Alignment between Operational Goals and Decision Makers’ Preferences: Their Role in Inventory Decisions

Inventory management addresses a fundamental tradeoff between the costs associated with having inventory and the service that decision makers want to provide to their customers. Specifically, improved customer satisfaction (greater likelihood of meeting customer demand) comes at the expense of greater inventory investment (greater inventory costs). Behavioral evidence suggests that the way decision makers assume this tradeoff can affect orders. However, little is known on how decision makers assume it.

In an inventory problem under demand uncertainty (Newsvendor problem), research has shown that the average decision maker tends to choose orders that deviate systematically from the optimal order. Several strategies that aim to reduce the extent of underperformance and/or explain it have been proposed. For example, Moritz (2010) observed that trivializing customer satisfaction could explain why orders deviate from the optimal order in a low-profit newsvendor task. The trivialization would reduce the dissonance that decision makers experience when pairing customer satisfaction and optimizing costs and profits, increasing orders away from the optimal order. Ho et al. (2010) observed that manipulating the salience of overstocks in a low-profit newsvendor task (by making profit losses from leftovers more salient) reduces orders’ deviation from the optimal order. The salience of overstocks would make decision makers think less about customer satisfaction, reducing orders. Analogously, Ho et al. (2010) observed that manipulating the salience of understocks in a high-profit newsvendor task (by making profit losses from shortages more salient) reduces orders’ deviation from the optimal order. The salience of understocks would make decision makers think more about customer satisfaction,
increasing orders. Finally, Castañeda & Gonçalves (2018) observed that when decision makers are constrained by a tight budget in a newsstand task, they still allocate some budget to a low-profit product even though this strategy is not sound profit-maximizing-wise. Achieving a greater-than-zero customer satisfaction for the low-profit product would make decision makers to allocate budget to order low-profit products.

Although some of these strategies have been proven useful to some extent, we still lack a clear understanding of what causes these biased ordering behaviors (Katok, 2010; Ren & Croson, 2013). Understanding the causes of these biases is a critical step to developing effective de-biasing strategies (Kremer, Minner, & van Wassenhove, 2010; Ren & Croson, 2013). This study explores how the alignment between operational goals and decision makers’ preferences for an operational goal affects inventory decisions. Our design considers two factors: (i) the information provided to the decision maker, which is either financial information only or financial information plus customer satisfaction information, and (ii) the preference of the decision maker, which we aligned with either a profit or a customer satisfaction mindset. This design allows to explore how the alignment between the inventory problem’s goal and the decision maker’s preference affects ordering choices.

The decision process in our experiment had two main tasks: a priming task and an inventory task. The priming tasks comes from the psychology literature and we used it to activate mindsets in participants aligned with a given operational goal. We used a scrambled-sentence task with words related to service level (e.g., coverage, availability, etc.) to activate a customer satisfaction mindset. This kind of priming task has been widely used in the psychology literature (e.g., Kleiman & Hassin, 2011; Smith & Trope, 2006; Van Loo & Rydell, 2013). The inventory task is a high-profit discrete newsvendor task that asks decision makers to maximize profits. In a
high-profit newsvendor task, decision makers usually place orders that are below the optimal order. Increasing orders towards the optimal order will increase expected profits and service level. Therefore, we hypothesize that aligning profit (the model’s goal) and service level (the decision maker’s mindset) could improve ordering performance. The task considers only three potential demand outcomes and three potential ordering choices. By pairing each ordering choice with each possible demand realization, we characterize each ordering choice with scenarios of profit realizations and scenarios of customer satisfaction realizations. Based on the results from the maximizing-profit setting, we will run additional experiments in which we evaluate the effect of aligning participants’ preferences with operational service level.

REFERENCES
Moritz, B. B. (2010). *Cognition and Heterogeneity in Supply Chain Planning: A Study of Inventory Decision Making*. (Ph.D. Dissertation), Carlson School of Management, University of Minnesota, Minneapolis, MN.