

The Effects of Food Insecurity on Work Outcomes

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Food insecurity—insufficient access to safe and nutritious foods—is one of the most crucial societal grand challenges the world faces today. It affects 2.3 billion people globally, and addressing it is one of the United Nations’ Sustainable Development Goals of 2030 (Food and Agriculture Organization of the United Nations et al., 2025). Despite its prevalence and importance, the field of applied psychology has ignored this problem with the implicit assumption that food insecurity is not an issue relevant to the workplace. Contrary to this view, we hypothesize and demonstrate that food insecurity is detrimental to the three core work outcomes: task performance, work engagement, and organizational citizenship behaviors. To test our hypotheses, we employed a multimethod design across three empirical studies: (a) an experimental recall study, (b) a within-person diary study, and (c) a field experiment. Our findings consistently demonstrate that food insecurity leads to higher anxiety, which subsequently has a negative effect on task performance, work engagement, and organizational citizenship behavior. In our field experiment, we further demonstrated that providing food to those experiencing food insecurity can improve work outcomes. This research highlights that food insecurity is a significant issue with important implications for the workplace that requires greater attention from both researchers and business leaders.

Keywords: food insecurity, anxiety, task performance, work engagement, organizational citizenship behavior

The food insecurity crisis is one of the most pressing challenges the world faces today. The United Nations set “Zero Hunger” as one of its Sustainable Development Goals to be achieved by 2030 (United Nations, 2015). However, the latest report from the United Nations estimated that 2.3 billion people—or 28% of the global population—only have intermittent access to sufficient food. Among these, 673 million people—or 8.2% of the world’s population—were experiencing severe food insecurity in the same year (Food and Agriculture Organization of the United Nations et al., 2025). Even among wealthy nations, food insecurity is a major issue. The U.S. Department of Agriculture (USDA) estimated that 47.4 million people—or 13.5% of the households in the United States—face food insecurity (Rabbitt et al., 2024).

Given the importance of the issue, a considerable number of scholars have examined the impact of food insecurity—defined as when “the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain” (Anderson, 1990, p. 1576). Previous research has shown that experiencing food insecurity is associated with

detrimental effects on numerous non-work-related outcomes, particularly in the domains of physiology and general health (Gundersen & Ziliak, 2015, 2018). For example, it has been associated with an increased risk of hypertension (Seligman et al., 2010), anemia (Eicher-Miller et al., 2009), asthma (Gundersen & Ziliak, 2015), sleep disorders (Ding et al., 2015), eating disorders (Hazzard et al., 2020), and anxiety and depression (Arenas et al., 2019).

Nonetheless, unlike other disciplines, the applied psychology literature has historically focused on WEIRD (Western, Educated, Industrialized, Rich, and Democratic) populations and has implicitly assumed that food insecurity is not a workplace-relevant issue. This assumption is in part reflected by the near absence of the topic of food in the applied psychology literature (Pina e Cunha et al., 2008). It is more strongly manifested by explicit statements such as “food is no longer a scarce resource” (Cho & Kim, 2022, p. 25). As a result, individuals experiencing food insecurity have largely been overlooked and are rarely represented in the samples in applied psychology research. However, given the prevalence and significance of food insecurity, we believe that it is important for applied

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psychology researchers to explore how a lack of access to food influences employees in their workplace. Accordingly, the purpose of this article is to extend research on food insecurity into the applied psychology literature.

Food is one of the most fundamental human needs because it is essential for survival (Maslow, 1943). Thus, the possibility of not having access to sufficient food, that is, the experience of food insecurity, is a highly salient and aversive threat. To explain how individuals respond to this threat, we draw from a neuropsychological theory that describes how humans regulate behavior in response to environmental cues of threats: reinforcement sensitivity theory (Gray, 1978, 1982; Gray & McNaughton, 2003). According to this theory, two neuropsychological systems underlie human responses to threatening stimuli, the fight–flight–freeze system, which is activated by immediate and explicit threats (e.g., physical assault), and the behavioral inhibition system, which responds to more diffuse and nonacute threats.

Food insecurity is a nonacute threat because individuals with food insecurity are not necessarily facing immediate life-threatening hunger, but rather a looming threat of possible food deprivation in the near future (Anderson, 1990; National Research Council, 2006). As such, reinforcement sensitivity theory suggests that the behavioral inhibition system will be activated in response to the threat of food insecurity. The activation of the behavioral inhibition system serves as the underlying neurological basis for what, in psychology, is referred to as anxiety (Gray & McNaughton, 2003).

This theory further posits that anxiety profoundly affects people's cognition and behaviors. When people experience anxiety, they tend to redirect attention to monitor and resolve the threat (Eysenck et al., 2007; Gray, 1982; Kouchaki & Desai, 2015). However, because individuals have limited cognitive capacity (Baddeley & Hitch, 1974), allocating additional cognitive resources to threat-related stimuli leaves fewer resources available for one's work. This diminished cognitive capacity will then most directly undermine three core workplace outcomes that rely heavily on cognitive and attentional bandwidth: task performance, work engagement, and organizational citizenship behavior (OCB).

First, effective task performance requires focused attention and information-processing ability, both of which are undermined when heightened anxiety consumes employees' mental resources (Cheng & McCarthy, 2018; Eysenck et al., 2007). Second, work engagement involves sustained mental presence and immersion in one's work (Kahn, 1990; Rich et al., 2010), which are disrupted when attention is diverted toward managing perceived threats. Last, engaging in OCBs depends on noticing and responding to the needs of others, and the increased cognitive load due to anxiety reduces the attentional capacity available to recognize and address those needs (Hiraoka & Nomura, 2016; Organ, 1988; Singh & Bhuvaneswari, 2023). Therefore, based on reinforcement sensitivity theory, we predict that food insecurity will negatively affect task performance, work engagement, and OCBs through increased anxiety. We conducted three studies using a multimethod design, including a recall-based experiment, a multiwave survey, and a field experiment in Pakistan to test our hypotheses.

This research makes several important theoretical, practical, and policy-relevant contributions to the literature. First, much of the applied psychology literature has examined stressors in the "WEIRD" contexts (Henrich et al., 2010)—especially among corporate workers who rarely experience food insecurity—which implicitly promotes the assumption that food insecurity is not a workplace-relevant

stressor. However, our article challenges this implicit assumption by pointing out that food insecurity is a pervasive issue that affects millions of workers across different cultural contexts (Food and Agriculture Organization of the United Nations et al., 2025) and demonstrates that food insecurity is detrimental to individuals' work outcomes, with incremental predictive validity beyond other insecurity-related stressors. In doing so, our research responds to George et al.'s (2016) call to "[tackle] societal grand challenges through management research" (p. 1880) and shifts the discourse in the field toward the work experiences of society's most vulnerable members, those struggling to meet even their most basic physiological needs. Second, we also contribute to the food insecurity literature by extending its focus beyond personal and physiological outcomes (Arenas et al., 2019) to also examine its implications for organizations. By shedding light on these organizationally relevant consequences, this research underscores the business rationale for addressing food insecurity, thereby increasing the likelihood that leaders in private organizations will become more involved and engaged in this effort (Sonenshein, 2006, 2016; United Nations, 2021).

Theory and Hypotheses

Food Insecurity

Food insecurity refers to an individual's subjective perception of inadequate access to food and lack of confidence in their ability to obtain enough of it (Anderson, 1990; Bickel et al., 2000). While often driven by objective circumstances, it is important to recognize that food insecurity is not solely determined by the immediate availability of food in one's home but also by an individual's perceived ability to acquire adequate food.

Food insecurity is also a state-like construct that can fluctuate over time based on situational factors, with empirical evidence indicating weekly variation (Livings et al., 2023). For instance, individuals feel less food insecure immediately after receiving food aid from organizations such as the government or nonprofit food banks. In the United States, recipients of the Supplemental Nutrition Assistance Program, who receive monthly food benefits, are likely to feel more food secure immediately after receiving their stipend. However, as they gradually deplete their resources and must wait for the next iteration, their sense of food insecurity may increase. Moreover, fluctuations in food demand and supply can also influence food insecurity. For instance, when family members visit, a household's food supply may deplete more quickly, increasing food insecurity. Conversely, if an individual stays with a family member, their own household's food supply remains unused, temporarily reducing their perception of food insecurity.

Food insecurity is a significant challenge affecting 28% of the global population (Food and Agriculture Organization of the United Nations et al., 2025). Notably, food insecurity is not just a concern in low- and middle-income countries. Considerable portions of the population in wealthy countries also experience food insecurity. For example, in the United States, 13.5% of households—an equivalent of 47.4 million people—were food insecure at some time in the past year (Rabbitt et al., 2024). Similarly, the United Nations estimated the prevalence of moderate to severe food insecurity to be 13.8% in Australia, 8.4% in France, 6.9% in the United Kingdom, 4.1% in Germany, 17.3% in New Zealand, 9.5% in Singapore, and 13.4% in Finland (Food and Agriculture Organization of the United Nations, 2024).

Given its detrimental impacts on a large population, the issue of food insecurity has attracted substantial research across different disciplines. In the health science literature, researchers have found that people who experience food insecurity are likely to have poorer health (Gundersen & Ziliak, 2015; Stuff et al., 2004). Moreover, in the clinical psychology literature, research indicates that people with food insecurity suffer from mental health issues, including anxiety, depression, distress, and eating disorders (Arenas et al., 2019; Gundersen & Ziliak, 2015). However, despite the importance of food in keeping workers engaged and productive, applied psychology scholars have implicitly assumed that food insecurity is not a workplace-relevant issue. Indeed, the only stream of food-related research in applied psychology has focused on examining choices between healthy and unhealthy food options (Cho & Kim, 2022; Liu et al., 2017; Watkins et al., 2022). This focus, however, further demonstrates applied psychology researchers' implicit assumption that individuals in organizations have abundant food and the choice of food is the primary food-related problem that they face.

We argue that this is partly because the existing literature has primarily focused on white-collar professionals rather than workers from industries that might experience greater food insecurity (Kruyen & Sowa, 2023). Contrary to the belief that food is not a concern for employees, a survey has found that 17.3% of employed adults reported being food insecure (Waxman et al., 2022) and that more than half of the food-insecure households in the United States have at least one member employed full-time (Hales, 2024b). More strikingly, a survey conducted on University of California employees reported that more than 70% of its clerical, administrative, and support workers were experiencing food insecurity (Dreier et al., 2016). Similarly, 78% of employees at Kroger—an American supermarket that sells groceries—also reported experiencing food insecurity (Flaming et al., 2022). These figures highlight that food insecurity is highly prevalent in the workplace, and applied psychology researchers should pay more attention to the issue.

Recognizing the importance and prevalence of food insecurity in the workplace, the present study will investigate how it affects employees at work. By doing so, we hope to draw greater attention from researchers and business leaders and encourage them to dedicate more resources to help mitigate this important societal challenge.

Food Insecurity and Work Outcomes

In this research, we propose that food insecurity negatively affects the three core applied psychology outcomes: task performance, work engagement, and OCBs. First, a growing body of research has demonstrated that when individuals' basic survival resources are insufficient, their executive functioning declines (e.g., Mani et al., 2013; Meuris & Leana, 2018; Mullainathan & Shafir, 2013). For instance, Mani et al. (2013) reported that individuals who experienced resource deprivation showed a reduction in cognitive function equivalent to a 13-point drop in IQ. This decline in cognitive capacity can, in turn, impair people's ability to carry out work tasks effectively. Furthermore, under such conditions, individuals are also likely to invest less effort in their tasks (Pitesa & Thau, 2018), as their focus shifts toward meeting immediate survival needs rather than their job-related responsibilities (Keys et al., 1950; Piech et al., 2010; Polivy, 1996). Therefore, we predict that employees experiencing food insecurity perform worse at their work tasks. Formally, we hypothesize the following:

Hypothesis 1a: Food insecurity has a negative effect on task performance.

Second, we argue that food-insecure employees also have lower work engagement, which is defined as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002, p. 74). Specifically, vigor refers to having high energy, mental resilience, and the willingness to exert effort in one's work; dedication refers to a strong involvement in work, marked by feelings of significance, enthusiasm, inspiration, and pride; and absorption refers to a deep concentration and engrossment in work activities, to the extent that time seems to pass quickly and detachment from work becomes difficult. Together, work engagement reflects a positive and energetic state where people fully concentrate on their work tasks (Kahn, 1990). Employees whose basic needs are unmet, however, are unlikely to feel inspired or enthusiastic about their jobs. Instead, they are likely to be easily distracted by pressing concerns unrelated to their tasks (de Bruijn & Antonides, 2022), preventing them from completely immersing themselves in their work. Therefore, we predict that food-insecure employees are less likely to be fully engaged in their jobs. Formally, we hypothesize the following:

Hypothesis 2a: Food insecurity has a negative effect on work engagement.

Last, people experiencing food insecurity should also be less likely to engage in OCBs. OCBs are discretionary behaviors that are not directly rewarded but promote effective organizational functioning (Organ, 1988). In essence, OCBs are prosocial behaviors that involve helping the organization or other coworkers and often require considerable effort and dedication, as they go beyond the scope of regular job responsibilities (Williams & Anderson, 1991). However, when individuals have insufficient essential resources, their attention narrows toward securing those resources for survival and not on the needs of others (Shah et al., 2012; Sun et al., 2024). In a similar vein, the narrowed attention also makes them more focused on short-term cost-benefit calculations while ignoring potential long-term rewards (Ong et al., 2019; Shah et al., 2012). Since OCBs are discretionary and often go unrecognized or unrewarded in the short term, expending additional effort for the benefit of coworkers or the organization without immediate reward is perceived as a costly burden by food-insecure employees. Consequently, we predict that food-insecure employees are less likely to engage in OCBs, as such behaviors do not offer immediate and direct personal gains. Formally, we hypothesize the following:

Hypothesis 3a: Food insecurity has a negative effect on OCBs.

Reinforcement Sensitivity Theory

To provide a more integrative theoretical account for why food insecurity adversely affects the three core work outcomes, we draw from a theory that describes how humans' brains respond to the presence of a conditioned aversive stimulus such as food insecurity: reinforcement sensitivity theory (Gray, 1982; Gray & McNaughton, 2003). The reinforcement sensitivity theory posits that three neuro-psychological systems regulate human behavior, including the behavioral approach system, the fight-flight-freeze system, and the behavioral inhibition system. Among these, the behavioral inhibition system involves the septohippocampal system, posterior cingulate,

amygdala, and the dorsal prefrontal cortex region of the brain (McNaughton & Corr, 2004). This system is identified as the core neuropsychological system that regulates responses to nonacute and uncertain threats, which means potential, anticipatory danger that is not immediately life-threatening (Corr, 2002; Davis et al., 2010). The activation of the behavioral inhibition system heightens vigilance and risk assessment while inhibiting goal-directed behaviors as individuals focus on gathering more information and evaluating the situation (Gray, 1982). Importantly, the behavioral inhibition system is the neurobiological basis for the experience of anxiety, which refers to an unpleasant emotional state that involves the feeling of tension, nervousness, uneasiness, worry, and frustration (Brooks & Schweitzer, 2011; Kouchaki & Desai, 2015).

Because food is one of the most basic human survival needs, people naturally develop a conditioned aversion to the prospect of losing access to food since it is closely associated with the negative experience of hunger. As such, food insecurity is a highly salient conditioned aversive stimulus. Based on reinforcement sensitivity theory (Gray, 1982; Gray & McNaughton, 2003), the presence of an aversive threatening stimulus will activate one of the two neuropsychological systems: the behavioral inhibition system or the fight-flight-freeze system. In particular, the key distinction of which system is activated depends on the nature of the threat. The fight-flight-freeze system is activated in response to immediate, explicit threats (e.g., physical assault), triggering avoidance behaviors aimed at escaping the danger. In contrast, when the threat is more diffuse or uncertain, the behavioral inhibition system is activated, resulting in heightened anxiety and increased vigilance to assess and manage the potential risk. Food insecurity is a type of nonacute and diffuse threat, as it does not pose an immediate danger to an individual's life (National Research Council, 2006). Indeed, food-insecure individuals are usually able to ration the remaining food, such as reducing portion sizes or skipping meals, to stretch their food supplies over a longer time period (Bickel et al., 2000). Even in its most extreme case, people can still survive without any food for at least a week (Kottusch et al., 2009; Pietzner et al., 2024). In other words, unlike physical assaults that pose an imminent danger and activate the fight-flight-freeze system, food insecurity represents a looming threat characterized by the possibility of food deprivation in the near future rather than an immediate life-threatening danger and should accordingly activate the behavioral inhibition system (Anderson, 1990; Gray, 1982). Since the behavioral inhibition system is the neurological basis for anxiety, food insecurity elicits anxiety as individuals struggle with the uncertainty of meeting their physiological needs, which manifests in continuous worry about how to obtain food. In sum, reinforcement sensitivity theory suggests that food insecurity elicits anxiety (Arenas et al., 2019).

Reinforcement sensitivity theory further posits that the experience of anxiety, due to heightened activity in the behavioral inhibition system, suppresses goal-directed actions, increases vigilance, and redirects cognitive resources toward threat-related stimuli (Gray, 1982; Gray & McNaughton, 2003). In other words, individuals become laser-focused on the source of the threat (Byrne & Eysenck, 1995; Eysenck & Calvo, 1992; Fox et al., 2002), engaging in behaviors such as monitoring the environment for risks, gathering and analyzing information about the threat, and developing strategies to resolve or mitigate it. However, while these responses may be adaptive for managing threats, they can also divert attention and hinder individuals from performing effectively in the workplace

(Cheng & McCarthy, 2018; Eysenck et al., 2007). Indeed, due to the limited capacity of the human cognitive processing system (Baddeley & Hitch, 1974; Reisberg, 2019), allocating additional cognitive resources to threat-related stimuli leaves fewer resources available for processing work tasks (Clore et al., 1994; Eysenck, 1992; Loewenstein & Lerner, 2003; Sarason et al., 1986). Therefore, drawing from reinforcement sensitivity theory, we predict that food insecurity has an indirect negative effect on task performance, work engagement, and OCBs through increased anxiety.

Food Insecurity, Anxiety, and Work Outcomes

First, based on reinforcement sensitivity theory, employees experiencing food insecurity often exhibit heightened anxiety, which increases their sensitivity to salient, threat-related stimuli (Eysenck et al., 2007; Gray & McNaughton, 2003). In other words, food-insecurity-induced anxiety makes these employees more susceptible to being distracted by task-irrelevant thoughts (Alting & Markham, 1993; Cheng & McCarthy, 2018), particularly those relating to the food shortage threat, such as how to secure access to sufficient food (Cisler & Koster, 2010). Supporting this, past research has shown that individuals in need of food exhibit heightened sensitivity and responsiveness to food-related stimuli (Piech et al., 2010; Radel & Clément-Guillotin, 2012). These anxiety-induced task-irrelevant thoughts consume a substantial amount of individuals' limited cognitive resources in their working memory, reducing the capacity available to concentrate on and effectively execute the work tasks (Eysenck, 1992). Moreover, the increased distractibility can lead to increased errors, slower task completion, and an overall decline in the quality of work. Additionally, prolonged rumination on how to acquire food consumes valuable time that could otherwise be allocated to work tasks, further compounding the adverse effects of food insecurity on workplace performance (Cheng & McCarthy, 2018). Therefore, food-insecure individuals are likely to have lower task performance because the experience of food insecurity elicits anxiety, which negatively impacts cognition by depleting mental resources needed for job tasks. Formally, we hypothesize the following:

Hypothesis 1b: Food insecurity has an indirect negative effect on task performance via anxiety.

Second, we propose that anxiety induced by food insecurity also leads to lower work engagement, which refers to a positive motivational state characterized by employees being fully concentrated, absorbed, and emotionally connected to their tasks (Kahn, 1990; Schaufeli et al., 2002). Put differently, engagement requires individuals to invest all of their physical, cognitive, and emotional energy simultaneously in their work role (Rich et al., 2010). However, anxiety consumes a substantial amount of the food-insecure workers' cognitive and emotional resources (Cheng & McCarthy, 2018), making it difficult for them to sustain the level of attention and involvement that engagement demands. Indeed, past research has shown that anxious individuals are more likely to be preoccupied with intrusive, ruminative thoughts related to securing food rather than being fully absorbed in their job tasks (Bar-Haim et al., 2007; Cisler & Koster, 2010; Van Bockstaele et al., 2014). Therefore, we predict that food-insecure individuals are unable to remain fully engaged in their work, as their ability to invest

cognitive and emotional resources in their job is disrupted by anxiety. Formally, we hypothesize the following:

Hypothesis 2b: Food insecurity has an indirect negative effect on work engagement via anxiety.

Finally, we suggest that heightened anxiety due to food insecurity reduces individuals' likelihood of engaging in OCBs, that is, voluntary extrarole behaviors that involve helping coworkers or the organization. Anxiety activates a self-protective mode (Kouchaki & Desai, 2015). This self-protective mode causes people to heighten focus on their own needs and interests, leaving them insufficient attentional bandwidth to attune to the needs of others (Hiraoka & Nomura, 2016; Schwarzer & Wicklund, 1991). Put differently, anxiety elicits a self-focused orientation that diminishes food-insecure employees' motivation and ability to engage in other-oriented behaviors that do not directly address their immediate concerns (Mor & Winquist, 2002; Zhang et al., 2020). Therefore, we predict food-insecure workers, due to their elevated anxiety, prioritize meeting their own needs over expending additional time and energy to help others or the organization. Formally, we hypothesize the following:

Hypothesis 3b: Food insecurity has an indirect negative effect on OCBs via anxiety.

Overview of the Studies

We conducted three studies to test our theoretical model. Study 1 was a preregistered experimental recall study with 375 U.S. working adults who had experienced food insecurity. We asked participants to recall an experience of either food insecurity or food security and then what their work experiences were. In Study 2, we used a within-person diary study to collect weekly data from 567 U.S. working adults who experienced food insecurity with four waves of data collection. Study 3 was a field experiment conducted in Pakistan with 196 workers who were randomly assigned to receive either a food package or a nonfood package. Notably, Study 3 has high ecological validity because it was conducted in a real-world context where food insecurity is a major issue.

Data Transparency and Openness

We describe our sampling plan, data exclusions, manipulations, and measures in all studies, and we adhere to the *Journal of Applied Psychology* methodological checklist. All data and analysis codes are publicly available at the Open Science Framework repository and can be accessed at <https://osf.io/hvqw2>. Study 1 was preregistered at https://aspredicted.org/9YT_18V. Study 2 and Study 3 were not preregistered. Data were analyzed using R (R Core Team, 2024) and Mplus (Muthén & Muthén, 2017). For R, we used the package *lavaan* for structural equation modeling (Rosseel, 2012).

Study 1

Method

Participants and Procedure

Participants for this study were recruited from Prolific.com upon approval from the University of Washington's institutional review board (Approval Number: STUDY00016916; Title: Food Insecurity's

Effect on Individual Work Performance). To be eligible for the study, potential participants must be employed, live in the United States, and work at least 31 hr per week as of the beginning of the study. Participants also had to have experienced food insecurity within the past 6 months because those who had not faced food insecurity would be unable to recall such an experience. Thus, in the screening survey, participants were asked to report whether they experienced food insecurity in the last 6 months using three items from the USDA, which are "You cut the size of your meals or skipped meals because there wasn't enough money for food," "Worried that food would run out before you got more money to buy food," and "You were hungry but didn't eat because there wasn't enough money for food" (Bickel et al., 2000, p. 23). All items were measured using a 5-point Likert scale (1 = *never* to 5 = *always*). Only participants with an average score of 3 or above were invited to participate in the main study.

We screened 2,609 participants based on the eligibility criteria. We then invited 550 participants who met the eligibility criteria to complete the main study. We received 402 complete responses. Each participant received \$1.00 for participating in the survey. We excluded one response from a single participant who completed the survey twice, thirteen participants due to failed attention checks, four participants for being flagged as very likely bots (Bernierth et al., 2021), and nine participants who did not follow the manipulation instruction in describing their food insecurity or security experience.¹ This resulted in 375 usable responses. Of these, 189 participants were assigned to the food insecurity condition, and 186 participants were assigned to the food security condition. The average age of participants was 37.10 ($SD = 11.17$); 61% of the participants were female, and 57% of the participants were White.

Manipulation and Measures

Food Insecurity Manipulation. Participants were randomly assigned to one of two conditions: They were asked to either recall and write about their most recent day experiencing food insecurity or recall and write about their most recent day experiencing food security. Specifically, in the food insecurity condition, participants received the following definition: "Food insecurity is defined as whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain." In the food security condition, participants received the following definition: "Food security is defined as nutritionally adequate and safe foods are readily available and can be acquired in socially acceptable ways (i.e., without stealing, accessing emergency food supplies, or relying on other coping strategies)." Then, all participants were instructed to "Please take 1 minute to recall the most recent day that you experienced food [insecurity or security]. Then, in the space below, please write 3–5 sentences that describe your feelings and behaviors that day at work." After writing their experience, participants were asked to respond to measures on anxiety and work outcomes and then report their demographic information. The time referent for the measures of anxiety and work outcomes was the specific day they had written about.

Anxiety. Marteau and Bekker's (1992) six-item shortened version of Spielberger et al.'s (1983) State-Trait Anxiety Inventory

¹ The results were not meaningfully different when these 26 excluded participants were included in the analyses.

was used to measure anxiety. An example item is “I was tense” (1 = *strongly disagree* to 5 = *strongly agree*; Cronbach’s $\alpha = .95$).

Task Performance. We measured task performance using the adapted three-item scale developed by Williams and Anderson (1991), as this scale has been commonly used in prior research (e.g., Barnes et al., 2023; Guarana et al., 2021; Lanaj et al., 2021). An example item is “I adequately completed assigned duties” (1 = *strongly disagree* to 5 = *strongly agree*; Cronbach’s $\alpha = .82$).

Work Engagement. We used Schaufeli et al.’s (2019) three-item scale to measure work engagement. An example item is “Time flew when I was working” (1 = *strongly disagree* to 5 = *strongly agree*; Cronbach’s $\alpha = .87$).

OCB. We measured OCB using the adapted four-item scale from Williams and Anderson (1991), as this scale has been commonly used in prior research (e.g., Barnes et al., 2023; Guarana et al., 2021). An example item is “Took time to advise, help, or mentor a co-worker” (1 = *strongly disagree* to 5 = *strongly agree*; Cronbach’s $\alpha = .89$).

Controls. We included age, gender (1 = *female*, 0 = *not female*), race (1 = *White*, 0 = *not White*), education (1 = *college degree or above*, 0 = *below college degree*), income, and financial insecurity as control variables to isolate the unique impact of food insecurity on anxiety and work outcomes by removing potential confounding influences. Income was measured using a multicategorical variable based on participants’ self-reported annual salary in U.S. dollars: (a) less than \$20,000, (b) \$20,000–\$34,999, (c) \$35,000–\$49,999, (d) \$50,000–\$74,999, (e) \$75,000–\$99,999, and (f) \$100,000 or more. Financial insecurity was measured with four items from Petitta et al. (2020) that asked about their financial experiences over the past 12 months (Cronbach’s $\alpha = .93$): “I worried about having the funds to cover normal monthly expenses,” “I felt like I am living paycheck-to-paycheck,” “I am stressed by my financial situation,” and “An unexpected event could cause a financial emergency for me.” Responses were given on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*).

We controlled for income and financial insecurity because they are key predictors of the experience of food insecurity (Loopstra & Tarasuk, 2013; Rabbitt et al., 2024), and prior research has shown that individuals with poorer financial situations tend to experience higher levels of anxiety (Ridley et al., 2020; Sareen et al., 2011) and achieve poorer work outcomes (Meuris & Leana, 2015, 2018). Additionally, prior research has also shown that individuals who are younger, female, non-White, or without a college degree are more likely to experience food insecurity (Coleman-Jensen, 2013; Hales,

2024a; Rabbitt et al., 2024; Weeks et al., 2023), and these factors have been shown to be related to both anxiety (Bjelland et al., 2008; Gum et al., 2009; McLean et al., 2011; Vanderminde & Esala, 2019) and work outcomes (Green et al., 2009; Greenhaus & Parasuraman, 1993; Ng & Feldman, 2008, 2009; Roth et al., 2012). Therefore, it is important to show the effect of food insecurity on anxiety and work outcomes beyond their associations with the above control variables.

Results

Manipulation Check

We asked two research assistants, who were blind to the study hypotheses, to review the written recall materials from Study 1. They rated each participant’s described experience on the extent to which it reflected food insecurity (1 = *very food secure* to 7 = *very food insecure*). The correlation between the two research assistants’ ratings was high ($r = 0.86$, $p < .001$). Consistent with our manipulation, experiences described by participants in the food insecurity condition ($M = 5.77$) were rated as reflecting greater food insecurity compared to those in the food security condition ($M = 2.06$), $t(373) = -28.80$, $p < .001$.

Hypotheses Testing

We tested the hypotheses using path analysis with the *lavaan* package 0.6-18 (Rosseel, 2012) using maximum likelihood estimation. Following best practice recommendations (Simmons et al., 2011), we analyzed our data with and without control variables to demonstrate the robustness of our results regardless of model specification. Table 1 presents the means, standard deviations, and correlations in Study 1.

We first tested our model without control variables. The overall model had a good fit, $\chi^2(39) = 103.773$, $p < .001$, comparative fit index = 0.973, root-mean-square error of approximation = 0.067, standardized root-mean-square residual = 0.043. People in the food insecurity condition reported significantly lower task performance ($b = -0.86$, $SE = 0.09$, $p < .001$, 95% CI $[-1.03, -0.68]$), work engagement ($b = -1.41$, $SE = 0.11$, $p < .001$, 95% CI $[-1.63, -1.19]$), and OCBs ($b = -0.79$, $SE = 0.10$, $p < .001$, 95% CI $[-0.99, -0.59]$). We also presented the means, standard deviations, and Cohen’s d effect size for the comparison between the experimental conditions in Table 2.

Table 1
Descriptive Statistics and Zero-Order Correlations of Variables in Study 1

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Food insecurity	0.50	0.50	—										
2. Anxiety	2.95	1.36	.79*	—									
3. Task performance	3.98	0.88	-.46*	-.55*	—								
4. Work engagement	2.95	1.14	-.53*	-.63*	.41*	—							
5. OCB	3.16	1.05	-.39*	-.46*	.44*	.56*	—						
6. Age	37.10	11.17	-.02	-.04	.09	.06	.10*	—					
7. Female	0.61	0.49	-.02	.07	.05	.01	.07	-.01	—				
8. White	0.57	0.50	.04	.09	.02	-.19*	-.02	.08	-.01	—			
9. College or above	0.65	0.48	-.01	-.06	-.02	.08	.06	.08	.08	-.06	—		
10. Income	3.58	1.52	-.08	-.13*	-.01	.20*	.15*	.08	-.10*	-.09	.34*	—	
11. Financial insecurity	4.34	0.86	.08	.20*	.01	-.16*	-.12*	.02	.10	.11*	-.21*	-.29*	—

Note. $N = 375$. OCB = organizational citizenship behavior.

* $p < .05$.

Table 2*Means (Standard Deviations) and Effect Sizes by Experimental Condition in Study 1*

Variable	Food insecurity condition	Food security condition	Cohen's <i>d</i>
Task performance	3.57 (0.90)	4.39 (0.64)	−1.04
Work engagement	2.35 (1.06)	3.56 (0.87)	−1.24
Organizational citizenship behaviors	2.75 (1.04)	3.57 (0.89)	−0.85
Anxiety	4.02 (0.85)	1.87 (0.80)	2.61

Note. Values are in mean (standard deviation). *N* = 375.

We then added the control variables to our model. The model, including control variables, also had a good fit, $\chi^2(137) = 260.885$, $p < .001$, comparative fit index = 0.967, root-mean-square error of approximation = 0.049, standardized root-mean-square residual = 0.064. Similarly, after including the control variables, we found that people in the food insecurity condition reported significantly lower task performance ($b = -0.86$, $SE = 0.09$, $p < .001$, 95% CI $[-1.04, -0.68]$), work engagement ($b = -1.34$, $SE = 0.11$, $p < .001$, 95% CI $[-1.56, -1.13]$), and OCBs ($b = -0.76$, $SE = 0.10$, $p < .001$, 95% CI $[-0.95, -0.56]$); see Table 3. Hypotheses 1a, 2a, and 3a were all supported.

To test the mediating effect of anxiety in the relationship between food insecurity and work outcomes, we used bootstrapping 10,000 times to construct 95% confidence intervals (CIs). The indirect effect was significant for task performance ($Est = -0.95$, 95% CI $[-1.26, -0.67]$), work engagement ($Est = -1.35$, 95% CI $[-1.73, -1.02]$), and OCBs ($Est = -0.92$, 95% CI $[-1.28, -0.59]$).² Hypotheses 1b, 2b, and 3b were all supported.

Discussion

Using an experimental design, Study 1 established the effects of food insecurity on three important work outcomes in organizations. A strength of this study was the experimental manipulation of food insecurity, which allowed us to draw internally valid conclusions about the effects of food insecurity. Nonetheless, recall-based manipulations may be limited by participants' accuracy in remembering their experiences with food insecurity, which may have occurred at varying times in the past. Therefore, we used a prospective study design to measure natural variation in food insecurity over a longer controlled time period.

Study 2

Method

Participants and Procedure

Participants for this study were recruited from Prolific.com upon approval from the University of Washington's institutional review board (Approval Number: STUDY00017980; Title: Food and Work). To be eligible for the study, potential participants must be employed, live in the United States, and work at least 31 hr per week. Eligible participants must have experienced food insecurity in the past 6 months because those who had not faced food insecurity would be unlikely to show within-individual variation in their food insecurity levels in the measurement period. We screened 4,102 participants using the same eligibility criteria as in Study 1. We invited 794 eligible participants to complete our study, and 588

participants signed up for the first phase of the study, but 16 of them only completed the first survey and were excluded. We also excluded five participants who were flagged as being very likely to be bots (Bernerth et al., 2021).³ The final study sample consisted of 567 participants who completed at least two surveys; 44.5% were female. The average age was 36.54 ($SD = 10.82$); 64.5% of the participants were White.

Participants received \$1.40 for each survey completed and a \$2.50 bonus for completing all surveys. We collected data over four rounds, with participants completing one survey each week for a duration of 4 weeks. We chose to use the weekly interval because it is more useful for capturing the natural variation in food insecurity levels (Livings et al., 2023). For example, individuals in the United States receive food benefits at monthly intervals, leaving room for weekly variation in food insecurity between intervals. In each round of the survey, participants were asked to report their food insecurity level, their anxiety level, and their task performance, work engagement, and OCBs. Participants were also asked to report their demographic information in the first survey. The total number of possible observations was 2,352 (588×4). We received 2,125 observations, resulting in an overall participation rate of 90.35%. Of the 567 participants, 453 of them provided complete responses, whereas the rest of them provided partial responses. The average number of completed rounds was 3.75 ($SD = 0.54$).

Measures

Food Insecurity. Food insecurity was measured using the same three-item scale from the USDA in Study 1. The items are "worried that food would run out before you got money to buy food," "were hungry but didn't eat because there wasn't enough money for food," or "cut the size of your meals or skipped meals because there wasn't enough money for food" (Bickel et al., 2000, p. 23). The mean Cronbach's α for this scale was .90 (range = .88–.91, $SD = 0.01$).

Anxiety. The same scale from Study 1 was used to measure anxiety. The mean Cronbach's α for this scale was .89 (range = .88–.90, $SD = 0.01$).

Task Performance. The same scale from Study 1 was used to measure task performance. The mean Cronbach's α for this scale was .75 (range = .70–.79, $SD = 0.04$).

² We also tested an alternative model specification with anxiety as the first-stage and work engagement as the second-stage mediator for task performance and OCB. We found the serial indirect effect is significant for task performance ($Est = -0.24$, 95% CI $[-0.43, -0.06]$) and OCB ($Est = -0.62$, 95% CI $[-0.89, -0.42]$).

³ The results were not meaningfully different when these participants were included in the analyses.

Table 3
Regression and Mediation Analyses of Study 1

Variable	Model 1			Model 2		
	Task performance	Work engagement	OCB	Task performance	Work engagement	OCB
Food insecurity	−0.86*	−1.34*	−0.76*	0.09	0.00	0.16
Controls						
Age	0.01	0.01	0.01*	0.01	0.00	0.01
Female	0.10	0.05	0.17	0.19*	0.18	0.26*
White	0.05	−0.40*	0.00	0.10	−0.32*	0.05
College or above	−0.03	−0.01	−0.01	−0.07	−0.06	−0.04
Income	−0.02	0.09*	0.06	−0.03	0.08*	0.05
Financial insecurity	0.02	−0.10	−0.08	0.11*	0.03	0.01
Meditation						
Anxiety				−0.44*	−0.62*	−0.42*
Indirect effect				−0.95 [−1.26, −0.67]	−1.35 [−1.73, −1.02]	−0.92 [−1.28, −0.59]

Note. $N = 375$. The 95% confidence intervals for the indirect effects were generated using 10,000 times bootstrapping and are in brackets. OCB = organizational citizenship behavior.

* $p < .05$.

Work Engagement. The same scale from Study 1 was used to measure work engagement. The mean Cronbach's α for this scale was .87 (range = .87–.88, $SD = 0.003$).

OCB. The same scale from Study 1 was used to measure OCB. The mean Cronbach's α for this scale was .91 (range = .90–.92, $SD = 0.01$).

Results

Table 4 presents the means, standard deviations, and correlations in Study 2.

We first conducted a confirmatory factor analysis to test the factor structure of our measurement. The five-factor model, where each item loaded on its respective latent factor at its respective timepoint, provided a good fit, $\chi^2(2476) = 5053.747$, $p < .001$, comparative fit index = 0.926, root-mean-square error of approximation = 0.043, standardized root-mean-square residual = 0.065. Intraclass correlation coefficients (ICCs) were calculated to assess within-person variance, and results indicated sufficient within-person variability in each variable to warrant a within-individual approach, including 31.3% for food insecurity (ICC = 0.687), 21.5% for anxiety (ICC = 0.785), 41.6% for task performance (ICC = 0.584), 36.0% for work engagement (ICC = 0.640), and 27.7% for OCB (ICC = 0.723).

We used a multilevel path analysis to examine the within-person and between-person effects of food insecurity on work outcomes (Preacher et al., 2010);⁴ see Table 5. Food insecurity was person-mean-centered to obtain unbiased estimates (Enders & Tofighi, 2007). We first tested the within-person effects and found that food insecurity was associated with a significant increase in anxiety ($b = 0.11$, $SE = 0.02$, $p < .001$, 95% CI [0.08, 0.14]). However, food insecurity was not significantly related to task performance ($b = -0.04$, $SE = 0.02$, $p = .076$, 95% CI [−0.09, 0.00]), work engagement ($b = -0.04$, $SE = 0.03$, $p = .118$, 95% CI [−0.10, 0.01]), or OCB ($b = 0.01$, $SE = 0.03$, $p = .637$, 95% CI [−0.04, 0.06]). Thus, Hypotheses 1a, 2a, and 3a were not supported.

To test the mediating effect of anxiety in the relationship between food insecurity and work outcomes, we constructed 95% CIs using 10,000 Monte Carlo simulations (Bauer et al., 2006). The indirect effect was significant for task performance ($Est = -0.015$, 95% CI [−0.024, −0.008]), work engagement ($Est = -0.024$, 95% CI

[−0.036, −0.014]), and OCB ($Est = -0.010$, 95% CI [−0.018, −0.003]). Thus, we found support for Hypotheses 1b, 2b, and 3b.

We then tested the between-person effects and found that people with higher food insecurity in that month reported higher anxiety ($b = 0.47$, $SE = 0.04$, $p < .001$, 95% CI [0.39, 0.54]), lower task performance ($b = -0.14$, $SE = 0.03$, $p < .001$, 95% CI [−0.20, −0.08]), and lower work engagement ($b = -0.14$, $SE = 0.04$, $p = .001$, 95% CI [−0.22, −0.05]), but not OCB ($b = -0.02$, $SE = 0.05$, $p = .726$, 95% CI [−0.11, 0.07]). We then tested the model with the same set of between-person control variables used in Study 1 to produce a more precise estimate of the between-person effects, including age, gender, income, race, education, and financial insecurity (Cronbach's $\alpha = .94$). Similarly, we found that people with higher food insecurity in that month reported lower task performance ($b = -0.22$, $SE = 0.03$, $p < .001$, 95% CI [−0.28, −0.15]) and lower work engagement ($b = -0.13$, $SE = 0.05$, $p = .007$, 95% CI [−0.22, −0.03]), but not OCB ($b = 0.02$, $SE = 0.05$, $p = .626$, 95% CI [−0.07, 0.12]). Thus, for the between-person effect, we found support for Hypotheses 1a and 2a, but not 3a.

Finally, we tested the between-person indirect effects using 10,000 Monte Carlo simulations to construct the 95% CI. We found the effect to be significant for task performance ($Est = -0.101$, 95% CI [−0.135, −0.070]), work engagement ($Est = -0.148$, 95% CI [−0.196, −0.104]), and OCB ($Est = -0.093$, 95% CI [−0.135, −0.058]). We again found support for Hypotheses 1b, 2b, and 3b.⁵

Discussion

Study 2 largely replicated the findings of Study 1, demonstrating the negative effects of food insecurity on work outcomes through the

⁴ In the reported result, we used listwise deletion to handle missing data. However, we note that the pattern of results is not meaningfully different when using full-information maximum likelihood instead.

⁵ We also tested an alternative model specification with anxiety as the first-stage and work engagement as the second-stage mediator for task performance and OCB. We found the serial indirect within-person effect is significant for task performance ($Est = -0.003$, 95% CI [−0.004, −0.001]) and OCB ($Est = -0.003$, 95% CI [−0.005, −0.001]), and the between-person serial indirect effect is also significant for task performance ($Est = -0.023$, 95% CI [−0.036, −0.011]) and OCB ($Est = -0.067$, 95% CI [−0.096, −0.044]).

Table 4
Descriptive Statistics and Zero-Order Correlations of Variables in Study 2

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Food insecurity	2.88	0.99	—										
2. Anxiety	2.91	0.97	.40*	—									
3. Task performance	4.04	0.80	-.14*	-.27*	—								
4. Work engagement	3.09	1.06	-.11*	-.36*	.27*	—							
5. OCB	3.01	1.07	-.01	-.22*	.24*	.36*	—						
6. Age	36.54	10.82	.02	-.12*	.11*	.13*	.17*	—					
7. Female	0.45	0.50	.06*	.16*	.06*	-.04	-.04	.10*	—				
8. White	0.65	0.48	-.01	.05*	.09*	-.05*	.06*	.11*	.12*	—			
9. College or above	0.61	0.49	-.11*	-.10*	-.13*	.01	.10*	.04	-.11*	-.10*	—		
10. Income	3.31	1.52	-.13*	-.20*	-.13*	.10*	.18*	.23*	-.14*	-.08*	.40*	—	
11. Financial insecurity	4.12	0.98	.39*	.47*	.08*	-.10*	-.07*	-.04	.22*	.16*	-.25*	-.38*	—

Note. *N* = 567. OCB = organizational citizenship behavior.

* *p* < .05.

mediator of anxiety. A key strength of this study is the use of a within-subject design, which controls for all time-invariant confounding variables. However, similar to Study 1, this study relied on samples from Prolific. Although prior research suggests that Prolific is a high-quality platform for data collection, with participants providing higher quality responses compared to other platforms such as Amazon MTurk, Qualtrics Panel, and undergraduate student samples (Albert & Smilek, 2023; Douglas et al., 2023; Peer et al., 2022), we acknowledge the concern that survey respondents on online platforms may not fully represent the general population (Goodman et al., 2013). Another limitation of this study is that the use of a nonexperimental design also limits our ability to draw causal inferences. Therefore, in Study 3, we conducted a field experiment in a setting with greater ecological validity by recruiting real-life participants experiencing food insecurity through our collaboration with a nongovernmental organization (NGO) in Pakistan.

Study 3

Method

Participants and Procedure

We collaborated with an NGO based in Lahore, Pakistan, to carry out a field experimental study. Several factors influenced our decision to conduct the study in Pakistan. As a developing country, Pakistan faces significant challenges, with 41.7% of its population experiencing food insecurity (Food and Agriculture Organization of the United Nations, 2024). The country has also been grappling with severe food price inflation due to catastrophic floods in 2022 and ongoing regional security issues. At the time of our study in 2023, the average weekly food price inflation rate was roughly 40% (Shahid, 2023). Conducting this research in Pakistan was therefore relevant from both a policy and practical perspective, as it targeted a segment of the global population experiencing some of the highest levels of food insecurity. The NGO we partnered with specializes in assisting individuals facing financial hardship and poverty, which involves distributing food aid and cash donations. We requested the NGO to provide us with a list of participants for our study. As part of the recruitment criteria, we asked the NGO to only include people who were employed with a steady job and at least 18 years old in age. They supplied a list of 218 individuals who were randomly assigned to either the food or nonfood conditions. This led to 98

people being assigned to the food condition and 120 to the nonfood condition.⁶ In the final sample, 28% of the participants were female. The average monthly income was PKR 19,836 (an equivalent of USD 71). The most common occupations were as follows: 17% were factory workers, 15% worked in domestic cleaning, 11% worked as manual labor, 8% worked as taxi drivers, and 8% worked in clerical work. Two participants (1%) did not mention any occupation.

Participants completed a survey 1 month prior to data collection to get baseline measures of our focal variables and demographics, and they completed another survey 3 days postintervention. In the baseline data collection, we used a 4-week time reference for our measures, and in the postintervention data collection, we used a 3-day time reference. The study was approved by the University of Washington's institutional review board (Approval Number: STUDY00017934; Title: Food Study).

Intervention. We conducted multiple meetings with our partner NGO, which has extensive experience in assisting individuals dealing with food insecurity, to generate a list of items for the food and nonfood packages (see Table 6 for more details on the food and the nonfood packages). We decided on the following items for the food package: cooking oil, lentils, rice, wheat flour, sugar, dates, and loose tea. These items represent the basic staples of the Pakistani diet. For the nonfood package, we selected cleansing and hygiene products, including soap bars, shampoo, toothpaste, dish detergent, laundry detergent, and bathroom cleaner. Both packages were matched to have equivalent monetary value in Pakistani Rupees (approximately PKR 5,500). We distributed the packages over two separate days. We first randomly assigned participants to either the food or the nonfood condition. We then asked all participants in the nonfood condition to pick up their packages from a specified location. The distribution was completed on the same day. The following day, participants in the food condition collected their packages from the same location.

Measures

We translated survey items from English into Urdu using the back-translation process (Brislin, 1970). Specifically, we hired a

⁶ Even though we had planned to have a similar number of participants in both conditions, due to logistical reasons involving storage and delivery of items in time before the distribution, we had more nonfood than food packs. We thus randomly assigned more people to the nonfood versus food groups.

Table 5
Regression and Mediation Analyses of Study 2

Variable	Model 1			Model 2			
	Task performance	Work engagement	OCB	Anxiety	Task performance	Work engagement	OCB
Food insecurity (within-person)	-0.04	-0.04	0.01	0.11*	-0.03	-0.02	0.02
Food insecurity (between-person)	-0.22*	-0.13*	0.02	0.30*	-0.12*	0.02	0.12*
Controls							
Age	0.01*	0.01*	0.01*	-0.01*	0.01*	0.01*	0.01*
Female	0.02	-0.06	-0.06	0.17*	0.08	0.02	-0.01
Income	-0.07*	0.03	0.08*	-0.01	-0.07*	0.03	0.08*
White	0.06	-0.15	0.16*	0.02	0.06	-0.14	0.17*
College or above	-0.13*	-0.08	0.12	0.07	-0.10	-0.05	0.14
Financial insecurity	0.10*	-0.02	-0.02	0.33*	0.21*	0.15*	0.08
Mediation							
Anxiety (within-person)					-0.14*	-0.22*	-0.09*
Anxiety (between-person)					-0.34*	-0.49*	-0.31*
Indirect effect (within-person)					-0.015 [-0.024, -0.008]	-0.024 [-0.036, -0.014]	-0.010 [-0.018, -0.003]
Indirect effect (between-person)					-0.101 [-0.135, -0.070]	-0.148 [-0.196, -0.104]	-0.093 [-0.135, -0.058]

Note. $N = 567$. The 95% confidence intervals for the indirect effects were generated using 10,000 Monte Carlo simulations and are in brackets. OCB = organizational citizenship behavior.
* $p < .05$.

bilingual research assistant who translated the initial materials into Urdu, after which a bilingual member of the author team translated the survey back into English and resolved the remaining discrepancies. We resolved disagreements in multiple stages of back translation until the final translation was closest to the actual English scales in meaning.

Anxiety. We used the same scale from Study 1 to measure anxiety. The Cronbach's α for this scale was .81.

Task Performance. We used the same scale from Study 1 to measure task performance. The Cronbach's α was .31 for the three-item task performance scale. The relatively low α is attributed to the item "I failed to perform essential duties" not loading well onto the same latent factor as the other two items, likely because it does not translate well into Urdu. The two-item scale, which excluded the problematic item, had a Cronbach's α of .84. The correlation between the three-item and the two-item versions of the scale was high ($r = 0.84, p < .001$). We analyzed the data using both versions, and the results were not meaningfully different.⁷ To maintain consistency with our prior studies, the result reported below used the three-item measure.

Work Engagement. We used the same scale from Study 1 to measure work engagement. The Cronbach's α for this scale was .86.

OCB. Because participants in Study 3 worked mostly as daily wage workers rather than corporate employees and much of their interactions were with people outside their organization, we adapted the scale from Study 1 to measure general prosocial behaviors. The four items we used were "I took time out to help others," "I lent a compassionate ear when someone had a personal/work problem," "I helped a person who had too much to do," and "I gave others encouragement or appreciation." The Cronbach's α for this scale was .76.

Controls. We controlled for the baseline measure for each of our focal variables while running our analyses.

Results

Table 7 presents the means, standard deviations, and correlations of the variables in Study 3. We received data from 196 participants after the intervention (response rate of 90%).

Manipulation Check

To test our hypotheses, we treated the intervention as an experimental manipulation that reduced participants' food insecurity, such that the food condition represented relatively low food insecurity, and the no-food control condition represented relatively high food insecurity. To demonstrate the efficacy of the manipulation, participants were asked to report food insecurity using the same scale from Study 1 (Cronbach's $\alpha = .72$). Consistent with our manipulation, participants in the food condition reported significantly lower levels of postintervention food insecurity compared to those in the nonfood condition, $t(194) = -3.39, p < .001$.

Hypotheses Test

Data were analyzed using path analysis with Mplus 8.1 (Muthén & Muthén, 2017). As can be seen in Table 8, people in the food condition (vs. those in the nonfood condition) report significantly

⁷ We note that the result of the indirect effect using the two-item performance measure is also significant ($Est = 0.11, 95\% CI [0.02, 0.21]$).

Table 6
Food and Nonfood Package Details of Study 3

Item name	Unit	Quantity per package
Food package details		
Flour 15 kg	Bag	1
Sugar	Kg	3
Cooking oil 1 L	Packet	2
Lentils	Kg	2
Tea	Packet	1
Rice	Kg	2
Dates	Kg	1
Price per package		PKR 5,582
Nonfood package details		
Soap	Bars	7
Shampoo	Bottle	2
Toothpaste	Pieces	2
Dish detergent	Pieces	5
Laundry detergent	Pieces	3
Toilet cleaner	Bottle	2
Price per package		PKR 5,534

Note. PKR = Pakistani Rupees.

lower anxiety ($b = -0.40$, $SE = 0.08$, $p < .001$, 95% CI $[-0.55, -0.25]$). However, the effect was not significant for task performance ($b = 0.18$, $SE = 0.10$, $p = .06$, 95% CI $[-0.01, 0.37]$), work engagement ($b = 0.24$, $SE = 0.14$, $p = .08$, 95% CI $[-0.03, 0.51]$), or OCB ($b = 0.10$, $SE = 0.11$, $p = .37$, 95% CI $[-0.12, 0.32]$). Therefore, Hypotheses 1a, 2a, and 3a were not supported.

To test the mediating effect of anxiety in the relationship between food condition (vs. nonfood condition) and work outcomes, we used bootstrapping 10,000 times to construct 95% CIs. The indirect effect was significant for both task performance ($Est = 0.10$, 95% CI $[0.03, 0.18]$) and work engagement ($Est = 0.12$, 95% CI $[0.03, 0.23]$), but not for OCB ($Est = 0.03$, 95% CI $[-0.05, 0.12]$).⁸ Therefore, Hypotheses 1b and 2b were supported, but Hypothesis 3b was not supported.

General Discussion

Across three studies with complementary research designs, we examined the relationship between food insecurity and workers' task performance, work engagement, and OCBs and the mediating effect of anxiety. The results generally supported our hypotheses that food insecurity has a negative effect on people's work outcomes due to increased anxiety. Importantly, using a field experiment, we also provided evidence that offering food aid to food-insecure workers is an effective remedy that has an indirect beneficial effect on task performance and work engagement through the mediator of anxiety. Our results have several important theoretical and practical implications that we will discuss below.

Theoretical Contributions

First, our research contributes to the applied psychology literature by highlighting an overlooked yet important issue in the workplace: food insecurity. There is an implicit assumption that food insecurity is not an issue among employed individuals, and it is not an issue in high-income countries such as the United States. Contrary to these common beliefs, the USDA reported that more than half of the food-insecure households in the United States have one or more members

employed at a full-time job (Hales, 2024b). This underscores that food insecurity is a serious issue in the workplace and warrants attention from applied psychology researchers. The present study pioneers research in this area by starting to document the detrimental effects of food insecurity on people's work and uncovering the mediating psychological mechanism of anxiety. With that, we aim to move the literature forward by raising awareness about the importance of the food insecurity issue in the workplace.

By doing so, we respond to George et al.'s (2016) call to "[tackle] societal grand challenges through management research" (p. 1880). *Zero Hunger* is at the top of the list of the United Nations' Sustainable Development Goals for 2030 (United Nations, 2015). Current efforts to alleviate food insecurity are primarily led by governmental agencies and nonprofit organizations, such as the Food and Agriculture Organization, the World Food Programme, and welfare programs in each country, such as the Supplemental Nutrition Assistance Program in the United States. However, governments and nonprofit organizations "cannot eradicate hunger alone and need more private sector involvement" (United Nations, 2021, p. 1). Our field is ideally placed in a position to influence the attitudes of current and future business leaders. By recognizing the costs of food insecurity to organizations, our research shows that investing resources into helping food-insecure employees is not just a humanitarian and ethical decision, but it also has benefits to the organization since it improves the work outcomes of employees. Thus, we hope this research will be the first step in a long journey of encouraging more research to examine how businesses can become more involved in helping their food-insecure employees.

Second, our research contributes to the theoretical understanding of food insecurity by extending its conceptual relevance beyond the public health domain (e.g., Arenas et al., 2019; Gundersen et al., 2011; Stuff et al., 2004). We demonstrated that food insecurity would not only affect individuals' personal well-being but also spill over into the workplace, exerting a negative influence on how workers function in their jobs. Moreover, through a randomized field experiment, our work not only provided high ecological validity, causal evidence of the negative effect of food insecurity on employees but also demonstrated that the distribution of food aid (vs. nonfood aid) is an effective remedy for improving the performance and engagement of food-insecure employees at work. However, interestingly, we also found that food insecurity has a weaker and less consistent negative effect on OCB. This aligns with the mixed findings and ongoing debates in the literature regarding how scarcity influences individuals' altruistic behaviors. On the one hand, some research has argued that individuals experiencing scarcity engage in more altruistic behavior (e.g., Amir et al., 2018; Piff et al., 2010), as they feel greater compassion toward others, particularly those in similar circumstances. Nonetheless, consistent with our theorizing, many other studies have also found that individuals experiencing essential resource scarcity engaged in less altruistic behaviors as they became more self-focused (e.g., He et al., 2020; Sirola, 2023; Sirola & Pitesa, 2017; Yu & Greer, 2023). While our findings largely support the latter explanation, the inconsistent

⁸ We also tested an alternative model specification with anxiety as the first-stage and work engagement as the second-stage mediator for task performance and OCB. We found the serial indirect effect is significant for task performance ($Est = 0.034$, 95% CI $[0.007, 0.070]$) and OCB ($Est = 0.022$, 95% CI $[0.001, 0.058]$).

Table 7*Descriptive Statistics and Zero-Order Correlations of Variables in Study 3*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Food condition	0.47	0.50	—								
2. Anxiety (baseline)	3.74	0.72	-.05	—							
3. Anxiety (posttest)	2.80	0.58	-.35*	.05	—						
4. Task performance (baseline)	3.49	1.01	-.03	.23*	.02	—					
5. Task performance (posttest)	3.33	0.68	.13	-.12	-.23*	.00	—				
6. Work engagement (baseline)	3.29	0.93	-.01	.44*	.04	.01	-.04	—			
7. Work engagement (posttest)	3.41	0.97	.12	-.16*	-.19*	-.09	.44*	.04	—		
8. OCB (baseline)	3.37	1.23	.01	.66*	-.04	.41*	-.14*	.36*	-.14	—	
9. OCB (posttest)	2.97	0.78	.07	-.03	-.08	.18*	.05	-.01	.23*	.04	—

Note. *N* = 196. OCB = organizational citizenship behavior.

* *p* < .05.

finding might be attributed to the effect being partially attenuated by the former mechanism. As such, we believe it will be fruitful for future research to deepen the understanding of how food insecurity influences OCB and to investigate its boundary conditions, for instance, by examining whether food-insecure workers engage in more citizenship behavior toward colleagues who face a similar challenge but less toward those who are not.

Finally, our findings also contribute to the workplace anxiety literature. Past studies have identified many situations that can induce anxiety, such as job demands, competitive environments, abusive supervision, and relationship conflict (Dawson et al., 2016; De Dreu & Weingart, 2003; Farh & Chen, 2014; Sprigg et al., 2007). However, the extant literature in applied psychology has overlooked stressors that are unique to workers who are struggling to earn a livable wage and cannot even meet their most basic physiological needs. By investigating the effects of food insecurity, our work complements an emerging stream of research in broadening the understanding of workplace anxiety to include factors that predominantly affect economically disadvantaged workers (e.g., He et al., 2020; Meuris & Leana, 2018; Sayre, 2023; Spoelma et al., 2024). This is particularly important given that, whereas organizations frequently implement policies to address other workplace concerns, such as mental health programs (Hafenbrack, 2017; Vuori et al., 2012), food insecurity remains unacknowledged, leaving food-insecure employees without formal support from their organization. By integrating food insecurity into the domain of applied psychology, our work highlights the need to reconceptualize the boundaries of workplace-relevant stressors and to recognize that basic needs

insecurity is not peripheral, but central, to understanding employee performance. In sum, the metapoint is for employers to step back and ask whether employees' basic needs are being met, perhaps before engaging in often more popular programs to meet higher level needs (e.g., meditation programs, employee resource groups).

Practical Implications

Organizations have increasingly been called upon to tackle societal grand challenges (George et al., 2016; Sonenshein, 2016; Walsh et al., 2003). With their economic power, they have the capacity to supplement governments and nonprofits in tackling societal issues (den Hond & de Bakker, 2007; Moir, 2001). However, a key barrier is the perception of illegitimacy, as many businesses adopt a shareholder-centric view, epitomized by Friedman's (1970) assertion that "the social responsibility of business is to increase its profits." To overcome this barrier, issue-selling researchers suggest reframing social issues as business opportunities to gain support from organizational leaders (Sonenshein, 2006). Food insecurity represents one such societal challenge that has largely been overlooked by businesses, likely because it is framed as a purely social issue rather than one with direct relevance to organizations. By documenting the detrimental effects of food insecurity on employees' work outcomes, our research aims to make a compelling case highlighting the business rationale for addressing this issue (Dutton & Ashford, 1993; Sonenshein, 2006, 2016).

Moreover, guided by the findings of our field experiment, which showed that food aid is an effective intervention that can enhance the

Table 8*Regression and Mediation Analyses of Study 3*

Variable	Model 1				Model 2		
	Task performance	Work engagement	OCB	Anxiety	Task performance	Work engagement	OCB
Food condition	0.18	0.24	0.10	-.40*	0.08	0.12	0.07
Controls							
Baseline dependent variables	0.04	0.08	0.05	-0.001	0.04	0.08	0.05
Meditation							
Anxiety					-.025*	-.029*	-.008
Indirect effect					0.10 [0.03, 0.18]	0.12 [0.03, 0.23]	0.03 [-0.05, 0.12]

Note. *N* = 196. The 95% confidence intervals for the indirect effects were generated using 10,000 times bootstrapping and are in brackets. OCB = organizational citizenship behavior.

* *p* < .05.

work outcomes of food-insecure employees via reduced anxiety, we propose several policies that organizations could consider implementing. First, it would be ideal if the organization could provide free food to all food-insecure employees. If this is not possible due to financial constraints, we also encourage organizations to offer discounted food to food-insecure employees. This can be achieved by negotiating discounts with local grocery stores through bulk purchasing, which allows the organization to buy food at a lower price. By passing on these cost savings to employees, organizations can help food-insecure employees access more food and improve their work outcomes with little cost to the organization itself.

Second, organizations can collaborate with local food banks and establish on-site food pantries that are accessible to employees experiencing food insecurity. Organizations can also set up a community garden at the workplace that allows employees to grow their own fruits and vegetables. However, if space is limited, organizations can at least educate employees about accessing the Supplemental Nutrition Assistance Program or other equivalent welfare programs and the locations of local food banks (for U.S. locations, see Food Research & Action Center, 2024). These food banks are typically operated by nonprofit organizations and provide food free of charge to those in need, so this again helps organizations and their employees with minimal costs to the organization itself.

Third, and relatedly, organizations can provide free transportation for food-insecure employees to food banks. This is particularly important for offices that are located within or near food deserts, that is, neighborhoods and communities where the majority population has limited access to fresh foods due to the lack of supermarkets and large grocery stores in the area (Dutko et al., 2012). People living in food deserts tend to have limited access to public transit or private vehicles. This service can significantly reduce the burden on food-insecure employees and ensure they have reliable access to food.

Limitations and Future Directions

Our research, while robust in its multimethod design and sampling in two countries, is not without its limitations. First, in Study 3, we only found that the indirect effects, but not the direct effects, of food insecurity on work outcomes were significant. We can only speculate why this may have been the case. It is possible that the effects were not pronounced because the study was conducted in a developing country where people face a wider range of anxiety-inducing factors (e.g., lack of social security, higher crime rates), meaning that food insecurity accounts for a smaller proportion of the overall variance in anxiety. Since our intervention specifically targets alleviating food insecurity, its impact on broader anxiety may be more limited in this context. We further acknowledge that while our intervention—providing a single bundle of food—was effective, it may not have been powerful enough to reduce food insecurity substantially, given the high levels experienced by our participants. Future research could explore the number of food packages needed to have a more substantial impact on work outcomes.

Second, another limitation is the reliance on self-reported methods in our studies, which may raise concerns about common method bias (Podsakoff et al., 2003). That said, we would like to highlight some factors that may mitigate this concern. First, in Study 3, the independent variable was manipulated through an intervention rather than self-rated, thereby reducing the risk of same-source bias. The within-person design of Study 2 also partly

addresses same-source bias by eliminating any potential between-person confounding effects, such as social desirability and general response tendencies. Additionally, prior research suggests that self-reported and other-reported performance tends to be correlated (Heidemeier & Moser, 2009), and previous studies have used self-reported task performance (e.g., Barnes et al., 2023; Fu et al., 2021; Guarana et al., 2021; Lanaj et al., 2021; Scott et al., 2025), especially when using manipulated independent variables rather than self-reported independent variables. Moreover, one recent article showed that the results were the same with self-reported performance as with other-reported performance (Guarana et al., 2021). Nevertheless, we acknowledge that using other reports could be a way to improve future research examining this topic.

Third, the NGO we partnered with in Study 3 primarily distributes food aid, and the nonfood intervention was developed solely for the purposes of this study. We understand that there may be concerns about potential bias if participants in the nonfood condition expected to receive food items but instead received nonfood items, and we acknowledge this as a limitation of our study. However, we believe it is ultimately a reasonable trade-off to use an active control group rather than a passive no-treatment control group, as it helps mitigate the Hawthorne effect and strengthens the validity of our findings.

Last, the present study focused solely on task performance, work engagement, and OCBs. However, we acknowledge that food insecurity could have adverse effects on other work-relevant outcomes as well. For example, food insecurity might have a negative impact on turnover. It could also affect absenteeism since people with food insecurity tend to have more health issues (Gundersen & Ziliak, 2015; Seligman et al., 2010; Stuff et al., 2004). Additionally, while we believe anxiety is the primary mediating mechanism based on reinforcement sensitivity theory, we also encourage future research to explore other mechanisms—such as negative affect or regulatory focus—to develop a more comprehensive understanding of the nomological network of how food insecurity affects employees.

Conclusion

Food insecurity is an important societal issue that affects billions of people in the world, with *Zero Hunger* being one of the United Nations 2030 Sustainable Development Goals (United Nations, 2015). Despite a substantial amount of workers being food insecure (Hales, 2024b; Waxman et al., 2022), this issue has been overlooked by past applied psychology research because of the implicit assumption that workers have access to sufficient food. In a series of three studies, the present research documented the adverse effects of food insecurity and further demonstrated that providing food aid to food-insecure employees is an effective intervention. We hope our research will attract more attention to the issue of food insecurity and encourage further research into studying how businesses can be more engaged in supporting their food-insecure employees, which, in turn, benefits the businesses themselves.

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