced. Individuals are incentivized to provide the same answer they supplied while participating in the experiment but may also state that they do not recall. This study design allows for the detection of memory suppression versus simply forgetting as guessing the previous ranking strictly dominates stating "I don't recall" given the monetary incentive for accuracy.

We have completed the first wave of data collection and are currently analyzing 730 household responses (71.5%) received. The second wave of data collection will be completed by the end of February. We anticipate presenting the results of our initial analysis and discussing key findings.

References

BERTAZZI, P. A., D. CONSONNI, S. BACHETTI, M. RUBAGOTTI, A. BACCARELLI, C. ZOCCHETTI, AND A. C. PESATORI (2001): "Health effects of dioxin exposure: a 20-year mortality study," *American Journal of Epidemiology*, 153, 1031–1044.

BUI, T. V., C. BLIZZARD, K. N. LUONG, N. V. TRUONG, B. Q. TRAN, P. OTAHAL, V. SRIKANTH, M. NELSON, T. B. AU, S. T. HA, H. N. PHUNG, M. H. TRAN, M. CALLISAYA, K. SMITH, AND S. GALL (2016): "Fruit and vegetable consumption in Vietnam, and the use of a 'standard serving' size to measure intake," *British Journal of Nutrition*, 116, 149 – 157.

HOI, P. V., A. P. J. MOL, AND P. J. M. OOSTERVEER (2009): "Market governance for safe food in developing countries: the case of low-pesticide vegetables in Vietnam." *Journal of environmental management*, 91, 380–8.

HUMBLET, O., L. BIRNBAUM, E. RIMM, M. A. MITTLEMAN, AND R. HAUSER (2008): "Dioxins and cardiovascular disease mortality," *Environmental Health Perspectives*, 116, 1443–1448.

NGO, H. M., R. LIU, M. MORITAKA, AND S. FUKUDA (2020): "Urban consumer trust in safe vegetables in Vietnam: The role of brand trust and the impact of consumer worry about vegetable safety," *Food Control*, 108, 106856.

STELLMAN, J. M., S. D. STELLMAN, R. CHRISTIAN, T. WEBER, AND C. TOMASALLO (2003): "The extent and patterns of usage of Agent Orange and other herbicides in Vietnam," *Nature*, 422, 681–687.

STELLMAN, S. D. AND J. M. STELLMAN (1986): "Estimation of exposure to Agent Orange and other defoliants among American troops in Vietnam: a methodological approach," *American Journal of Industrial Medicine*, 9, 305–321.

THE WORLD HEALTH ORGNAIZATION (2023): "Food safety in Viet Nam," https://www.who.int/vietnam/health-topics/food-safety, accessed: 2023-01-10.