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Assessment of Caretaker Resources and Motivation in the Wean-to-Market Phase of Swine Production

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ASSESSMENT OF CARETAKER RESOURCES AND MOTIVATION IN THE WEAN-TO-MARKET PHASE OF SWINE PRODUCTION

by

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ABSTRACT

This study is a novel application of I/O Psychology principles to the U.S. swine industry. The Swine Health Information Center (SHIC) recently identified caretaker motivation related to compliance with biosecurity behaviors as a priority needing to be better understood. This exploratory study seeks to identify if there is indeed a worker motivation issue within the industry that is impacting compliance with biosecurity, and if so, establish both a baseline of motivation and a better understanding of the primary influencing factors. Using the Theory of Planned Behavior and the Job Demands/Resources Model of Burnout as a framework, an online survey was developed using items, adapted or in original form, from previous research and established measures. A total of 139 caretakers from five pork production companies participated in the survey and form the study's sample population. Results suggest the swine industry's problem with biosecurity compliance is not a motivationally driven issue, but findings were unable to provide evidence supporting a conclusive determination. Results for attitude (TPB) and job resources (JD-R) suggest further investigation into the rewards, supervisor support, and performance feedback categories of job resources could be promising avenues for continuing to explore what drives biosecurity non-compliance. Valuable insight was obtained about the swine industry and the caretaker role, and results are promising for improving quality of data collected as the research continues applying I/O theories and models to the swine industry for the purpose of investigating worker resources and attitudes. Continuing this research will help one of the largest industries in the United States to better understand the interactions and motivations behind worker attitudes and perceptions towards biosecurity adherence and to enhance positive outcomes for employees, farms, and consumers.

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CHAPTER 1: INTRODUCTION

This study is a novel application of I/O Psychology principles to the U.S. swine industry. The Swine Health Information Center (SHIC) recently identified caretaker motivation related to compliance with biosecurity behaviors as a priority needing to be better understood. This is significant given that swine industry experts who participated in this study had no knowledge of any previous employee-focused research, and the industry's heavy focus on production and operations likely contributed to the study primary finding few previous research related to this topic and field. SHIC is an organization which finances research beneficial to the swine industry using U.S. Pork Checkoff funds, a national program that collects $0.35 per $100 of swine product sold for promotion, research, and education purposes (The National Pork Board, 2024). This exploratory study seeks to identify if there is indeed a worker motivation issue impacting compliance with biosecurity, and if so, establish both a baseline of motivation and a better understanding of the primary influencing factors. Doing so will provide needed insight into the role and perspective of a caretaker operating in the U.S. swine industry and establish a foundation for future research. This is an issue the field of I/O psychology can address, as motivation related to work has been and continues to be a top priority for the I/O psychology field.

Swine Industry Background

Biosecurity is a priority for the swine industry since raising pigs today is done on a much larger scale, with larger herd sizes and multiple herds located on purpose-designed farms being the new norm. The industry operates in a very different way than it did several decades ago, when the

primary producers were mostly family farms engaged in multiple types of agricultural production. At the time, producing a diversity of crop and animal products allowed them to meet more swine production needs internally, but it also limited overall swine production capabilities due to time and resources being allocated towards producing the other goods. Swine production now is more consolidated and specialized, and it is typically separated into phases, such as the wean-to-harvest phase on which this study focuses. Just as farms have become consolidated and specialized for the specific phase of production they support, so has the industry which supports this large-scale production. Typically, everything required in the process is now externally sourced (animal feed, disposal of manure, genetic material, etc.) in quantities supporting numerous farms and requiring transportation to reach individual farms. Farms often hire third-party contractors for animal care, manure removal, livestock feed delivery, and to complete other vital functions. The benefit of operating in such a manner has been a substantial increase in production capabilities, but a cost has been the increased risk of a disease outbreak and the need to prioritize biosecurity. This is because the people, vehicles, machinery, supplies delivered, or anything which crosses the boundary and enters the farm's premise is a potential pathogen-carrying agent, or a potential source that a pathogen could use to enter a farm (Baker et al., 2017).

Transitioning to an open-production system has required the swine industry to increase the prioritization of addressing biosecurity concerns. The exposure risk to pathogen-carrying agents has risen greatly as farms are now dependent on outside sources for vital functions (Baker et al., 2017). The potential economic harm of a disease outbreak is now much greater as disease transmission has become easier through the increased movement of individual pigs between herds, by having multiple herds on the same farm, and by using contracted services visiting multiple farms (Amass & Clark, 1999). An assessment of the economic impact to U.S. pork producers

caused by the porcine reproductive and respiratory syndrome virus (PRRSV) by Holtkamp et al. (2013) estimated annual losses from this single virus to be around $664 million. Today, biosecurity research is a major priority of the industry, and a significant avenue of research has focused on biosecurity control measures meant to assist pork producers. Biosecurity control measures are measures focused on either reducing the risk of a disease outbreak or preventing the spread of pathogens during an active outbreak (Alarcon et al., 2021). Today, pork producers have a variety of empirically supported biosecurity control measures to select from when developing their biosecurity system (Moore et al., 2008).

Biosecurity control measures can be subdivided into 1., measures that involve people (administrative measures) and 2., measures that don't involve people (engineered measures). While most biosecurity control measures have some element of both, nearly all biosecurity control measures implemented by the U.S. swine industry rely heavily on people as they tend to be less expensive and require lower capital investments than engineered measures. To be effective, administrative biosecurity control measures must be performed consistently and properly by all personnel. The continuance of disease outbreaks experienced by the industry indicates there is a gap in biosecurity control measure effectiveness found between what is supported by research and the actual outcomes experienced by pork producers using control measures in applied settings. The reliance on workers to perform biosecurity control measures argues that this gap could plausibly be the result of a worker-issue. A study by Kovach & Pavlovic (2021) evaluated factors and processes related to carcass removal in order to determine how contamination can spread. A primary factor influencing the spread of contamination was found to be worker adherence to proper protocols. A study by Racicot et al. (2012), found workers on chicken farms would routinely violate biosecurity controls. These are not single instances of failure either, but systematic, as pork

producers typically adopt a swiss-cheese approach to biosecurity, where multiple control measures are used to prevent any single breakdown in biosecurity from allowing an outbreak to occur. Indeed, when an outbreak does occur, the current established and SHIC-endorsed method of conducting an outbreak investigation immediately looks to identify two things: 1. the entry event where the active pathogen physically entered the farm premises, and 2. the three failures which must have occurred to expose the herd to the active pathogen (Holtkamp, n.d.). These three failures begin with the first, where a pathogen-carrying agent is contaminated or infected with a transmissible pathogen. The second failure is when the pathogen-carrying agent remains contaminated or infected, and the third failure is the exposure of an animal(s) to the contaminated/infected pathogen-carrying agent. This demonstrates the criticality of swine production workers when it comes to maintaining biosecurity and implies that workers not following biosecurity protocols is a plausible source of a significant portion of disease outbreaks experienced by pork producers. In a review of pig farm biosecurity, Alarcon et al. (2021) implied that understanding the perspective of caretakers could be fruitful and recommended that future research collaboration with other scientific fields such as psychology could be beneficial. Pastrana-Camacho et al. (2023) demonstrated the value of collaboration in a study which explored how pig slaughterhouse workers' attitude and knowledge related to the human-animal relationship, defined by the American Veterinary Medical Association (1998) as a "mutually beneficial and dynamic relationship between people and animals that is influenced by behaviors considered essential to the health and well-being of both". Tallet (2018) found the human-animal relationship mattered because it modulates animal health and welfare, productivity, work quality, and job satisfaction. Pastrana-Camacho et al. (2023) developed four profiles of pig slaughterhouse workers, including identifying four attitude-related factors which define the relationship, for the

purpose of developing improved industry strategies promoting/improving human-pig relationships.

While resources are sometimes devoted to developing standard operating procedures and training personnel on the proper execution of bioexclusion and biocontainment control measures, very little work has been done to understand the motivations and barriers that determine whether personnel will consistently perform them. The most relevant study found was an application of the TPB by Petrea (2001) to explore factors driving motivation in pork producers regarding PPE use designed for respiratory protection. This research gap is acknowledged in SHIC's 2023 call for research, Wean-to-Harvest Biosecurity Research Program Research Priority: *Personnel biocontainment and bioexclusion – Compare implementation and compliance incentives and/or rewards and their successes, shortcomings, or adoption barriers across sites or systems to help understand worker motivation to consistently execute biocontainment and/or bioexclusion protocols* (SHIC, 2023).

Purpose of Study

Responding to the call, the objective of this study is to determine if the described problem with biosecurity compliance is a motivationally driven worker issue. This will be accomplished by assessing motivation, relevant factors, and potential barriers related to wean-to-harvest caretakers' compliance with bioexclusion and biocontainment protocols. Several models will be applied to archival data, accessible by partnering with the consulting firm Talent Metrics, and analyses should provide critical insight into caretaker motivation and related factors. To determine if there is a worker motivation issue, the model of motivation applied will be the Theory of Planned Behavior,

or TPB (Ajzen, 1985). Assessing potential barriers influencing caretaker motivation and behavior, and to provide insight using other constructs of interest, will be accomplished by applying the Job Demands-Resources, or JD-R (Demerouti et al., 2001). The results will help the industry identify the source of this worker issue, insight into the motivation for biosecurity compliance perceived by caretakers, and improved understanding of how the balance of demands and resources experienced on the job is influencing both motivation and burnout.

CHAPTER 2: MOTIVATION

Motivation related to work continues to be a priority in the field of Industrial Organizational Psychology (Kanfer et al., 2017). A popular avenue of research, introduced by Heckhausen & Kuhl (1985), is based on the perspective that motivation is the result of two interdependent cognitive subsystems, one system responsible for goal selection and the other responsible for goal enactment. Together, the systems help individuals to decide which goals to pursue and how to best obtain them from within the constraints of a finite pool of cognitive resources available, and along with environmental pressures. Collectively, the theories associated with this perspective are called "process-oriented theories of motivation", and one result is that they have provided a more detailed and complex understanding of work motivation as a resource allocation process (Kanfer et al., 2017).

Theory of Planned Behavior

One model of motivation falling under the umbrella of process-oriented theories is the Theory of Planned Behavior, also known by the acronym TPB (Ajzen, 1985). Building upon the Theory of Reasoned Action (Ajzen & Fishbein, 1980), it was developed to predict motivation to engage with behaviors in situations where the decision to engage is not fully controlled by the worker. This is appropriate as the caretakers of interest in this study are technically required to engage with biosecurity behaviors as a requirement of their position, but there is a lack of oversight and enforcement mechanisms. The TPB follows the idea that behavioral achievement can be predicted by motivation, measured as *intentions*, and ability, measured as *perceived behavioral control*.

Intentions

The primary factor of measuring motivation is *intentions*, and it is understood that stronger behavioral intentions increase the likelihood of actually engaging in a behavior. It is assumed that intentions capture the relevant factors influencing behavior, and they act as a measurable indicator of the amount of effort a person is willing to designate to the performance of the behavior (Armitage & Conner, 2001). Three motivational factors which act as determinants of intention, and are measured within the model, are 1. attitude, 2. subjective norm, and 3. perceived behavioral control. These three factors each capture one of the three primary beliefs driving behavior as a function, behavioral, normative, and control. As noted by Ajzen (1991), the relative importance for predicting intentions held by attitude, subjective norm, and perceived behavioral control are expected to vary across behaviors and situations.

Attitude acts as a measure of the degree to which the worker perceives the behavior as favorable or unfavorable. Attitude is the result of a worker's appraisal of a behavior's worth and importance within the greater context of the job. Attitude is a result of behavioral beliefs held by an individual, and beliefs related to a behavior are formed by associations with that behavior, as initially described by Fishbein & Ajzen's (1975) expectancy-value model of attitudes.

The second motivational factor is labeled *subjective norm*, and it captures normative beliefs by measuring the intensity and direction of social pressure to perform, or not perform, the behavior. Normative beliefs are formed from concerns about the approval or disapproval of important referent individuals/groups (Ajzen, 1991). Thus, subjective norm captures the perceived social pressure from peers and organizational leadership at work as pertaining to the behavior of interest.

Perceived Behavioral Control

The third factor is *perceived behavioral control*, which acts as both a factor influencing motivation and as a moderator influencing the relationship between intention and actual behavior. Perceived behavioral control captures control beliefs, which are beliefs related to the perceived presence or absence of necessary resources and opportunities. Perceived behavioral control provides a measure of the ease or difficulty of performing the behavior as perceived by the worker; this is similar to Bandura's (1977) concept of self-efficacy, which focuses on self-judgements about an individual's ability to resolve a given situation. The higher perceived behavioral control is, the stronger it positively influences both the worker's intention to perform, and the likelihood the intention leads to action. As a measure, the predictive capability of perceived behavioral control is dependent on the accuracy of an individual's perceptions, meaning it works best for predicting engagement in behaviors that are familiar and understood. (i.e., least predictive ability for new hires unfamiliar with work behaviors).

Theory of Planned Behavior: Previous Applications

Several requirements are necessary to fully benefit from the use of the TPB. The first is that measures for intention and perceived behavioral control must be congruent with the specific behavior(s) of interest (Ajzen, 1988). This can be addressed relatively easily as the behaviors of interest relate to biosecurity. Again, biosecurity is an industry-level concept that has a shared general understanding of its purpose and value across the swine industry and above the influence

of differences in specific bioexclusion or biocontainment methods practiced between companies. This additionally allows results from data collected from a subset of farms/producers to be generalizable to the swine industry. The second requirement is having the stability of environment to limit external influences. The third is that judgements of ability are accurate representations of actual ability so that perceived behavioral control is fully utilized. Both the second and third requirement are addressed by using archival data collected from a sample of actively working caretakers familiar with the role.

The TPB has been used in a variety of industries to predict motivation to engage with a variety of work-related behaviors, and it is often utilized specifically to assess worker motivation to engage in safety-related behaviors (Kanfer et al., 2017). A study by Johnson & Hall (2004) explored factors driving motivation to engage in safe-lifting behaviors using a sample of workers who, in their jobs, were frequently engaged with manual lifting. The study found that perceived behavioral control and intention were the strongest predictors of engaging in safe-lifting behaviors, while subjective norm has a smaller, but still significant, influence on intention. In this study, attitude was not found to be predictive of safe-lifting behavior, but it did have a mediating influence on subjective norms and perceived behavioral control, meaning it indirectly was influencing both intention and behavior. Overall, the study authors concluded that their results supported the TPB as an effective model which explained safe-lifting behavior and supported the model's application to exploring factors driving other safety-related behaviors. Petrea (2001) applied the TPB to the swine industry in a focused exploratory study looking at factors driving the motivation of pork producers to use respiratory protection in confinement buildings. Although intentions did not significantly correlate with perceived behavioral control, it did positively correlate with attitude (0.42) and subjective norm (0.37). Additionally, intention correlated with

actual self-reported behavior both immediately and for some time into the future. The author concluded that the TPB provided information and insight valuable for directing future interventions.

The use of the TPB to explore factors related to motivation for compliance with safety-behaviors has not been restricted to just those aimed at protecting the worker's personal safety and health. It has also been utilized in situations where safety-behaviors are focused on protecting the recipient of a worker's labor, situations similar to how the swine industry's biosecurity behaviors are designed to protect the animals. When applied to pharmacy students for the purpose of exploring their motivation regarding patient safety, Rajiah et al. (2021) found that the student's behavior when engaging in behaviors related to patient safety were defined by their measured attitude, subjective norms, perceived behavioral control, and behavioral intentions. Additionally, they found that attitudes and perceived behavioral control measures positively correlated with the student's understanding of patient safety knowledge. A meta-analysis by Lin & Roberts (2020) reviewed 46 studies where the TPB was applied to explore factors related to motivation towards food handling safety-behaviors. Results indicated the constructs in the TPB significantly predicted intentions related to food safety-behaviors, and subjective norms was the most influential.

Current Application of TPB

For the current study, the TPB is the most appropriate model available to apply to the swine industry and the purpose of assessing caretaker motivation to engage in biosecurity procedures. This determination is based on both the design and capability of the TPB to provide the necessary data, and on the available literature demonstrating its successful application in

situations/environments like the current study.

Job Demands-Resources Model of Burnout

The Job Demands-Resources Model of Burnout, also known as the JD-R (Demerouti et al., 2001), was selected to assess how the balance of job demands and job resources experienced by caretakers on the job may act as a barrier preventing behavioral intention (motivation) from becoming realized behavior. It was selected for several reasons, the first being the model's assumption that the motivation for behavioral achievement is present, but characteristics of the job are impeding its realization. It also incorporates, as one of two processes leading to burnout, a motivation-related pathway that expresses burnout as disengagement from work. If results from the TPB support industry claims of a worker motivation issue, the JD-R can provide additional information and insight into how caretaker motivation is being influenced by the balance of demands and resources experienced on the job. If there is insufficient evidence to support the existence of a worker motivation issue, the JD-R could provide additional insight into the role of caretaker through the construct of burnout, and possibly illuminate worthwhile avenues for future research.

The publication of the JD-R (Demerouti et al., 2001) was one of the first studies to demonstrate that burnout is relevant to many industries and not limited to the human services. Burnout as defined by Maslach (1982) is a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment. Since its introduction, it has become an established model used internationally by thousands of organizations and many different industries (Bakker & Demerouti, 2017). The four components of the model are 1. job demands, 2. job resources, 3.

exhaustion, and 4. disengagement from work. Job demands are mental or physical aspects of a job associated with physiological and psychological costs. Job resources are aspects of a job which either assist in work goal achievement, reduce the costs associated with job demands, or stimulate personal growth and development. Extreme job demands act as predictors of exhaustion, whereas a lack of job resources are predictors of disengagement from work. Exhaustion and disengagement from work are the two dimensions of burnout and share their conceptualization with the Oldenburg Burnout Inventory (OLBI; Demerouti, 1999). Exhaustion is defined as a consequence of intensive physical, affective, and cognitive strain, and disengagement from work is defined as workers distancing themselves from their job and having cynical feelings and behaviors directed toward work.

Propositions of the JD-R

The JD-R model can provide critical insight into potential barriers preventing swine caretakers from acting upon motivation to engage with biosecurity behaviors, and further insight into the role of caretaker in general. Several empirically supported propositions made by the model support its inclusion in the current study. The first is that all job characterizations can be categorized as either job demands or job resources, regardless of position, organization, or industry. In the model's original publication, Demerouti et al. (2001) worked with 374 German workers as participants, employed in 21 jobs split between human services, transport operations, and manufacturing industry. The researchers found that results from the OLBI and JD-R model measurements were consistent across occupational fields. Thus, the JD-R model is generalized enough to be applicable to various organizations/industries, and adaptable enough to account for

occupational-specific factors associated with the job (e.g., Bakker & Demerouti, 2007; Bakker, 2011).

The second proposition made by the JD-R model states that job demands and resources initiate different processes towards burnout; job demands via a health-impairment process and job resources via a motivational one (Bakker & Demerouti, 2017). Either expression of burnout can act as a barrier preventing workers from transitioning intention into behavior; being in a state of exhaustion means the worker lacks the required mental and physical resources needed to act on feelings of motivation, while feeling disengaged from work negatively impacts motivation in a direct manner. A study by Bakker et al. (2003) used the JD-R model to predict future absenteeism among 214 nutrition production employees. The results indicated absence duration was best predicted by job demands, while absence frequency was best predicted by job resources. In line with the model's proposition, this indicates that the absence durations are consequences of worker health impairment, whereas absence frequency is a consequence of low motivation/organizational commitment. Importantly, this also means job resources tend to be the most important predictors of work enjoyment, motivation, and work engagement (Bakker et al., 2007; Bakker et al., 2010). Work engagement itself has been found to be an important predictor of organizational performance, and a diary study with fast-food workers by Xanthopoulou et al. (2009) found a positive relationship between daily work engagement and financial returns. For the current study though, this proposition is what will allow insight to be drawn regarding caretakers' perceived feelings of motivation, in conjunction with results from the TPB. If, for example, results from the TPB imply that caretaker motivation to comply with biosecurity behaviors is high, but that disengagement from work is also high and reported job resources are low, it would strongly suggest that the balance of demands and resources is having a strong, negative influence on the

transitioning of intention to behavior.

The JD-R model's third proposition is that job resources can buffer the negative effects of job demands. A study involving over 700 home care professionals conducted by Xanthopoulou et al. (2007) found job resources, such as autonomy and performance feedback, counteracted the relationship between burnout and job demands (e.g., patient harassment, workload, and physical demands). Essentially, home care professionals who used available job resources were better able to cope with their job demands and less likely to experience burnout. Further support is offered by Bakker et al. (2010) who found 88% of all possible interactions between utilized job demands and job resources were statistically significant, in a study involving over 12,000 employees spread across 148 organizations. This proposition also means that the workers most at risk of burnout, and experiencing the most barriers to motivated behavior, are those with high job demands and low-to-no job resources. A balance of high job resources and high job demands has been found to have the greatest positive effect on motivation, and this led to greater work engagement and improved performance (i.e., experiencing a positive effect promoting behavioral intent becoming actual behavior) (Bakker & Demerouti, 2017).

Current Application of JD-R

Data obtained with the JD-R measures can be used to assess the balance of demands and resources experienced by caretakers, which in turn can be compared with results from the TPB to determine if the balance of demands and resources is influencing the ability of caretakers to act upon feelings of motivation, and if so, how strongly, and in which direction. This will be informative both for better understanding the caretaker role in general and for guiding future

studies involving interventions. While low job resources can decrease worker motivation, increasing job resources has the capability to initiate a positive motivational process leading to better outcomes, such as increased feelings of motivation, work enjoyment, and work engagement (Salanova et al.,2010; Bakker & Demerouti, 2007; Bakker, 2011; Knight et al., 2017).

In the same way as the TPB, results from the JD-R are generalizable to the greater industry because they are measuring common characteristics of the caretaker role, rather than specific details that can vary from company to company. These characteristics are relatively consistent between companies because the role of caretaker is a consistent concept in the industry, with a generally agreed-upon understanding of how the role operates. Additionally, JD-R self-reported survey responses have been previously compared with observations made by trained observers collected at the same time, and the researchers found no significant differences between the self-reported responses and observations (Demerouti et al., 2001).

CHAPTER 3: METHOD

Participants and Procedure

This study utilized archival data procured by Talent Metrics Consulting, a management consulting firm specializing in talent selection, talent management, and organizational culture. The firm helps organizations develop strategies for sustained success by using two key components, 1. measurement (improved effectiveness of employee assessment, deeper understanding of employees, customers, and competition), and 2. Management (evidence-based, data-driven, actionable insights). Funding was fully provided by the Swine Health Information Center. Talent Metrics collected the data by partnering with SHIC and five corporate pork producers based in the Midwest, the largest of which has 1,000+ employees, over 800 farm locations, and markets more than 5.5 million hogs a year. Two producers are among the top 10 largest pork producers in the U.S. Access to the sample population of caretakers was facilitated by company management who forwarded communications from the study primaries. Data was collected using an online survey which combined measures for TPB elements (Attitude, Social Norms, Perceived Behavioral Control, Behavioral Intent, & Behavior) and JD-R elements (Job Demands, Job Resources, Exhaustion, & Disengagement from Work), and occurred between November 1st, 2023, and January 7th, 2024. The survey was opened in stages by company, and caretakers were informed the survey would be left open for two weeks. This time frame was extended by one or two weeks for all but one of the companies. To summarize, responses were recorded during a period lasting for a minimum of two weeks and a maximum of four. Participants were caretakers employed, either directly or contracted, by one of the five participating pork producers. The original invitation to participate, as well as subsequent follow ups as reminders, were forwarded to the caretakers by

organizational management through company email. A $20 VISA gift card was offered for completion of the survey as an incentive to encourage voluntary participation. A total of 139 responses were collected from caretakers between the five companies. Two companies did not provide the additional information needed to determine their response, but the response rates for the other three were found to be the following. Company A had a response rate of 24.36%, with 19 responses returned from the 78 caretakers who were invited to participate. Company B had a response rate of 16.81%, with 37 responses collected from the 220 caretakers invited to participate. Company C had a response rate of 29.44%, with 53 responses collected from the 180 caretakers invited to participate. Company D had 27 responses collected and Company E had 3 responses collected.

Measures

A single survey combining all elements included in the Theory of Planned Behavior and Job Demands-Resources Model of Burnout was utilized (see Appendix A). Items for both models used a 1-5 Likert scale, and participants were asked to select the appropriate response from the options, 1- Strongly Disagree, 2- Disagree, 3- No Opinion, 4- Agree, and 5- Strongly Agree. Survey development and distribution followed best practices for surveys as established by Dillman et al. (2014), to maximize the utility of the data collected. The demographics portion of the survey had 14 items and included both commonly used demographic items and items meant to provide additional context and insight into the experience of a caretaker. The survey, as well as all communications originating from Talent Metrics, were provided in both English and Spanish. Translations were provided by two I/O professionals, one fluent in Spanish and the other a native

speaker.

The five components of the TPB were measured using sixteen (16) items adapted from two previous studies. The first was a study by Gu & Guo (2022) which used the TPB to explore the relationship between fatigue and motivation to engage in safety-behaviors among construction industry workers. The measure used safety-behaviors in a general sense rather than specifying specific behaviors associated with safety, and changes to the items were restricted to replacing safety-behaviors with biosecurity behaviors. Items adapted from this study were two (2) items measuring attitude, four (4) items measuring social norms, four (4) items measuring perceived behavioral control, and three (3) items measuring behavioral intent. The second study was by Colemont & Van den Broucke (2008) and used the TPB to explore difference in the motivation of farmers to engage with safety-behaviors related to machinery use, animal handling, fall prevention, and pesticide use. To measure behavior, one (1) item was adapted from the items specifically addressing animal handling. It was necessary to craft two (2) additional items, with input from a swine SME, when items adaptable to the current study were exhausted. An open-ended response item was included to gather qualitative data for further insight into the TPB's behavior element. Four (4) items total were used to measure caretaker *attitude* for compliance with biosecurity behaviors. Four (4) items total were used to measure *subjective norms*. Two (2) items asked about the social pressure related to complying with biosecurity behaviors which originated from supervisors, and two (2) items asked about social pressure from coworkers. *Perceived behavioral control* was measured using four (4) items, while *behavioral intent* was measured with three (3) items. *Behavior* was measured using one (1) item with a 1-5 Likert scale option, and respondents were asked to elaborate on their option selection in an open-ended follow-up question.

A total of thirty-five (35) items were used to measure the four components of the JDR.

Items to measure the five (5) *job demand* categories and six (6*) job resource* categories were adapted from Demerouti et al. (2001). The job demand categories of 'Physical Workload' and 'Time Pressure' were measured using one (1) item each. Two (2) items were used to measure the categories of 'Contact with Livestock', 'Work Schedule Effect on Physical Health, Family, and Social Life', and 'General Physical Environment of Work (climate, lighting, noise, dust, gases, etc.)'. Job resources were measured using two (2) items for 'Performance Feedback', two (2) items for 'Rewards', two (2) items for 'Job Control', two (2) items for 'Participation in Decision Making', one (1) item for 'Job Security', and two (2) items for 'Supervisor Support'. *Exhaustion* and *disengagement from work* were measured using the items from the established Oldenburg Burnout Inventory (OLBI, 1999), with each component measured by eight (8) items.

CHAPTER 4: RESULTS

Sample Population Demographics

A total of 139 respondents participated, with 132 providing fully completed surveys. The English-version of the survey was used by 76.98% (107/139) of respondents, and the remaining 23.02% (32/139) participated using the Spanish-version. The sample population had a mean age of M = 40.5 years (SD = 11.91 years), a range between 18 and 76 years, and the 25^{th} and 75^{th} age percentiles were 31 and 49.5 years, respectively. Males represented 78.42% (109/139) of the sample, with the remaining 21.58% (30/139) of respondents selecting Female as their gender. Response options provided for the item, "What is your race/ethnicity?" were, 'American Indian or Alaskan Native', 'Asian/Pacific Islander', 'Black or African American', 'Hispanic', 'White/Caucasian', and 'Other'. A total of 137 responses were collected, and 35.77% (49/137) of the sample of caretakers identified as Hispanic, 62.04% (85/137) identified as White/Caucasian, and three respondents who selected 'Other' and responded to the prompt for clarification by identifying as American, Mexicano, or Mexicana.

The sample population included caretakers directly employed or contracted by one of the five participating pork producers. A third group was also represented and is best categorized as 'Owner of facilities and caretaker of pigs', meaning they are contracted both for the use of their property for swine production and as caretakers overseeing the animals. Caretakers directly employed by one of the pork producers represented 26.81% of the 138 respondents who selected a response. Caretakers who are contracted by one of the pork producers represented 34.06%, while caretakers who are also owners of the facilities represented 36.96% of the sample. Respondents

had the option to select an ‘Other’ option if they felt their employment status did not fit into one of the three above categories, and if chosen, respondents were prompted to clarify their employment status. Three respondents selected ‘Other’, and provided explanations describing what are likely informal working relationships (e.g., free labor, working for family).

Respondents were asked to clarify their caretaker work experience history by indicating how long they have been working in the pork industry in general, and how long they have been caring for pigs for the producer they are currently employed/contracted through. Each item provided the following selection options; ‘Less than 6 months’, ‘6 months to 1 year’, ‘1-3 years’, ‘3-5 years’, ‘5-10 years’, and ‘More than 10 years.’ For length of industry employment, both ‘Less than 6 months’ and ‘6 months to 1 year’ respectively were selected by 3.6% of respondents (5/139). Respondents with 1-3 years of industry experience represented 13.67% of the sample (19/139), while the sample proportion of respondents with 3-5 years of industry experience was 15.11% (21/139). Respondents with 5-10 years of industry experience represented 21.58% (30/139) of the sample. The largest group, comprising 42.45% (59/139) of the sample, were caretakers with more than 10 years of industry experience. When asked about their length of employment with the relevant pork producer, 137 respondents provided an answer. Caretakers with less than 6 months of company experience comprised 4.38% of the sample (6/137), while caretakers with 6 months to a year of company experience represented 6.57% (9/137). The second-most chosen option was 1-3 years of company experience, which was selected by 23.36% (32/137) of the sample. The option 3-5 years of company experience was selected by 21.17% (29/137) of respondents, while 18.25% (25/137) indicated 5-10 years of company experience. The most selected option for length of company experience was more than 10 years, with 26.28% (36/137) or respondents indicating this best describes their work experience.

Several items were included to provide further insight into the role of caretaker. The first asked how many farms the respondent oversees. Three respondents failed to provide an answer for this item. An additional 7 respondents had to be dropped as outliers, indicating that efforts to limit survey access to the specified population of interest were not entirely successful. Three outlier responses to the number of farms overseen were unusually high, and answers of 100, 2,400, and 12,000 farms overseen are likely indications of someone in a supervisor role or higher. Four respondents indicated they oversee zero farms, and they were dropped as outliers as well. This left a remaining sample size of N = 127 and a mean of M = 2.7 farms overseen (SD = 2.68). The range of farms overseen was between 1 and 24 farms, with the 25^{th} and 75^{th} percentiles being 1 farm and 4 farms, respectively.

Respondents were asked how many days per week they typically work as a caretaker. Three respondents chose not to respond, and results from the 136 collected responses indicate the mean number of days per week worked is M = 6.2 (SD = 1.4). The range of days worked was between 1 and 7 days per week, the 25^{th} percentile was 6 days, and the 75^{th} percentile was 7 days per week. When asked how many hours they worked as a caretaker on a typical day, respondents were provided with the following response options to select from: 'Less than 1 hour', '1-2 hours', '3-5 hours', '6-8 hours', '9-10 hours', '11-12 hours', and 'More than 12 hours'. One respondent chose not to respond so 138 responses were collected, and 4.35% (6/138) indicated that they work less than 1 hour per day, 24.64% (34/138) indicated they work 1-2 hours per day, 17.39% (24/138) indicated they work 3-5 hours per day, 26.09% (36/138) indicated they work 6-8 hours per day, and 23.19% (32/138) indicated they work 9-10 hours per day. The options '11-12 hours' per day and 'More than 12 hours' were each selected by three respondents. Respondents were also asked to select the best option for how much time they spend driving to and from sites on a typical

workday. The provided options were, ‘Less than 1 hour’, ‘1-2 hours’, 3-5 hours’, and ‘more than 5 hours.’ A total of 138 responses were collected and 70.29% (97/138) indicated they spend less than an hour driving on a typical workday. 25.36% (35/138) indicated they spend 1-2 hours driving, and the remaining 6 responses were selections for 3-5 hours of driving.

Three items were Yes/No questions which asked if the respondent was responsible for 1. Vaccinating pigs, 2. Loading and unloading pigs, and 3. Early pig care of weaned pigs. Results of these items indicate that 84.89% of the sample population of caretakers are responsible for vaccinating pigs, 87.77% of the sample population of caretakers are responsible for loading and unloading pigs, and 76.98% of the sample are responsible for early pig care of weaned pigs.

To obtain further insight into the role of caretaker, an open-ended response item was included which asked respondents the following, ‘In your own words, please describe your training with biosecurity procedures (training materials, how often you receive training, etc.)’. This item had a response rate of 84.17% (117/139), and responses were manually sorted into broad categories by two researchers involved in the study. While most responses fit into one of three categories, there does not appear to be any industry standard for how training related to biosecurity is provided to caretakers. The three response groups were divided between training primarily through company operation manuals, training described as a formal, annual event, and responses which can be interpreted as continuous informal training.

Theory of Planned Behavior

Initial plans for analysis of the TPB results included evaluating each component individually and evaluating the strength and direction of each factor’s (attitude, social norm, and

perceived behavioral control) relationship with motivation (behavioral intent). This is informative and provides context for understanding caretaker motivation to comply with biosecurity behaviors as directly measured by behavioral intent. Summary statistics for each component of the TPB are described below and presented in Table 1.

Attitude

Attitude was measured using four items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that higher values (4= moderate; 5= strong) represent positive, stronger attitudes, values close to the middle represent weaker positive/negative attitudes (3 = having no opinion), while lower values represent negative, stronger attitudes. Attitude had an overall mean of 3.97 (SD = 0.619). Item One, which stated it is important to follow biosecurity procedures when working, had a mean of 4.5 (SD = 0.68). Item Two, which stated they are rewarded for following biosecurity procedures, had a mean of 2.8 (SD = 1.2). One respondent did not provide a response to this item, and the most selected response was 'No Opinion', which was chosen by 30% of respondents. Item Three, which stated there are consequences for not following biosecurity procedures, had a mean of 4.1 (SD = 0.8). Item Four stated biosecurity procedures help keep the animals safe and healthy and had a mean of 4.4 (SD = 0.83).

Results for attitude indicate that overall, caretakers have a moderately favorable perception regarding the importance of complying with biosecurity procedures. Perceptions of the favorability of biosecurity compliance was strongest for items framing the importance of biosecurity in relation

to fulfilling their role and for the purpose of keeping the animals safe and healthy. The notable exception however was Item 2, which found that caretakers have a weak, negative perception of being rewarded for complying with biosecurity procedures.

Social Norms

Social Norms were measured by four items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Two items specified social norms related to supervisors, while the other two asked about coworker views. Items were scored so that higher values represent a stronger perception of social norms while lower values represent a weaker perception, and social norms are assumed to be favorable regarding biosecurity compliance so that a stronger perception can be interpreted as more influential to motivation. Social Norms had an overall mean of 3.8 (SD = 0.658). Supervisor Social Norms had an overall mean of 3.79 (SD = 0.816). The first item measuring Supervisor Social Norms, "my supervisor keeps workers informed of biosecurity rules and procedures, and explains why they are important", had a mean of 3.9 (SD = 0.85, N = 139). The second item, "my supervisor spends time showing workers how to follow biosecurity procedures correctly", had a mean of 3.7 (SD = 0.9, N = 139). Coworker Social Norms had an overall mean of 3.81 (SD = 0.743). The first item, "my coworkers follow biosecurity procedures", had a mean of 3.8 (SD = 0.82, N = 139), and 'No Opinion' represented 25.18% of responses. The second item, "my coworkers encourage others to follow biosecurity procedures", had a mean of 3.8 (SD = 0.79, N = 139), with 23.02% of respondents selecting 'No Opinion'.

Overall, results for social norms indicate caretakers perceive their supervisors and coworkers similarly as having a weak-to-moderately strong, positive perception of the compliance with biosecurity procedures. It appears that while the direction of social pressure is positive, or in favor of complying with biosecurity compliance, the intensity of the pressure is not very strong. A possible explanation could be the autonomy typical in a caretaker role, and it seems to indicate that for caretakers, social norms do not act as the most influential predictor/driver of motivation as measured by intent. Results from social norms, and how they relate to other TPB variable findings, will be explored further in the discussion section.

Perceived Behavioral Control

Perceived Behavioral Control (PBC) was measured using four items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that higher values represent positive, stronger perceptions of PBC, values close to the middle represent weaker positive/negative perceptions, while lower values represent negative, stronger perceptions of PBC. The overall mean of PBC was 3.93 (SD = 0.753). The first item, "it is easy for me to follow biosecurity procedures when I am working", had a mean of 4 (SD = 0.89, N = 139). The second item, "I am given the proper tools, equipment, and training to follow biosecurity procedures", had a mean of 4 (SD = 0.9, N = 139). The third item, "it is not easy for me to follow biosecurity procedures", had a mean of 3.9 (SD = 1.0, N = 139). The last item, "I have enough time to complete all my tasks while following biosecurity procedures", had a mean of 3.8 (SD = 0.94, N = 139).

Results from items measuring perceived behavioral control indicate that when acting as a driver of intent, caretakes have a weak-to-moderately strong, positive perception of their ability to correctly comply when engaging in biosecurity control measures. The standard deviation for each item indicates the data for perceived behavioral control collected had good response variability and supports the usefulness of these items. Perceived behavioral control's role as a moderating influence was not explored as results from correlational and factor analyses, discussed below, indicate there is insufficient validity and reliability to support any meaningful findings.

Behavioral Intent

Behavioral Intent was measured using three items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that higher values represent positive, stronger Behavioral Intentions, values close to the middle represent weaker positive/negative Behavioral Intentions, while lower values represent negative, stronger Behavioral Intentions. Behavioral Intentions had an overall mean of 4.41 (SD = 0.579). The first item, "I intend to follow biosecurity procedures while I work", had a mean of 4.4 (SD = 0.62, N = 139). The second item, "I intend to carry out tasks and activities that help improve the safety and health of the animals", had a mean of 4.5 (SD = 0.63, N = 138), and had one respondent fail to select a response. The third item had a mean of 4.4 (SD = 0.7, N = 139), and was written as, "How certain are you that you could follow biosecurity procedures correctly? Are you confident you could?"

Results from data collected measuring intentions suggest that caretaker motivation for

compliance with biosecurity control measures has a positive direction and moderate-to-strong strength. These results indicate caretakers are feeling motivated to comply with biosecurity control measures. Notable however is that the standard deviation of every item measuring behavioral intent was low (between 0.6 and 0.7), which indicates a low variability in the responses collected and that responses were highly consistent. This could be an indication that items need to be retooled to improve their utility for use with the caretaker population.

Behavior

Behavior was measured using one item where respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with the statement about themselves and their work. Written as, "I follow biosecurity procedures when I am working", the item was scored so that higher values represent higher engagement with biosecurity procedures while lower values represent lower engagement. Behavior had a mean of 4.5 (SD = 0.72, N = 139), indicating caretakers are self-reporting they comply with biosecurity control measures most of the time. While not further quantifiable, the mean for behavior landed midway between the response options for agree (= 4) and strongly agree (= 5). It is notable that the standard deviation indicates lower response variability, which means there could be better ways of wording the item used to measure behavior.

An additional open-response item was included for behavior to provide additional context, and was worded as follows, "In your own words, please explain why you chose the response you did in the previous question". This item had a response rate of 87.05% (121/139), and responses were manually sorted into broad categories by two researchers involved in the study. Responses were

primarily favorable towards biosecurity, with responses mostly mentioning animal welfare as the reason, followed by a smaller portion who view it as important due to being a job requirement. Results from the Likert-scale item measuring behavior suggested there would be several responses with negative perceptions of biosecurity, but the total number of comments which contained negative perceptions of biosecurity was 3x the number of respondents who provided a corresponding answer for behavior's Item One. Roughly 10% of the responses collected provided explanations for why the respondent does not always comply with biosecurity. The most common explanation was a lack of ability, understanding, or perceived value of biosecurity. The second most common explanation was that perfect compliance is not possible due to incompatibility with completing other tasks, environmental factors like building layout, or the believe that other workers are compromising biosecurity and making personal compliance worthless. Overall, results will be useful for formulating additional questions and retooling items for a possible follow up study.

TPB Factor Analysis Findings

A factor analysis of the results for items measuring components of the Theory of Planned Behavior did not return the expected five factors, but instead most strongly supports the items were measuring a single factor. Figure 1 presents a Scree Plot of the findings of the TPB factor analysis. The TPB had a Chi Squared Value of 383.4347, a *p* value less than 0.01, and the degrees of freedom was 104. Overall, this is indicating results are significant with high reliability for the single factor measured, but determining what factor was truly being measured is not possible with the current data available. For the purposes of this study however, results lack sufficient reliability to fully

support analyses findings and suggest that item retooling at a minimum is necessary to increase the utility of the TPB for the current application purpose.

TPB Correlational Findings

Results of a correlational analysis for the TPB found the strongest correlations between behavioral intent and perceived behavioral control ($r = 0.665$, $p < 0.01$), and between Behavioral Intent and Attitude ($r = 0.663$, $p < 0.01$). All pairing of TPB variables produced moderate, positive relationships except for behavior and social norms, which was found to have a weak, positive relationship ($r = 0.306$, $p < 0.01$). Table 2 presents a correlational matrix of TPB variables. It should be noted that results from the factor analysis found only a single factor, meaning these values are likely representing how well that one factor correlates with itself.

TPB Regression Analysis Findings

While results do not suggest regression analyses for the TPB would provide further insight, the novelty of this study supported investigating if any demographic variable measured could be acting as a moderating variable within the TPB. Additionally, results for Attitude-Item Two stand out when compared to the other three items used to measure attitude, so it was determined to be worthwhile investigating further as well. Analysis results of various multiple regressions found several variables were significant as predictors of Attitude-Item Two, suggesting potential avenues of research to pursue. Gender was the only demographic variable found to be significant as a very weak predictor of Attitude-Item Two. Participant's mean score

for job resources was also found to be significant as a weak predictor, and further investigation found this was driven by participant's mean scores for job resource categories of performance feedback and rewards.

Job Demands-Resources Model of Burnout

Initial plans for analysis of the JD-R (Demerouti et al., 2001) results called for evaluating the strength and direction of each category of Job Demand and Job Resource, determination of the balance of demands and resources experienced in the role of caretaker, evaluating if evidence exists that caretakers are experiencing burnout and if so, how it is being expressed (Exhaustion and/or Disengagement from Work), and evaluating if and how Job Demands correlates with Exhaustion and Job Resources correlates with Disengagement from Work. Results from the JD-R demonstrate how each category of Demands and Resources are contributing (strength and direction) to the overall balance of Demands/Resources. This is informative and provides improved insight into how caretakers perceive their work environment. Individual measures of each demands/resources category indicate how strongly caretakers believe that specific job characteristics impact their work, and whether it is a positive or negative impact. Analysis of results for Exhaustion and Disengagement from Work will indicate the prevalence of burnout experienced by caretakers, but establishing the intensity of burnout being experienced is not possible due to lack of an appropriate benchmark. This provides insight into how common it is for caretakers to be experiencing burnout, and how burnout is being expressed, either as exhaustion or as disengagement from work. Summary statistics for items measuring components of the JD-R are discussed below. Table 3 presents summary statistics for Job Demands by category and item,

and Table 4 presents summary statistics for Job Resources.

Job Demands

Job Demands were measured using eight items covering five categories of demands, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that higher values indicate stronger negative influences and greater mental/physical costs from caretakers, and lower scores indicate demands with less impact to caretakers. Job Demands had an overall mean score of 2.80 (SD = 0.611). The first Job Demand category is Physical Workload and was measured by one item which stated, "My work does not tax me too much physically". Physical Workload had a mean of 3.4 (SD = 1.1, N = 139), and 22.3% of respondents selected 'No Opinion'. Time Pressure, the second category of Demands, had a mean of 2.8 (SD = 0.98, N = 139) and was measured by one reversed item, which stated, "I always have enough time to perform my tasks". The third category of Demands is Demanding Contact with Livestock, which had a mean of 3.28 (SD = 0.887) and was measured by two items. The first item, "my contact with the animals I oversee is demanding", had a mean of 3.5 (SD = 1.0, N = 139). The second item, "taking care of animals is straining", had a mean of 3.1 (SD = 0.97, N = 139). The second item had 25.18% of respondents select, 'No Opinion'. Work Schedule Effect on Physical Health, Family, and Social Life is the fourth category of Demands, and it had a mean of 2.45 (SD = 0.761) as measured by two items. The first item, "it is physically taxing for me to get used to my working times", had a mean of 2.4 (SD = 0.95, N = 139), with 'No Opinion' selections representing 22.3% of responses. The second item, "I can combine my social and family

life with working life quite easily", was a reversed item and had a mean of 2.5 (SD = 0.95, N = 138). One respondent failed to select a response for this item. The fifth category of Demands is General Physical Environment of Work, which was measured by two items and had a mean of 2.38 (SD = 0.724). The first item was reversed, and said, "my physical working conditions (climate, light, noise, design of the working place, and materials) are all right". This item had a mean of 2.5 (SD = 0.96, N = 139), and 23.02% of respondents selected 'No Opinion'. The second item, "I am constantly being interrupted or disturbed at work", had a mean of 2.3 (SD = 0.92, N = 139).

Results for job demands indicate caretakers perceive the costliest demands involved in fulfilling the role of caretaker as the physical workload and the demanding contact involved with caring for animals. Perceptions for time pressure, shift work, and the physical environment at work indicate that they are demands with lower associated costs.

Job Resources

Job Resources was measured using eleven items covering six categories of resources, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that a mean closer to 5 indicates a job resource with a stronger, positive influence, means closer to 3 indicate resources with weak influence, and values closer to 1 indicate a lack of resources having a negative influence. Job Resources had an overall mean of 3.21 (SD = 0.504), indicating caretakers perceive job resources are available but have less influence. The low deviation value is notable only in that there may be a better way of wording

the items used to measure resources. The categories of Job Resources are Performance Feedback, Rewards, Job Control, Participation in Decision Making, Job Security, and Supervisor Support. Performance Feedback was measured by two items and had a mean of 3.19 (SD = 0.839). The first item, “I get enough feedback about the quality of my work performance”, had a mean of 3.2 (SD = 0.99, N = 138), with one respondent failing to select a response and ‘No Opinion’ being selected by 27.54% of respondents. The second item, “I only get feedback on my performance if it’s bad”, was a reversed item and had a mean of 3.2 (SD = 1.1, N = 139), with ‘No Opinion’ representing 23.02% of all responses. Rewards was measured by two items and had a mean of 2.79 (SD = 0.952). The first item, “my performance is rewarded properly”, had a mean of 2.7 (SD = 1.1, N = 139), and 28.78% of respondents selected ‘No Opinion’. The second item was reversed and states, “my performance at work is not fully recognized and appreciated”, with a mean of 2.9 (SD = 1.1, N = 139) and ‘No Opinion’ selections making up 28.06% of responses. Job Control was measured with three items and had an overall mean of 3.41 (SD = 0.672). The first item, “I can decide for myself how I manage my workload”, had a mean of 3.7 (SD = 0.91, N = 138) and had one respondent fail to select a response. The second item was reversed and stated, “I do not get to decide for myself when I complete my tasks”, with a mean of 3.6 (SD = 0.96, N = 139). The third item, “I am involved in decisions that go beyond my immediate area of work”, had a mean of 2.9 (SD = 1.1, N = 139), and had 26.62% of all responses be ‘No Opinion’. Participation in Decision Making had a mean of 3 (SD = 1.1, N = 139) and was measured by one reversed item, “only the management decides what everybody has to do”. ‘No Opinion’ was selected by 23.02% of respondents. Job Security had a mean of 3.1 (SD = 1.0, N = 139) and was measured by one item, “the threat of losing this job is very low”. Respondents who selected ‘No Opinion’ represented 35.25% of all responses. Supervisor Support had a mean of 3.5 (SD = 0.727) and was measured

by two items. The first was reversed and stated, “my supervisor keeps distance from their employees”, with a mean of 3.3 (SD = 0.92, N = 139), with ‘No Opinion’ responses making up 33.09% of total responses. The second item, “my supervisor offers adequate support for me to complete my tasks”, had a mean of 3.7 (SD = 0.96, N = 139). ‘No Opinion’ was selected by 23.02% of respondents. See Table 3 at the bottom of the document for the full summary statistics related to overall Job Resources, resource categories, and individual items.

Results from the analysis of items measuring job resources indicate that the most influential resource available to caretakers is supervisor support, with job control being a close second. These two resource categories also had the least response variability out of all resources, and results from the factor analysis (discussed below) do not fully support the reliability of the items used to measure supervisor support and job control. Importantly, the only resource negatively perceived by caretakers, either because of insufficient access or influence, was rewards.

Demands/Resources Factor Analysis Findings

A factor analysis of items measuring Job Demands and Job Resources found evidence supporting two factors, with a Chi Squared value of 222.6, a p value < 0.01, and 134 degrees of freedom. Figure 2 presents a scree plot of the Job Demands/ Resources factor analysis results. Factor loadings for job demands largely support the reliability of the items used in the measure, with all demands primarily loading to the correct factor. It should be noted that three items measuring two demands between them also had weak, negative loadings for the second factor. One item measured the physical workload demand, and the other two items measured the general physical environment of work demand. This is suggestive that there is an additional variable at

work which is influencing how caretakers responded to these items, but determining that variable is outside the scope of the current study. The reliability of items measuring job resources are weak-to-moderately supported by results from the factor analysis. However, individual item loadings suggest some issue(s) is consistently interfering across items measuring job resources, and improvements to the measure are required. All items measuring performance feedback, rewards, and participation in decision making, as well as Item 2 of job control, had moderate, positive loadings in the correct factor, but also weak, negative loadings in the wrong factor. Item 1 of job control failed to load at all on the correct factor and instead has a weak, negative loading on the wrong one. Job security weakly loaded on both factors, but its negative loading in the wrong factor was slightly greater. Item 3 for job control and both items for supervisor support loaded weakly but correctly. Table 5 presents the full results of the factor analysis of Job Demands and Resources.

Exhaustion

Exhaustion was measured using eight items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored so that lower values indicate higher levels of Burnout, as expressed through Exhaustion, and higher scores indicate lower levels of Burnout and Exhaustion. Exhaustion had an overall mean of 3.3 (SD = 0.611). Three items had individual mean scores lower than the overall mean, which more strongly indicates the presence of Exhaustion. The first, Item One, was a reversed item stating there are days when the respondent feels tired before arriving at work and had a mean of 2.4 (SD = 0.89, N = 139) with 20% of respondents selecting, ‘No Opinion’. Item Six was a reversed item which

stated that the respondent feels worn out and weary after work and had a mean of 3.0 (SD = 1.0, N = 138). One respondent did not provide a response for this item, and 27.54% of responses were, 'No Opinion'. The last item with an individual mean lower than the overall mean was Item Two, which was also a reversed item and stated that after work, the respondent tends to need more time than in the past to relax and feel better. This item had a mean of 3.1 (SD = 1.1, N = 139) with 'No Opinion' selected by 20% of respondents. Item Three stated the respondent can tolerate the pressures of their work very well and had a mean of 3.9 (SD = 0.82, N = 138), and one respondent failed to select an option. Item Four was reversed, and stated the respondent feels emotionally drained during their work. This item had a mean of 3.3 (SD = 1.0, N = 139), and the option, 'No Opinion', represented 24.5% of responses. Item Five stated that the respondent has enough energy for their leisure activities after working and had a mean of 3.3 (SD = 1.0, N = 139). Item Seven stated the respondent can usually manage the amount of their work well and had a mean of 4.0 (SD = 0.68, N = 139). Item Eight stated that when the respondent works, they usually feel energized, and had a mean of 3.5 (SD = 0.94, N = 138). One respondent failed to provide a response to Item Eight, and 22.5% of respondents selected, 'No Opinion'. Table 6 presents the full summary statistics for items measuring Exhaustion and Disengagement from Work. Results generally support the presence of experiencing burnout as expressed through exhaustion among caretakers.

Disengagement From Work

Disengagement From Work was measured using eight items, and respondents were asked to select the appropriate response option (1- Strongly Disagree, …, 5- Strongly Agree) to indicate their level of agreement with each statement about themselves and their work. Items were scored

so that lower values indicate higher levels of Burnout, as expressed through Disengagement from Work, and higher scores indicate lower levels. Disengagement From Work had an overall mean score of 3.28 (SD = 0.567). Three items had individual means lower than the overall mean, indicating these were items more strongly associated with experiencing disengagement from work. Item Five was a reversed item which stated that over time, a person could become disconnected from this type of work. Item Five had a mean of 2.5 (SD = 0.95, N = 139), and 22.3% of respondents chose, 'No Opinion'. Item Seven stated that this is the only type of work the respondent can imagine themselves doing and had a mean of 2.6 (SD = 1.1, N = 139), and 23.74% of respondents selected, 'No Opinion'. Item Three was reversed, and stated that lately, the respondent tends to think less at work and do their job almost mechanically. Item Three had a mean of 3.1 (SD = 1.1, N = 139), and 'No Opinion' was selected by 22.3% of respondents. All other item means were above the overall mean for disengagement from work. The largest mean, or item least associated with experiencing disengagement from work, was Item One which stated the respondent always finds new and interesting aspects in their work and had a mean of 3.8 (SD = 0.87, N = 138). One respondent failed to provide a response to this item. Item Two was a reversed item which stated, "It happens more and more often that I talk about my work in a negative way" and had a mean of 3.5 (SD = 1.0, N = 139). Item Four stated the respondent finds their work to be a positive challenge and had a mean of 3.7 (SD = 0.81, N = 139). The option 'No Opinion' was selected by 23.74% of respondents for Items Two and Four. Item Six was a reversed item which stated the respondent sometimes feels sickened by their work tasks and had a mean of 3.3 (SD = 1.0, N = 139). Item Eight stated the respondent feels more and more engaged in their work and had a mean of 3.6 (SD = 0.84, N = 139). Item Eight had 26.62% or respondents select 'No Opinion'. Table 6 presents the full summary statistics for items measuring Exhaustion and

Disengagement from Work. Overall, results for items measuring disengagement generally support that burnout expressed as disengagement from work is being experienced by caretakers.

Exhaustion & Disengagement Factor Analysis Findings

A factor analysis of the sixteen items included in the Oldenburg Burnout Inventory found results which modestly support the OLBI as a 2-factor model. The analysis found a Chi Squared value of 116.06, a *p* value = 0.029, and 89 degrees of freedom. Figure 3 presents a scree plot of the factor analysis results for Exhaustion and Disengagement from Work, the two components of the OLBI measure. Factor loadings indicate there were issues with the OLBI's application as all but three items, Items Five and Seven for exhaustion and Item One for disengagement from work, loaded on both factors to some extent. For exhaustion, Items One, Two, Three, and Four had moderately positive loadings in the correct factor and weak, positive loadings in the wrong one. Item Three and Item Seven showed only weak, positive loadings. The strongest was Item Six which strongly, positively loaded in the correct factor but also weakly, negatively loaded in the second. Item 8 had a moderate, positive loading in both factors, but was slightly stronger in the wrong one. Moving to items which measured disengagement from work, all but Item Five and Item Six had primary loadings in the correct factor, but also had weak, positive loadings in the other. Items Five and Six both had stronger loadings in the wrong factor, and Items Three and Seven had weak, positive loadings. Table 7 presents the full results of the Exhaustion and Disengagement from Work factor analysis findings.

JD-R Correlational Findings

Results from a correlational analysis of data measuring JD-R variables did not support the model's proposition that job demands have a positive relationship with exhaustion and job resources have a negative relationship with disengagement from work. Table 8 presents a correlation matrix of job demands and resources. Job demands had moderate, negative relationships with both exhaustion and disengagement from work, while job resources had weak, positive relationships with exhaustion and disengagement from work.

JD-R Regression Analyses Findings

Similar to the TPB, results from the JD-R do not suggest regression analyses would provide further insight, but it was deemed worthwhile for the purpose of investigating if any demographic variable measured could be acting as a moderating variable within the model. No significant results were found for regressions using demographic data to predict JD-R variable mean scores. Additionally, results from items measuring job demand categories physical workload and demanding contact with animals stand out as the strongest demands when compared to the other demand categories, so it was determined to be worthwhile investigating further as well. However, no significant results were found to suggest any demographic variable is a predictor for either category of demand. Finally, the categories of rewards and supervisor support within job resources were also determined to be worth investigating further as they are the lowest and highest rated category of job resources, respectively. Length of time working in the swine industry was found to be significant as a weak predictor of supervisor support, which suggests a potential path of investigation for future research.

CHAPTER 5: DISCUSSION

Results from the TPB model (Ajzen, 1985) do not support the existence of a worker motivation issue in the swine industry, but reliability issues prevent the study's findings from conclusively rejecting motivation as an influential variable driving the problem with biosecurity compliance. Perceived behavioral control and attitude appear to be the most influential drivers of behavioral intent, but the results of the factor analysis do not substantiate this. Since measures for the TPB variables did not perform as expected and instead measured a single factor, and because determining what that factor was is not possible with the given data, there is no way to determine if the TPB model is supported or not in this study.

Results from the JD-R model (Demerouti et al., 2001) provided insight into the balance of demands and resources experienced by caretakers working in the swine industry. Specific insights can be drawn to provide greater understanding of what the caretaker role experiences for use by pork production management. Results however did not support the model, specifically the model's proposition that job demands positively relate to burnout through exhaustion and that job resources negatively relate to burnout through disengagement from work. Results for the OLBI did not align with available research but may still be of use as a baseline for comparison in future research.

While reliability issues do restrict what meaningful conclusions can be drawn from the results, this novel study was successful in providing critical insight into the swine industry and the role of caretaker. Understanding what methods, models, measures, and items worked as excepted, and which did not, is valuable for improving future quality of data collected, and will be used in a redesigned version of this study, or for future research relevant to the topic and field.

Limitations/ Future Considerations

The methodology of this study relied on a single measure for collecting all necessary data in a single session, meaning results are vulnerable to mono-method bias with no method for determining how much variance mono-method bias may be responsible for (Spector et al., 2019). Future studies will need to include an additional method of collecting data appropriate for the specific measure used, as Spector et al. (2019) concluded that accounting for method variance is better accomplished by focusing on individual measures as opposed to overall methodology. There are several other implications related to the single method used in the study.

The single method used in the study prevents determining and accounting for bias introduced through impression management, or the conscious attempt to inflate positive attributes and ignore/reduce negative ones (Paulhus, 1984) to either avoid consequences or receive rewards (Baumeister, 1982). Access to the study sample was only possible through cooperation with the management of each pork producer, and all communication had to be routed from the researcher through management to the caretakers. While necessary, it also likely undermined the separation between researcher and employer and failed to prevent the perceived connection between survey items and consequences (Podsakoff et al., 2012). Bias related to impression management and employment very likely influenced TPB results especially.

Evidence of careless responding was found in the data collected, but the limited sample size prevented analyses from being able to account for this bias as removing even a few respondents prevented the findings from being significant. Research indicates that increases to survey length can increase careless responding bias (Bowling et al., 2021), as can including respondents with insufficient motivation to respond truthfully (Bowling et al., 2016). Bowling et

al. (2021) found evidence supporting careless response bias can be minimized by the inclusion of a warning message in the survey. Including a warning message is recommended for future research.

Additional insights for addressing these issues and improving the quality of data collected in future research can be drawn from the experiences of MTurk and Prolific, two organizations which pays respondents and then sells the collected data for use in online survey research. While survey use remains a cost-effective method of gathering information in research, noted issues with data collected by MTurk and Prolific illustrates there are commonalities in the issues found using surveys, but that there is no one-size-fits-all solution, and each use of a survey must be tailored for the situation, environment, and audience. One of the most significant criticisms of data repositories such as MTurk and Prolific, according to Barends & de Vries (2019), is the concern that a significant portion of participants are only motivated by the financial incentive, and thus do not provide high quality data by responding truthfully. Barends & de Vries asserted that past studies typically found 10% of the respondents accessed through MTurk did not pass inserted attention check questions, and their study found the proportion to be 15%. This is relevant for two reasons, the first being a recommendation for including attention check items in future studies using survey measures. While it is not possible to fully eliminate noncompliant responses, this will provide a method of determining and removing poor-quality responses and improve the accuracy of results. Additionally, it suggests that a larger sample size is necessary for future studies, as this study's population was not sufficiently large enough to adjust for the removal of noncompliant responses.

APPENDIX A: FIGURES

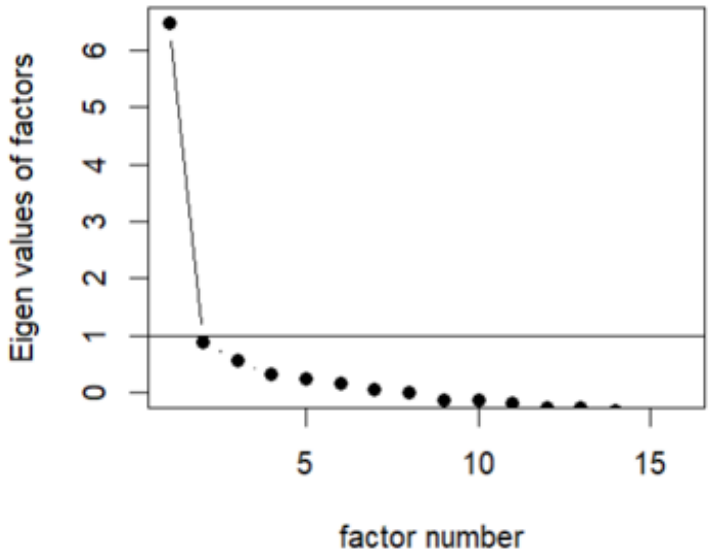

Figure 1: Scree Plot of TPB Factor Analysis

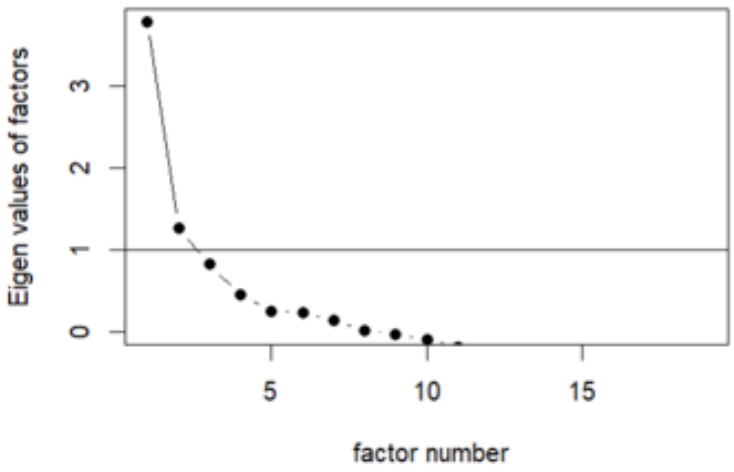

Figure 2: Scree Plot of Demands/Resources Factor Analysis

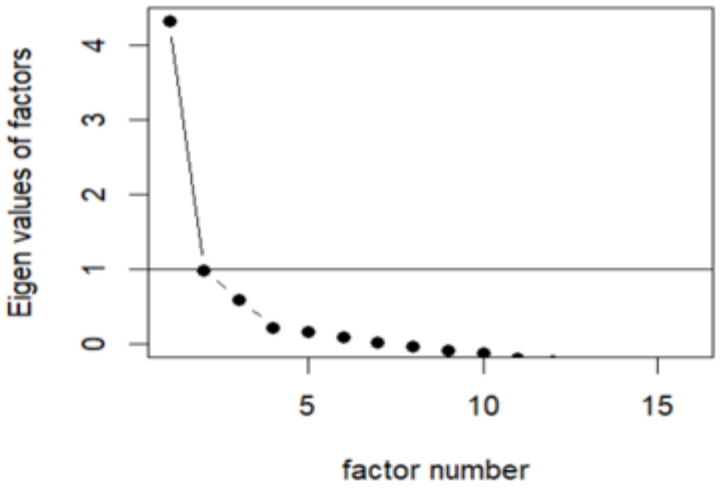

Figure 3: Scree Plot of Exhaustion & Disengagement from Work Factor Analysis

APPENDIX B: TABLES

Table 1

Summary Statistics of TPB

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Attitude (Combined)	139	3.97	0.619	1.5	3.75	4.25	5
Item 1	139	4.5	0.68	2	4	5	5
Item 2	139	2.8	1.2	1	2	4	5
Item 3	139	4.1	0.8	1	4	5	5
Item 4	139	4.4	0.83	1	4	5	5
Social Norms (Combined)	139	3.80	0.658	2	3.5	4	5
Item 1	139	3.9	0.85	1	4	4	5
Item 2	139	3.7	0.9	1	3	4	5
Item 3	139	3.8	0.82	2	3	4	5
Item 4	139	3.8	0.79	2	3	4	5
Perceived Behavioral Control (Combined)	139	3.93	0.753	1	3.5	4.5	5
Item 1	139	4	0.89	1	4	5	5
Item 2	139	4	0.9	1	4	5	5

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Item 3	139	3.9	1	1	4	5	5
Item 4	139	3.8	0.94	1	3	4	5
Behavioral Intent (Combined)	139	4.41	0.579	3	4	5	5
Item 1	139	4.4	0.62	2	4	5	5
Item 2	138	4.5	0.63	2	4	5	5
Item 3	139	4.4	0.7	1	4	5	5
Behavior	139	4.5	0.72	1	4	5	5

Table 2

TPB Correlation Matrix

Measure	Cronbach's Alpha	Attitude	Social Norms	Perceived Behavioral Control	Behavioral Intent	Behavior
1. Attitude	0.68	1.000	0.469	0.602	0.663	0.581
2. Social Norms	0.81		1.000	0.549	0.498	0.306
3. Perceived Behavioral Control	0.84			1.000	0.665	0.523
4. Behavioral Intent	0.89				1.000	0.619
5. Behavior						1.000

Note. All correlations significant with $p < 0.01$, N = 139

Table 3

Summary Statistics of Job Demands

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Job Demands (Combined)	139	2.8	0.611	1.38	2.375	3.125	4.38
Physical Workload	139	3.4	1.1	1	2	4	5
Time Pressure	139	2.8	0.98	1	2	4	5
Demanding Contact w/ Livestock (Combined)	139	3.28	0.887	1	2.75	4	5
Demanding Contact w/ Livestock – Item 1	139	3.5	1	1	3	4	5
Demanding Contact w/ Livestock – Item 2	139	3.1	0.97	1	2	4	5
Work Schedule Effect on Physical Health, Family, & Social Life (Combined)	139	2.45	0.761	1	2	3	5
Work Schedule Effect on Physical Health, Family, & Social Life –	139	2.4	0.95	1	2	3	5

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Item 1							
Work Schedule Effect on Physical Health, Family, & Social Life – Item 2	138	2.5	0.95	1	2	3	5
General Physical Environment of Work (Combined)	139	2.38	0.724	1	2	3	5
General Physical Environment of Work – Item 1	139	2.5	0.96	1	2	3	5
General Physical Environment of Work – Item 2	139	2.3	0.92	1	2	3	5

Table 4

Summary Statistics of Job Resources

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Job Resources (Combined)	139	3.21	0.504	1.45	2.91	3.55	4.27
Performance Feedback (Combined)	139	3.19	0.839	1	2.75	4	4.5
Performance Feedback – Item 1	138	3.2	0.99	1	3	4	5
Performance Feedback – Item 2	139	3.2	1.1	1	2	4	5:
Rewards (Combined)	139	2.79	0.952	1	2	3.5	5
Rewards – Item 1	139	2.7	1.1	1	2	4	5
Rewards – Item 2	139	2.9	1.1	1	2	4	5
Job Control (Combined)	139	3.41	0.672	1	3	4	5
Job Control – Item 1	138	3.7	0.91	1	4	4	5
Job Control –	139	3.6	0.96	1	3	4	5

Item 2							
Job Control – Item 3	139	2.9	1.1	1	2	4	5
Participation in Decision Making	139	3	1.1	1	2	4	5
Job Security	139	3.1	1	1	2	4	5
Supervisor Support (Combined)	139	3.5	0.727	1.5	3	4	5
Supervisor Support – Item 1	139	3.3	0.92	1	3	4	5
Supervisor Support – Item 2	139	3.7	0.96	1	3	4	5

Table 5

JD-R Factor Loadings by Item

JD-R Factor Loadings		
Item	**Factor 1**	**Factor 2**
Physical Workload- Item 1	*0.535*	*-0.149*
Time Pressure- Item 1	*0.619*	
Demanding Contact w/ Livestock- Item 1	*0.684*	
Demanding Contact w/ Livestock- Item 2	*0.768*	
Work Schedule Effect on Physical Health, Family, and Social Life - Item 1	*0.43*	
Work Schedule Effect on Physical Health, Family, and Social Life - Item 2	*0.48*	
General Physical Environment of Work- Item 1	*0.448*	*-0.148*
General Physical Environment of Work- Item 2	*0.373*	*-0.291*
Performance Feedback- Item 1	*-0.145*	*0.501*
Performance Feedback- Item 2	*-0.279*	*0.619*
Rewards- Item 1	*-0.274*	*0.786*
Rewards- Item 2	*-0.231*	*0.667*
Job Control- Item 1	*-0.372*	
Job Control- Item 2	*-0.325*	*0.321*
Job Control- Item 3		*0.199*
Participation in Decision Making- Item 1	*-0.111*	*0.461*
Job Security- Item 2	*-0.212*	*0.101*
Supervisor Support- Item 1		*0.137*
Supervisor Support- Item 2		*0.191*

Note. $\chi 2 = 222.6$, $p < 0.01$, d.f = 134, N = 139

Table 6

Summary Statistics of Exhaustion & Disengagement from Work

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Exhaustion	139	3.3	0.611	1.25	3	3.75	4.75
Item 1	139	2.4	0.89	1	2	3	5
Item 2	139	3.1	1.1	1	2	4	5
Item 3	138	3.9	0.82	1	4	4	5
Item 4	139	3.3	1	1	2	4	5
Item 5	139	3.3	1	1	2	4	5
Item 6	138	3	1	1	2	4	5
Item 7	139	4	0.68	1	4	4	5
Item 8	138	3.5	0.94	1	3	4	5
Disengagement from Work	139	3.28	0.567	1.75	3	3.625	4.38
Item 1	138	3.8	0.87	1	4	4	5
Item 2	139	3.5	1	1	3	4	5
Item 3	139	3.1	1.1	1	2	4	5
Item 4	139	3.7	0.81	1	3	4	5

Variable/Item	N	Mean	SD	Min	25th PCTL	75th PCTL	Max
Item 5	139	2.5	0.95	1	2	3	5
Item 6	139	3.3	1	1	2	4	5
Item 7	139	2.6	1.1	1	2	3	5
Item 8	139	3.6	0.84	1	3	4	5

Table 7

OLBI Factor Loadings for Exhaustion & Disengagement from Work by Item

OLBI Factor Loadings		
Loadings	**Factor 1**	**Factor 2**
Exhaustion- Item 1	*0.482*	*0.246*
Exhaustion- Item 2	*0.553*	*0.223*
Exhaustion- Item 3	*0.244*	*0.171*
Exhaustion- Item 4	*0.629*	*0.318*
Exhaustion- Item 5	*0.654*	
Exhaustion- Item 6	*0.832*	*-0.101*
Exhaustion- Item 7	*0.307*	
Exhaustion- Item 8	*0.459*	*0.476*
Disengagement from Work- Item 1		*0.491*
Disengagement from Work- Item 2	*0.355*	*0.561*
Disengagement from Work- Item 3	*0.13*	*0.278*
Disengagement from Work- Item 4	*0.18*	*0.721*
Disengagement from Work- Item 5	*0.496*	*0.314*
Disengagement from Work- Item 6	*0.615*	*0.333*
Disengagement from Work- Item 7	*0.11*	*0.229*
Disengagement from Work- Item 8	*0.142*	*0.697*

Note. $\chi 2 = 116.06$, $p = 0.029$, d.f = 89, N = 139

Table 8

JD-R Correlation Matrix

Measure	Cronbach's Alpha	Job Demands	Job Resources	Exhaustion	Disengagement from Work
1. Job Demands	0.77	1.000	-0.353	-0.680	-0.502
2. Job Resources	0.7		1.000	0.382	0.414
3. Exhaustion	0.78			1.000	0.599
4. Disengagement from Work	0.73				1.000

Note. All correlations significant with $p < 0.01$, N = 139

APPENDIX C: SURVEY ITEMS

Appendix C

Survey Items by Construct Measured

ATTITUDE		
	Item 1	It is important to follow biosecurity procedures when I am working
	Item 2	I am rewarded for following biosecurity procedures
	Item 3	There are consequences if I do not follow biosecurity procedures
	Item 4	Biosecurity procedures help keep the animals safe and healthy
SOCIAL NORMS		
	Item 1	My supervisor keeps workers informed of biosecurity rules and procedures, and explains why they are important
	Item 2	My supervisor spends time showing workers how to follow biosecurity procedures correctly
	Item 3	My coworkers follow biosecurity procedures
	Item 4	My coworkers encourage others to follow biosecurity procedures
PERCIEVED BEHAVIORAL CONTROL		
	Item 1	It is easy for me to follow biosecurity procedures when I am working

	Item 2	I am given the proper tools, equipment, and training to follow biosecurity procedures
	Item 3 *(Reversed)*	It is not easy for me to follow biosecurity procedures
	Item 4	I have enough time to complete all my tasks while following biosecurity procedures
BEHAVIORAL INTENT		
	Item 1	I intend to follow biosecurity procedures while I work
	Item 2	I intend to carry out tasks and activities that help improve the safety and health of the animals
	Item 3	How certain are you that you could follow biosecurity procedures correctly? Are you confident you could?
BEHAVIOR		
	Item 1	I follow biosecurity procedures when I am working
	Item 2 *(Open-Response)*	In your own words, please explain why you chose the response you did in the previous question *(Behavior – Item 1).*
JOB DEMANDS		
	Physical Workload *(Reversed)*	My work does not tax me too much physically
	Time Pressure *(Reversed)*	I always have enough time to perform my tasks
	Contact w/ Livestock – Item	My contact with the animals I oversee is demanding

1	
Contact w/ Livestock – Item 2	Taking care of animals is straining
Work Schedule Effect – Item 1	It is physically taxing for me to get used to my working times
Work Schedule Effect – Item 2 *(Reversed)*	I can combine my social and family life with working life quite easily
Physical Environment of Work – Item 1 *(Reversed)*	My physical working conditions (climate, light, noise, design of the working place, and materials) are all right
Physical Environment of Work – Item 2	I am constantly being interrupted or disturbed at work
JOB RESOURCES	
Performance Feedback – Item 1	I get enough feedback about the quality of my work performance
Performance Feedback – Item 2 *(Reversed)*	I only get feedback on my performance if it's bad
Rewards – Item 1	My performance is rewarded properly
Rewards – Item 2 *(Reversed)*	My performance at work is not fully recognized and appreciated
Job Control – Item 1	I can decide for myself how I mange my workload
Job Control – Item 2 *(Reversed)*	I do not get to decide for myself when I complete my tasks

Job Control – Item 3	I am involved in decisions that go beyond my immediate area of work
Participation in Decision Making *(Reversed)*	Only the management decides what everybody has to do
Job Support	The threat of losing this job is very low
Supervisor Support – Item 1 *(Reversed)*	My supervisor keeps distance from their employees
Supervisor Support – Item 2	My supervisor offers adequate support for me to complete my tasks
EXHAUSTION	
Item 1 *(Reversed)*	There are days when I feel tired before I arrive at work
Item 2 *(Reversed)*	After work, I tend to need more time than in the past in order to relax and feel better
Item 3	I can tolerate the pressure of my work very well
Item 4 *(Reversed)*	During my work, I often feel emotionally drained
Item 5	After working, I have enough energy for my leisure activities
Item 6 *(Reversed)*	After my work, I usually feel worn out and weary
Item 7	Usually, I can manage the amount of my work well

	Item 8	When I work, I usually feel energized
DISENGAGEMENT FROM WORK		
	Item 1	I always find new and interesting aspects in my work
	Item 2 *(Reversed)*	It happens more and more often that I talk about my work in a negative way
	Item 3 *(Reversed)*	Lately, I tend to think less at work and do my job almost mechanically
	Item 4	I find my work to be a positive challenge
	Item 5 *(Reversed)*	Over time, a person could become disconnected from this type of work
	Item 6 *(Reversed)*	Sometimes I feel sickened by my work tasks
	Item 7	This is the only type of work that I can imagine myself doing
	Item 8	I feel more and more engaged in my work

APPENDIX D: UCF IRB LETTER

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

EXEMPTION DETERMINATION

August 29, 2023

Dear Joshua Holtkamp:

On 8/29/2023, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study
Title:	Assessment of caretaker motivation to, and barriers hindering, engage in biosecurity-compliant behaviors in the wean-to-market phase of swine production.
Investigator:	Joshua Holtkamp
IRB ID:	STUDY00005830
Funding:	None
Documents Reviewed:	• HRP - 251 J.Holtkamp, Category: Faculty Research Approval; • Appendix A - Qualtrics Survey Items.docx, Category: Survey / Questionnaire; • Appendix C - Recruitment Email.docx, Category: Recruitment Materials; • Appendix E - Gift Card Distribution Link.docx, Category: Survey / Questionnaire; • HRP-255 - Request for Exemption for J.Holtkamp, Category: IRB Protocol; • STUDY 5830 HRP 254 - Explanation Consent Form, Category: Consent Form;

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in is detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Gillian Bernal
Designated Reviewer

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